


Code of Practice for the Structural Use of Steel 2011


The Buildings Department (BD) has set up a Technical Committee (TC) to, among others, collect and consider the views and feedback from the building industry arising from the use of the Code of Practice for the Structural Use of Steel 2011 (Steel Code 2011). Taking into account the advice of the TC, the following amendments to Steel Code 2011 have been promulgated and Steel Code 2011 (2023 Edition) incorporating all these amendments has been uploaded to BD website www.bd.gov.hk:

- (a) Appendix A – November 2016;
- (b) Appendix B – May 2021; and
- (c) Appendix C – March 2023.


(YU Po-mei, Clarice)
Building Authority

Amendments to Code of Practice for the Structural Use of Steel 2011
(November 2016)

Legends:

 Revision/Addition

(3/2023)

Major amendments to the Code of Practice for the Structural Use of Steel 2011 in November 2016 included:

- (a) updating the characteristic strength of reinforcement bar from 460 N/mm^2 to 500 N/mm^2 in accordance with the latest reinforcement bar standard CS2:2012 and the parameters of characteristic resistance of headed shear stud in different grades of concrete shown in Table 10.7;
- (b) including an additional Table 12.2e on strength reduction factors for hot rolled reinforcing bars at elevated temperatures and Chinese standard GB/T 700-2006 in the Acceptable Standard List in Annex A1.1.3;
- (c) explicating the need on second-order direct analysis for members in bending and sensitive to buckling in Equation 6.14 and the term of restrained beam mentioned in Clause 8.2 for consideration of lateral torsional buckling;
- (d) standardizing the two similar terms of "oscillation" and "vibration" to the latter to remove ambiguity and tally with that in the Chinese version; and
- (e) correcting the typo errors on expression of the reduction factor in Equation 9.23 and designation of buckling curves for S460 hot-finished structural hollow section in Table 8.7.

Amendments to the Code of Practice for Structural Use of Steel 2011 (November 2016)

Item	Clause/ Annex	Current Version	Amendments	Remarks																				
1	Clause 1.1 – para. 9	Section 5 contains particular requirements and guidance for deflection control and structural dynamics including serviceability criteria for wind induced oscillation of tall buildings. The section also covers durability and protection against corrosion attack.	Section 5 contains particular requirements and guidance for deflection control and structural dynamics including serviceability criteria for wind induced vibration of tall buildings. The section also covers durability and protection against corrosion attack.	The terms “oscillation” and “vibration” are collectively read as “vibration” for consistency.																				
2	Clause 1.2.5 – para. 3	Serviceability limit states correspond to limits beyond which specified in-service criteria are no longer met. Examples are deflection , wind-induced oscillation , human-induced vibration and durability .	Serviceability limit states correspond to limits beyond which specified in-service criteria are no longer met. Examples are deflection , wind-induced vibration , human-induced vibration and durability .																					
3	Clause 2.2 - Table 2.1	<p>Table 2.1 - Limit states</p> <table border="1"> <thead> <tr> <th>Ultimate limit states (ULS)</th> <th>Serviceability limit states (SLS)</th> </tr> </thead> <tbody> <tr> <td>Strength (including general yielding, rupture, buckling and forming a mechanism)</td> <td>Deflection</td> </tr> <tr> <td>Stability against overturning, sliding, uplift and sway stability</td> <td>Vibration</td> </tr> <tr> <td>Fire resistance</td> <td>Wind induced oscillation</td> </tr> <tr> <td>Brittle fracture and fracture caused by fatigue</td> <td>Durability</td> </tr> </tbody> </table> <p>Note:- For cold-formed steel, excessive local deformation is to be assessed under ultimate limit state.</p>	Ultimate limit states (ULS)	Serviceability limit states (SLS)	Strength (including general yielding, rupture, buckling and forming a mechanism)	Deflection	Stability against overturning, sliding, uplift and sway stability	Vibration	Fire resistance	Wind induced oscillation	Brittle fracture and fracture caused by fatigue	Durability	<p>Table 2.1 - Limit states</p> <table border="1"> <thead> <tr> <th>Ultimate limit states (ULS)</th> <th>Serviceability limit states (SLS)</th> </tr> </thead> <tbody> <tr> <td>Strength (including general yielding, rupture, buckling and forming a mechanism)</td> <td>Deflection</td> </tr> <tr> <td>Stability against overturning, sliding, uplift and sway stability</td> <td>Human induced vibration</td> </tr> <tr> <td>Fire resistance</td> <td>Wind induced vibration</td> </tr> <tr> <td>Brittle fracture and fracture caused by fatigue</td> <td>Durability</td> </tr> </tbody> </table> <p>Note:- For cold-formed steel, excessive local deformation is to be assessed under ultimate limit state.</p>	Ultimate limit states (ULS)	Serviceability limit states (SLS)	Strength (including general yielding, rupture, buckling and forming a mechanism)	Deflection	Stability against overturning, sliding, uplift and sway stability	Human induced vibration	Fire resistance	Wind induced vibration	Brittle fracture and fracture caused by fatigue	Durability	The terms “Vibration” and “Wind induced oscillation” stated in Table 2.1 are amended to “Human induced vibration” and “Wind induced vibration” respectively.
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4	Clause 2.3.3 – para. 3	<p>Situations where fatigue resistance needs to be considered include the following:</p> <ul style="list-style-type: none"> • Where there are wind-induced oscillations due to aerodynamic instability. Normal fluctuations in wind loading need not be considered. • Structural members that support heavy vibratory plant or machinery. • Members that support cranes as defined in clause 13.7. • Bridge structures, which will normally be designed to a bridge design code. 	<p>Situations where fatigue resistance needs to be considered include the following:</p> <ul style="list-style-type: none"> • Where there are wind-induced vibrations due to aerodynamic instability. Normal fluctuations in wind loading need not be considered. • Structural members that support heavy vibratory plant or machinery. • Members that support cranes as defined in clause 13.7. • Bridge structures, which will normally be designed to a bridge design code. 	The terms “oscillation” and “vibration” are collectively read as “vibration” for consistency.																				
5	Clause 2.4 – para. 1	<p>SERVICEABILITY LIMIT STATES (SLS)</p> <p>Serviceability limit states consider service requirements for a structure or structural element under normally applied loads. Examples are deflection, human induced vibration, wind induced oscillation and durability. They are described in section 5.</p>	<p>SERVICEABILITY LIMIT STATES (SLS)</p> <p>Serviceability limit states consider service requirements for a structure or structural element under normally applied loads. Examples are deflection, human induced vibration, wind induced vibration and durability. They are described in section 5.</p>																					

6	Clause 5.2 - Table 5.1	Note: Exceedance of the above limit is not acceptable unless a full justification is provided. Precamber deflection can be deduced in the deflection calculation. Ponding should nevertheless be avoided in all cases. Long span structures should be checked against vibration and oscillation.	Note: Exceedance of the above limit is not acceptable unless a full justification is provided. Precamber deflection can be deduced in the deflection calculation. Ponding should nevertheless be avoided in all cases. Long span structures should be checked against vibration .	The terms “oscillation” and “vibration” are collectively read as “vibration” for consistency hence the word “oscillation” is deleted.
7	Clause 5.3	WIND-INDUCED OSCILLATION Vibration and oscillation of a structure should be limited to avoid discomfort to users and damage to contents. For special structures, including long-span bridges, large stadium roofs and chimneys, wind tunnel model tests are recommended for their wind resistant design to meet serviceability limits.	WIND-INDUCED VIBRATION Vibration of a structure should be limited to avoid discomfort to users and damage to contents. For special structures, including long-span bridges, large stadium roofs and chimneys, wind tunnel model tests are recommended for their wind resistant design to meet serviceability limits.	
8	Clause 5.3.2	Serviceability limit state The serviceability limit states on oscillation, deflection and acceleration should be checked to ensure serviceable condition for the structure.	Serviceability limit state The serviceability limit states on vibration , deflection and acceleration should be checked to ensure serviceable condition for the structure.	The terms “oscillation” and “vibration” are collectively read as “vibration” for consistency.
9	Clause 5.3.3.1	<i>Natural frequencies</i> Structural analysis programmes should be used to determine the natural frequencies of vibration of buildings and structures to mitigate excessive horizontal oscillation and vertical vibration. Empirical formulae can also be used for approximated vibration analysis of typical and regular buildings.	<i>Natural frequencies</i> Structural analysis programmes should be used to determine the natural frequencies of vibration of buildings and structures to mitigate excessive horizontal and vertical vibration . Empirical formulae can also be used for approximated vibration analysis of typical and regular buildings.	The terms “oscillation” and “vibration” are collectively read as “vibration” for consistency hence the word “oscillation” is deleted.
10	Clause 5.3.5	Serviceability criteria for communication and broadcasting towers Communication and broadcasting services demand minimal disruption to transmission. The serviceability limits for communication and broadcasting towers are selected to meet the performance specifications of antennae and other transmission devices to be mounted on those towers. Excessive oscillation and vibration of towers should be avoided. For design, reference should be made to specialist literature.	Serviceability criteria for communication and broadcasting towers Communication and broadcasting services demand minimal disruption to transmission. The serviceability limits for communication and broadcasting towers are selected to meet the performance specifications of antennae and other transmission devices to be mounted on those towers. Excessive vibration of towers should be avoided. For design, reference should be made to specialist literature.	
11	Clause 6.8.3 – equation 6.14	Member lateral-torsional and torsional buckling checks are carried out separately or alternatively by replacing M_{ox} in the above equation by the buckling resistance moment M_b in Equations 8.20 to 8.22. If moment equivalent factor m_{LT} is less than 1, both Equation 6.12 or 6.13 and Equation 6.14 are required for member resistance check. $\frac{F_c}{A_g p_y} + \frac{M_x}{M_{cx}} + \frac{M_y}{M_{cy}} = \frac{F_c}{A_g p_y} + \frac{m_{LT} [\bar{M}_x + F_c (\Delta_x + \delta_x)]}{M_b} + \frac{m_y [\bar{M}_y + F_c (\Delta_y + \delta_y)]}{M_{cy}} \leq 1 \quad (6.14)$ The equivalent uniform moment factor m_{LT} for beams and the moment equivalent factor m_y for flexural buckling can be referred to Tables 8.4 a & b and Table 8.9.	Member lateral-torsional and torsional buckling checks are carried out separately or alternatively by replacing M_{ox} in the above equation by the buckling resistance moment M_b in Equations 8.20 to 8.22. If moment equivalent factor m_{LT} is less than 1, both Equation 6.12 or 6.13 and Equation 6.14 are required for member resistance check. $\frac{F_c}{A_g p_y} + \frac{M_x}{M_{cx}} + \frac{M_y}{M_{cy}} = \frac{F_c}{A_g p_y} + \frac{m_{LT} [\bar{M}_x + F_c (\Delta_x + \delta_x)]}{M_b} + \frac{m_y [\bar{M}_y + F_c (\Delta_y + \delta_y)]}{M_{cy}} \leq 1 \quad (6.14)$ The equivalent uniform moment factor m_{LT} for beams and the moment equivalent factor m_y for flexural buckling can be referred to Tables 8.4 a & b and Table 8.9. For members in bending and sensitive to buckling, imperfection on both axes should be considered if effective length has reduction in capacity about buckling in both axes.	For second-order direct analysis, imperfections in both axes should be considered for members in bending about strong axis and sensitive to lateral torsional buckling.

12	Clause 8.2 – para.1	<p>RESTRAINED BEAMS</p> <p>Restrained beams refer to beams provided with full lateral restraint to their top flanges and with full torsional restraint at their ends. In such a case, lateral-torsional buckling should not occur before plastic moment capacity.</p>	<p>RESTRAINED BEAMS</p> <p>Restrained beams refer to beams provided with full lateral restraint to their top flanges and with nominal torsional restraint at their ends. In such a case, lateral-torsional buckling should not occur before plastic moment capacity.</p>	Torsional restraint requirement of beams at the ends to prevent lateral torsional buckling is revised from full restraint to nominal restraint																																																																																																																																																																										
13	Clause 8.7.6 - Table 8.7	<p>Table 8.7 - Designation of buckling curves for different section types</p> <table border="1"> <thead> <tr> <th rowspan="2">Type of section</th> <th rowspan="2">Maximum thickness (see note1)</th> <th colspan="2">Axis of buckling</th> </tr> <tr> <th>x-x</th> <th>y-y</th> </tr> </thead> <tbody> <tr> <td>Hot-finished structural hollow sections with steel grade > S460 or hot-finished seamless structural hollow sections</td> <td></td> <td>a₀)</td> <td>a₀)</td> </tr> <tr> <td>Hot-finished structural hollow section < grade S460</td> <td></td> <td>a)</td> <td>a)</td> </tr> <tr> <td>Cold-formed structural hollow section of longitudinal seam weld or spiral weld</td> <td></td> <td>c)</td> <td>c)</td> </tr> <tr> <td rowspan="2">Rolled I-section</td> <td>≤ 40 mm</td> <td>a)</td> <td>b)</td> </tr> <tr> <td>> 40 mm</td> <td>b)</td> <td>c)</td> </tr> <tr> <td rowspan="2">Rolled H-section</td> <td>≤ 40 mm</td> <td>b)</td> <td>c)</td> </tr> <tr> <td>> 40 mm</td> <td>c)</td> <td>d)</td> </tr> <tr> <td rowspan="2">Welded I- or H-section (see note 2)</td> <td>≤ 40 mm</td> <td>b)</td> <td>c)</td> </tr> <tr> <td>> 40 mm</td> <td>b)</td> <td>d)</td> </tr> <tr> <td rowspan="2">Rolled I-section with welded flange cover plates with 0.25 < U/B < 0.80 as shown in Figure 8.4)</td> <td>≤ 40 mm</td> <td>a)</td> <td>b)</td> </tr> <tr> <td>> 40 mm</td> <td>b)</td> <td>c)</td> </tr> <tr> <td rowspan="2">Rolled H-section with welded flange cover plates with 0.25 < U/B < 0.80 as shown in Figure 8.4)</td> <td>≤ 40 mm</td> <td>b)</td> <td>c)</td> </tr> <tr> <td>> 40 mm</td> <td>c)</td> <td>d)</td> </tr> <tr> <td rowspan="2">Rolled I or H-section with welded flange cover plates with U/B ≥ 0.80 as shown in Figure 8.4)</td> <td>≤ 40 mm</td> <td>b)</td> <td>a)</td> </tr> <tr> <td>> 40 mm</td> <td>c)</td> <td>b)</td> </tr> <tr> <td rowspan="2">Rolled I or H-section with welded flange cover plates with U/B ≤ 0.25 as shown in Figure 8.4)</td> <td>≤ 40 mm</td> <td>b)</td> <td>c)</td> </tr> <tr> <td>> 40 mm</td> <td>b)</td> <td>d)</td> </tr> <tr> <td rowspan="2">Welded box section (see note 3)</td> <td>≤ 40 mm</td> <td>b)</td> <td>b)</td> </tr> <tr> <td>> 40 mm</td> <td>c)</td> <td>c)</td> </tr> <tr> <td rowspan="2">Round, square or flat bar</td> <td>≤ 40 mm</td> <td>b)</td> <td>b)</td> </tr> <tr> <td>> 40 mm</td> <td>c)</td> <td>c)</td> </tr> <tr> <td>Rolled angle, channel or T-section Two rolled sections laced, battened or back-to-back Compound rolled sections</td> <td></td> <td colspan="2">Any axis: c)</td> </tr> </tbody> </table> <p>NOTE:</p> <ol style="list-style-type: none"> For thickness between 40mm and 50mm the value of p_c may be taken as the average of the values for thicknesses up to 40mm and over 40mm for the relevant value of p_y. 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Hot-finished structural hollow section < grade S460		a)	a)																																																																																																																																																																											
Cold-formed structural hollow section of longitudinal seam weld or spiral weld		c)	c)																																																																																																																																																																											
Rolled I-section	≤ 40 mm	a)	b)																																																																																																																																																																											
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Welded I- or H-section (see note 2)	≤ 40 mm	b)	c)																																																																																																																																																																											
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Rolled I-section with welded flange cover plates with 0.25 < U/B < 0.80 as shown in Figure 8.4)	≤ 40 mm	a)	b)																																																																																																																																																																											
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Welded box section (see note 3)	≤ 40 mm	b)	b)																																																																																																																																																																											
	> 40 mm	c)	c)																																																																																																																																																																											
Round, square or flat bar	≤ 40 mm	b)	b)																																																																																																																																																																											
	> 40 mm	c)	c)																																																																																																																																																																											
Rolled angle, channel or T-section Two rolled sections laced, battened or back-to-back Compound rolled sections		Any axis: c)																																																																																																																																																																												

14	Clause 9.3.6.1.6 – equation 9.23	<p>Bolts through packing When a bolt passes through packing with thickness t_{pa} greater than one-third of the nominal diameter d, its shear capacity P_s should be reduced by multiplying a reduction factor β_p obtained from:</p> $\beta_p = \left(\frac{9d}{8d + 3t_{pa}} \right) \leq 1.0 \quad (9.23)$ <p>For double shear connections with packing on both sides of connecting member, t_{pa} should have the same thickness; otherwise, the thicker t_{pa} should be used. This provision does not apply to preloaded bolt (friction-type) connections when working in friction, but does apply when such bolts are designed to slip into bearing.</p>	<p>Bolts through packing When a bolt passes through packing with thickness t_{pa} greater than one-third of the nominal diameter d, its shear capacity P_s should be reduced by multiplying a reduction factor β_p obtained from:</p> $\beta_p = \left(\frac{9d}{8d + 3t_{pa}} \right) \leq 1.0 \quad (9.23)$ <p>For double shear connections with packing on both sides of connecting member, t_{pa} should have the same thickness; otherwise, the thicker t_{pa} should be used. This provision does not apply to preloaded bolt (friction-type) connections when working in friction, but does apply when such bolts are designed to slip into bearing.</p>	Typo error on the upper bound of equation 9.23 in calculating the reduction factor β_p is rectified.																																																																																																																																																					
15	Clause 10.1.3	<p>Reinforcement Reinforcement shall comply with HKCC, and the characteristic strength, f_{yk}, shall not be larger than 460 N/mm². The elastic modulus shall be taken as 205 kN/mm², i.e. same as that of structural steel sections. Different types of reinforcement may be used in the same structural member.</p>	<p>Reinforcement Reinforcement shall comply with HKCC, and the characteristic strength, f_{yk}, shall not be larger than 500 N/mm². The elastic modulus shall be taken as 205 kN/mm², i.e. same as that of structural steel sections. Different types of reinforcement may be used in the same structural member.</p>	The characteristic strength of reinforcement bar is changed to 500N/mm ² to meet with the latest reinforcement bar standard CS2:2012																																																																																																																																																					
16	Clause 10.3.2.2 - Table 10.7	<p>Table 10.7 - Characteristic resistance P_k of headed shear studs in normal weight concrete</p> <table border="1"> <thead> <tr> <th colspan="2">Dimensions of headed shear stud</th> <th colspan="9">Characteristic resistance of headed shear studs P_k (kN)</th> </tr> <tr> <th colspan="2"></th> <th colspan="9">Cube compressive strength of concrete, f_{cu} (N/mm²)</th> </tr> <tr> <th>Nominal shank diameter (mm)</th> <th>Nominal height (mm)</th> <th>Minimum as-welded height (mm)</th> <th>C25</th> <th>C30</th> <th>C35</th> <th>C40</th> <th>C45</th> <th>C50</th> <th>C55</th> <th>C60</th> </tr> </thead> <tbody> <tr> <td>25</td> <td>95</td> <td>95</td> <td>111.4</td> <td>126.9</td> <td>141.7</td> <td>155.9</td> <td>169.7</td> <td>176.7</td> <td>176.7</td> <td>176.7</td> </tr> <tr> <td>22</td> <td>95</td> <td>88</td> <td>89.9</td> <td>102.4</td> <td>114.3</td> <td>125.8</td> <td>136.8</td> <td>136.8</td> <td>136.8</td> <td>136.8</td> </tr> <tr> <td>19</td> <td>95</td> <td>76</td> <td>67.1</td> <td>76.3</td> <td>85.2</td> <td>93.8</td> <td>102.1</td> <td>102.1</td> <td>102.1</td> <td>102.1</td> </tr> <tr> <td>16</td> <td>70</td> <td>64</td> <td>47.5</td> <td>54.1</td> <td>60.5</td> <td>66.5</td> <td>72.4</td> <td>72.4</td> <td>72.4</td> <td>72.4</td> </tr> </tbody> </table> <p>Note: For cube compressive strength of concrete greater than 60 N/mm², the values of P_k should be taken as those with f_{cu} and E_{cm} limiting to those of concrete grade C60.</p>	Dimensions of headed shear stud		Characteristic resistance of headed shear studs P_k (kN)											Cube compressive strength of concrete, f_{cu} (N/mm ²)									Nominal shank diameter (mm)	Nominal height (mm)	Minimum as-welded height (mm)	C25	C30	C35	C40	C45	C50	C55	C60	25	95	95	111.4	126.9	141.7	155.9	169.7	176.7	176.7	176.7	22	95	88	89.9	102.4	114.3	125.8	136.8	136.8	136.8	136.8	19	95	76	67.1	76.3	85.2	93.8	102.1	102.1	102.1	102.1	16	70	64	47.5	54.1	60.5	66.5	72.4	72.4	72.4	72.4	<p>Table 10.7 - Characteristic resistance P_k of headed shear studs in normal weight concrete</p> <table border="1"> <thead> <tr> <th colspan="2">Dimensions of headed shear stud</th> <th colspan="9">Characteristic resistance of headed shear studs P_k (kN)</th> </tr> <tr> <th colspan="2"></th> <th colspan="9">Cube compressive strength of concrete, f_{cu} (N/mm²)</th> </tr> <tr> <th>Nominal shank diameter (mm)</th> <th>Minimum as-welded height (mm)</th> <th>C25</th> <th>C30</th> <th>C35</th> <th>C40</th> <th>C45</th> <th>C50</th> <th>C55</th> <th>C60</th> </tr> </thead> <tbody> <tr> <td>25</td> <td>100</td> <td>116.1</td> <td>133.1</td> <td>147.6</td> <td>162.4</td> <td>176.7</td> <td>176.7</td> <td>176.7</td> <td>176.7</td> </tr> <tr> <td>22</td> <td>88</td> <td>89.9</td> <td>102.4</td> <td>114.3</td> <td>125.8</td> <td>136.8</td> <td>136.8</td> <td>136.8</td> <td>136.8</td> </tr> <tr> <td>19</td> <td>76</td> <td>67.1</td> <td>76.3</td> <td>85.3</td> <td>93.8</td> <td>102.1</td> <td>102.1</td> <td>102.1</td> <td>102.1</td> </tr> <tr> <td>16</td> <td>64</td> <td>47.5</td> <td>54.2</td> <td>60.5</td> <td>66.5</td> <td>72.4</td> <td>72.4</td> <td>72.4</td> <td>72.4</td> </tr> </tbody> </table> <p>Note: For cube compressive strength of concrete greater than 60 N/mm², the values of P_k should be taken as those with f_{cu} and E_{cm} limiting to those of concrete grade C60.</p>	Dimensions of headed shear stud		Characteristic resistance of headed shear studs P_k (kN)											Cube compressive strength of concrete, f_{cu} (N/mm ²)									Nominal shank diameter (mm)	Minimum as-welded height (mm)	C25	C30	C35	C40	C45	C50	C55	C60	25	100	116.1	133.1	147.6	162.4	176.7	176.7	176.7	176.7	22	88	89.9	102.4	114.3	125.8	136.8	136.8	136.8	136.8	19	76	67.1	76.3	85.3	93.8	102.1	102.1	102.1	102.1	16	64	47.5	54.2	60.5	66.5	72.4	72.4	72.4	72.4	<p>(a) The column “Nominal height” is deleted. (b) The minimum as-welded height of 25mm shank diameter shear stud is amended. (c) The corresponding characteristic resistances of headed shear stud for various concrete cube strengths are revised.</p>
Dimensions of headed shear stud		Characteristic resistance of headed shear studs P_k (kN)																																																																																																																																																							
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17	Clause 12.1	<p>DESIGN PRINCIPLES</p> <p>This section aims to provide guidance on fire resistant design in steel and composite structures which deals primarily with minimising the risk of structural collapse and restricting the spread of fire through the structure.</p> <p>The fire resistant design method is applicable to steel and composite structures with the following materials:</p> <p>Structural steel: Hot rolled steel sections with design strengths equal to or less than 460 N/mm².</p> <p>Cold formed steel sections with design strengths equal to or less than 550 N/mm².</p> <p>Concrete: Normal weight concrete with cube strengths equal to or less than 60 N/mm².</p> <p>Reinforcement: Cold worked reinforcing bars with design strengths equal to or less than 460 N/mm².</p> <p>For steel materials other than those listed above, refer to specialist design recommendations. Alternatively, passive fire protection method should be adopted.</p>	<p>DESIGN PRINCIPLES</p> <p>This section aims to provide guidance on fire resistant design in steel and composite structures which deals primarily with minimising the risk of structural collapse and restricting the spread of fire through the structure.</p> <p>The fire resistant design method is applicable to steel and composite structures with the following materials:</p> <p>Structural steel: Hot rolled steel sections with design strengths equal to or less than 460 N/mm².</p> <p>Cold formed steel sections with design strengths equal to or less than 550 N/mm².</p> <p>Concrete: Normal weight concrete with cube strengths equal to or less than 60 N/mm².</p> <p>Reinforcement: Cold worked reinforcing bars with design strengths equal to or less than 500 N/mm².</p> <p>For steel materials other than those listed above, refer to specialist design recommendations. Alternatively, passive fire protection method should be adopted.</p>	The design strength of reinforcement bar is changed to 500N/mm ² to meet the latest reinforcement bar standard CS2:2012																												
18	Clause 12.1.4 - Table 12.2e (added)	-	<p>Table 12.2e - Strength reduction factors for hot rolled reinforcing bars at elevated temperatures</p> <table border="1"> <thead> <tr> <th>Temperature (°C)</th> <th>Strength reduction factors</th> </tr> </thead> <tbody> <tr><td>20 °C</td><td>1.00</td></tr> <tr><td>100 °C</td><td>1.00</td></tr> <tr><td>200 °C</td><td>1.00</td></tr> <tr><td>300 °C</td><td>1.00</td></tr> <tr><td>400 °C</td><td>1.00</td></tr> <tr><td>500 °C</td><td>0.78</td></tr> <tr><td>600 °C</td><td>0.47</td></tr> <tr><td>700 °C</td><td>0.23</td></tr> <tr><td>800 °C</td><td>0.11</td></tr> <tr><td>900 °C</td><td>0.06</td></tr> <tr><td>1000 °C</td><td>0.04</td></tr> <tr><td>1100 °C</td><td>0.02</td></tr> <tr><td>1200 °C</td><td>0.00</td></tr> </tbody> </table>	Temperature (°C)	Strength reduction factors	20 °C	1.00	100 °C	1.00	200 °C	1.00	300 °C	1.00	400 °C	1.00	500 °C	0.78	600 °C	0.47	700 °C	0.23	800 °C	0.11	900 °C	0.06	1000 °C	0.04	1100 °C	0.02	1200 °C	0.00	A table extracted from BS EN 1992-1-2:2004 showing the strength reduction factors for hot rolled bars at elevated temperatures is added.
Temperature (°C)	Strength reduction factors																															
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19	Clause 13.2.5	<p>Serviceability issues</p> <p>The following serviceability issues shall be addressed for towers and masts:</p> <p>(a) Wind induced oscillations of antennas, structural elements and cables.</p> <p>(b) Access for maintenance of steelwork can be very difficult, therefore a high quality protective system should be specified.</p> <p>(c) Required stiffness for purpose (e.g. microwave alignment).</p> <p>(d) Access facilities for routine maintenance and inspection shall be designed to take into account of the availability and likely competence of staff trained to climb such structures but should normally include ladders fitted with a fall arrest system and regular platforms to rest and safely place work equipment.</p>	<p>Serviceability issues</p> <p>The following serviceability issues shall be addressed for towers and masts:</p> <p>(a) Wind induced vibrations of antennas, structural elements and cables.</p> <p>(b) Access for maintenance of steelwork can be very difficult, therefore a high quality protective system should be specified.</p> <p>(c) Required stiffness for purpose (e.g. microwave alignment).</p> <p>(d) Access facilities for routine maintenance and inspection shall be designed to take into account of the availability and likely competence of staff trained to climb such structures but should normally include ladders fitted with a fall arrest system and regular platforms to rest and safely place work equipment.</p>	The terms “oscillation” and “vibration” are collectively read as “vibration” for consistency.																												

20	Clause 13.2.6	<p>Design issues for steel chimneys</p> <p>In addition to the guidance given in clauses 13.2.1 to 13.2.5, special attention should be given to the following in the design of steel chimneys and flues:</p> <p>(a) Wind-excited oscillations should be considered and analyzed by aerodynamic methods. For circular chimneys the simplified method in clause 13.2.8 may be used.</p> <p>(b) Design should be in accordance with the appropriate provisions of the Code and in the acceptable references in Annex A2.1.</p> <p>(c) To control buckling in the case of a thin walled chimney with effective height to diameter ratio of less than 21 and diameter to thickness ratio of less than 130, the ultimate compressive stresses in the chimney structure arising from the three principal load combinations shall be limited to a value calculated in accordance with Table 12.2 of clause 12.1.4 which allows for reduced steel strength at elevated temperatures. If this value exceeds 140 N/mm², then a value of 140 N/mm² shall be used. The value should be reduced further for higher aspect ratios.</p>	<p>Design issues for steel chimneys</p> <p>In addition to the guidance given in clauses 13.2.1 to 13.2.5, special attention should be given to the following in the design of steel chimneys and flues:</p> <p>(a) Wind-excited vibrations should be considered and analyzed by aerodynamic methods. For circular chimneys the simplified method in clause 13.2.8 may be used.</p> <p>(b) Design should be in accordance with the appropriate provisions of the Code and in the acceptable references in Annex A2.1.</p> <p>(c) To control buckling in the case of a thin walled chimney with effective height to diameter ratio of less than 21 and diameter to thickness ratio of less than 130, the ultimate compressive stresses in the chimney structure arising from the three principal load combinations shall be limited to a value calculated in accordance with Table 12.2 of clause 12.1.4 which allows for reduced steel strength at elevated temperatures. If this value exceeds 140 N/mm², then a value of 140 N/mm² shall be used. The value should be reduced further for higher aspect ratios.</p>	<p>The terms “oscillation” and “vibration” are collectively read as “vibration” for consistency.</p>
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21	Clause 13.2.8	<p>Wind-excited oscillations of circular chimneys</p> <p>Flexible slender structures are subject to oscillations caused by cross wind and along wind action. Structures with a circular cross section, such as chimneys, oscillate more strongly across than along wind.</p> <p>The following simplified approach may be used for across wind oscillation, see also clause 5.3:</p> <p>(a) The Strouhal critical velocity V_{crit} in metres per second for the chimney is to be determined by:</p> $V_{crit} = 5 D_t f \quad (13.1)$ <p>where f (in Hz) is the natural frequency of the chimney on its foundations. This may be calculated analytically or from the following approximate formula for the case of a regular cone:</p> $f = \frac{500(3D_b - D_t) \left[\frac{W_s}{W} \right]^{\frac{1}{2}}}{h^2} \quad (13.2)$ <p>and</p> <p>h is the height of chimney (in m) D_t is the diameter at top (in m) D_b is the diameter at bottom (in m) W is the mass per metre height at top of structural shell including lining or encasing, if any (in kg) W_s is the mass per meter height at top of structural shell excluding lining (in kg)</p> <p>(b) If V_{crit} exceeds the design wind velocity in metres per second given by the following formula</p> $V = 40.4 (q)^{0.5} \quad (13.3)$ <p>where q is the design wind pressure in kN/m², severe oscillation is unlikely and no further calculation is required.</p> <p>(c) If V_{crit} is less than the design wind velocity, the tendency to oscillate C may be estimated by the following empirical formula:</p> $C = 0.6 + K \left[\frac{10 D_t^2}{W} + \frac{1.5 \Delta}{D_t} \right] \quad (13.4)$ <p>where</p> <p>Δ is the calculated deflection (in m) at the top of the chimney for unit distributed load of 1 kPa. K is 3.5 for all welded construction, 3.0 for welded with flanged and bolted joints and 2.5 for bolted and riveted or all riveted.</p> <p>(d) If C is less than 1.0, severe oscillation is unlikely. If C is between 1.0 and 1.3 the design wind pressure for the chimney should be increased by a factor C^2. If C is larger than 1.3 stabilizers or dampers should be provided to control the oscillations.</p>	<p>Wind-excited vibrations of circular chimneys</p> <p>Flexible slender structures are subject to vibrations caused by cross wind and along wind action. Structures with a circular cross section, such as chimneys, oscillate more strongly across than along wind.</p> <p>The following simplified approach may be used for across wind vibration, see also clause 5.3:</p> <p>(a) The Strouhal critical velocity V_{crit} in metres per second for the chimney is to be determined by:</p> $V_{crit} = 5 D_t f \quad (13.1)$ <p>where f (in Hz) is the natural frequency of the chimney on its foundations. This may be calculated analytically or from the following approximate formula for the case of a regular cone:</p> $f = \frac{500(3D_b - D_t) \left[\frac{W_s}{W} \right]^{\frac{1}{2}}}{h^2} \quad (13.2)$ <p>and</p> <p>h is the height of chimney (in m) D_t is the diameter at top (in m) D_b is the diameter at bottom (in m) W is the mass per metre height at top of structural shell including lining or encasing, if any (in kg) W_s is the mass per meter height at top of structural shell excluding lining (in kg)</p> <p>(b) If V_{crit} exceeds the design wind velocity in metres per second given by the following formula</p> $V = 40.4 (q)^{0.5} \quad (13.3)$ <p>where q is the design wind pressure in kN/m², severe vibration is unlikely and no further calculation is required.</p> <p>(c) If V_{crit} is less than the design wind velocity, the tendency to oscillate C may be estimated by the following empirical formula:</p> $C = 0.6 + K \left[\frac{10 D_t^2}{W} + \frac{1.5 \Delta}{D_t} \right] \quad (13.4)$ <p>where</p> <p>Δ is the calculated deflection (in m) at the top of the chimney for unit distributed load of 1 kPa. K is 3.5 for all welded construction, 3.0 for welded with flanged and bolted joints and 2.5 for bolted and riveted or all riveted.</p> <p>(d) If C is less than 1.0, severe vibration is unlikely. If C is between 1.0 and 1.3 the design wind pressure for the chimney should be increased by a factor C^2. If C is larger than 1.3 stabilizers or dampers should be provided to control the vibrations.</p>	<p>The terms “oscillation” and “vibration” are collectively read as “vibration” for consistency.</p>
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22	Clause 13.5.5	<p>Serviceability issues</p> <p>The following serviceability issues shall be addressed for long span structures:</p> <p>(a) Vibration from crowds. Refer to section 5 of the Code.</p> <p>(b) Wind induced oscillations of roof elements and cables. Fatigue may need to be checked.</p> <p>(c) Access for maintenance of roof steelwork can be very difficult therefore a high quality protective system should be specified for the steelwork.</p> <p>(d) Deflection limits for long span trusses under live and wind loads depend on circumstances. A value of span/360 may be used for preliminary design in the absence of other requirements. Significantly smaller deflection limits will be required for applications such as: aircraft hanger doors and stadia opening roofs.</p>	<p>Serviceability issues</p> <p>The following serviceability issues shall be addressed for long span structures:</p> <p>(a) Vibration from crowds. Refer to section 5 of the Code.</p> <p>(b) Wind induced vibrations of roof elements and cables. Fatigue may need to be checked.</p> <p>(c) Access for maintenance of roof steelwork can be very difficult therefore a high quality protective system should be specified for the steelwork.</p> <p>(d) Deflection limits for long span trusses under live and wind loads depend on circumstances. A value of span/360 may be used for preliminary design in the absence of other requirements. Significantly smaller deflection limits will be required for applications such as: aircraft hanger doors and stadia opening roofs.</p>	The terms “oscillation” and “vibration” are collectively read as “vibration” for consistency.
23	Paragraph 13.6.4	<p>Vibration and oscillation</p> <p>Pedestrians can be adversely affected by the dynamic behaviour of footbridges. In addition to the criteria specified in section 5 on Human-Induced Vibration, the natural frequency of a footbridge shall not be less than 3 Hz. If the natural frequency of a footbridge is less than 3 Hz which may lead to unpleasant vibration, the maximum vertical acceleration, a_v, shall be limited to an appropriate value as given in recognized design guidelines in Annex A2.3 in order to avoid unpleasant vibration.</p>	<p>Vibration</p> <p>Pedestrians can be adversely affected by the dynamic behaviour of footbridges. In addition to the criteria specified in section 5 on Human-Induced Vibration, the natural frequency of a footbridge shall not be less than 3 Hz. If the natural frequency of a footbridge is less than 3 Hz which may lead to unpleasant vibration, the maximum vertical acceleration, a_v, shall be limited to an appropriate value as given in recognized design guidelines in Annex A2.3 in order to avoid unpleasant vibration.</p>	The terms “oscillation” and “vibration” are collectively read as “vibration” for consistency hence the word “oscillation” is deleted.
24	Annex A1.1.3	<p><i>Chinese standards</i></p> <p>GB/T 247 - 1997 Rules of acceptance, package, label and certification for plate, strip and wide flat in structural steel</p> <p>GB/T 709 - 2006 Dimension, appearance, weight and tolerance of plate, strip and wide flat in hot rolled structural steel</p> <p>GB/T 1591 - 2008 High strength structural steel</p> <p>GB/T 5313 - 1985 Through thickness properties of steel plates</p> <p>YB 4104 - 2000 Steel plate for high rise building structure</p> <p>GB 50017 - 2003 Code for design of steel structures</p> <p>GB 50205 - 2001 Code for acceptance of construction quality of steel structures</p>	<p><i>Chinese standards</i></p> <p>GB/T 247 - 1997 Rules of acceptance, package, label and certification for plate, strip and wide flat in structural steel</p> <p>GB/T 700 – 2006 Carbon structural steel</p> <p>GB/T 709 - 2006 Dimension, appearance, weight and tolerance of plate, strip and wide flat in hot rolled structural steel</p> <p>GB/T 1591 - 2008 High strength structural steel</p> <p>GB/T 5313 - 1985 Through thickness properties of steel plates</p> <p>YB 4104 - 2000 Steel plate for high rise building structure</p> <p>GB 50017 - 2003 Code for design of steel structures</p> <p>GB 50205 - 2001 Code for acceptance of construction quality of steel structures</p>	The Chinese standard GB/T 700-2006 is added in the Acceptable Standard List.

Amendments to Code of Practice for the Structural Use of Steel 2011
(May 2021)

Legends:

 Amended
 Deleted

(3/2023)

Major amendments to the Code of Practice for the Structural Use of Steel 2011 in May 2021 included:

- (a) clause 1.5 – addition of a symbol λ_{eff} corresponding to the amendments to clause 8.7.9;
- (b) clause 3.1.2 – clarification on the definition of yield strength;
- (c) Table 3.9 – addition of BS EN 10268 to supersede the withdrawn BS 1449-1-1.5 & 1.11;
- (d) 3rd paragraph of clause 8.7.9 – revision of the formulas defining the effective slenderness ratios about different minor axes;
- (e) clause 11.7.5(iii) – deletion of the requirement to submit Welding Procedure Specification prior to the commencement and carrying out of welding works in cold-formed hollow sections;
- (f) Table 11.5 – elaboration of the conditions for welding cold-formed areas and adjacent materials;
- (g) clause A1 of Annex A – addition of a criterion for using the latest version of the standards listed in Annex A;
- (h) clause A1.1.5 of Annex A – addition of BS EN 10147:2000; and
- (i) clause A1.7.5 of Annex A – addition of BS EN 10268:2006.

Amendments to the Code of Practice for the Structural Use of Steel 2011 (May 2021)

Item	Current version	Amendments
1. Clause 1.5 ¹	λ_{cr} Elastic critical load factor λ_{L0} Limiting equivalent slenderness (lateral-torsional buckling)	λ_{cr} Elastic critical load factor λ_{eff} Effective slenderness ratio λ_{L0} Limiting equivalent slenderness (lateral-torsional buckling)
2. Clause 3.1.2 ²	<p>3.1.2 Design strength for normal strength steels</p> <p>The design strength, p_y, for steel is given by:</p> $p_y = \frac{Y_s}{\gamma_{m1}} \text{ but not greater than } \frac{U_s}{\gamma_{m2}}$ <p>where</p> <p>Y_s is the yield strength</p> <p>which is defined as the upper yield strength, R_{eH}, the stress at the initiation of yielding for steel materials with clearly defined yield point; or 0.2% proof stress, $R_{p0.2}$, or the stress at 0.5% total elongation, $R_{t0.5}$ for steel materials with no clearly defined yield point, whichever is smaller. In case of dispute, the 0.2% proof stress, $R_{p0.2}$, shall be adopted.</p>	<p>3.1.2 Design strength for normal strength steels</p> <p>The design strength, p_y, for steel is given by:</p> $p_y = \frac{Y_s}{\gamma_{m1}} \text{ but not greater than } \frac{U_s}{\gamma_{m2}}$ <p>where</p> <p>Y_s the yield strength is defined as :</p> <p>(a) the upper yield strength, R_{eH}, the stress at the initiation of yielding for steel materials with clearly defined yield point; or</p> <p>(b) if the yield point cannot be clearly defined, then the 0.2% proof stress, $R_{p0.2}$, or the stress at 0.5% total elongation, $R_{t0.5}$ for steel materials whichever is smaller.</p>

¹ Addition of a symbol λ_{eff} corresponding to the amendments to clause 8.7.9.

² Clarification on the definition of yield strength.

Item	Current version	Amendments																																																																								
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3. Table 3.9 ³	<p>Table 3.9 - Yield and ultimate strengths for steels supplied in accordance with various national standards</p> <table border="1"> <thead> <tr> <th>Type of steel</th> <th>Grade</th> <th>Yield strength Y_s (N/mm²)</th> <th>Tensile strength U_s (N/mm²)</th> </tr> </thead> <tbody> <tr> <td>British standard:</td> <td>S235</td> <td>235</td> <td>360</td> </tr> <tr> <td>BS EN 10025</td> <td>S275</td> <td>275</td> <td>430</td> </tr> <tr> <td>Hot rolled steel sheet of structural quality</td> <td>S355</td> <td>355</td> <td>510</td> </tr> <tr> <td>British standard:</td> <td>S220 G</td> <td>220</td> <td>300</td> </tr> <tr> <td>BS EN 10147</td> <td>S250 G</td> <td>250</td> <td>330</td> </tr> <tr> <td>Continuous hot dip zinc coated carbon steel sheet of structural quality</td> <td>S280 G</td> <td>280</td> <td>360</td> </tr> <tr> <td></td> <td>S320 G</td> <td>320</td> <td>390</td> </tr> <tr> <td></td> <td>S350 G</td> <td>350</td> <td>420</td> </tr> </tbody> </table>	Type of steel	Grade	Yield strength Y_s (N/mm ²)	Tensile strength U_s (N/mm ²)	British standard:	S235	235	360	BS EN 10025	S275	275	430	Hot rolled steel sheet of structural quality	S355	355	510	British standard:	S220 G	220	300	BS EN 10147	S250 G	250	330	Continuous hot dip zinc coated carbon steel sheet of structural quality	S280 G	280	360		S320 G	320	390		S350 G	350	420	<p>Table 3.9 - Yield and ultimate strengths for steels supplied in accordance with various national standards</p> <table border="1"> <thead> <tr> <th>Type of steel</th> <th>Grade</th> <th>Yield strength Y_s (N/mm²)</th> <th>Tensile strength U_s (N/mm²)</th> </tr> </thead> <tbody> <tr> <td>British standard:</td> <td>S235</td> <td>235</td> <td>360</td> </tr> <tr> <td>BS EN 10025</td> <td>S275</td> <td>275</td> <td>430</td> </tr> <tr> <td>Hot rolled steel sheet of structural quality</td> <td>S355</td> <td>355</td> <td>510</td> </tr> <tr> <td>British standard:</td> <td>S220 G</td> <td>220</td> <td>300</td> </tr> <tr> <td>BS EN 10147</td> <td>S250 G</td> <td>250</td> <td>330</td> </tr> <tr> <td>Continuous hot dip zinc coated carbon steel sheet of structural quality</td> <td>S280 G</td> <td>280</td> <td>360</td> </tr> <tr> <td></td> <td>S320 G</td> <td>320</td> <td>390</td> </tr> <tr> <td></td> <td>S350 G</td> <td>350</td> <td>420</td> </tr> </tbody> </table>	Type of steel	Grade	Yield strength Y_s (N/mm ²)	Tensile strength U_s (N/mm ²)	British standard:	S235	235	360	BS EN 10025	S275	275	430	Hot rolled steel sheet of structural quality	S355	355	510	British standard:	S220 G	220	300	BS EN 10147	S250 G	250	330	Continuous hot dip zinc coated carbon steel sheet of structural quality	S280 G	280	360		S320 G	320	390		S350 G	350	420
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³ Addition of BS EN 10268 to supersede the withdrawn BS 1449-1-1.5 & 1.11.

Item	Current version				Amendments				
British standard: BS EN 10149- 2 & 3 High yield strength steels for cold forming	S315 MC	315	390		British standard: S315 MC	315	390		
	S355 MC	355	430		BS EN 10149- S355 MC	355	430		
	S420 MC	420	480		2 & 3 S420 MC	420	480		
	S260 NC	260	370		High yield strength steels for cold	S260 NC	260	370	
	S315 NC	315	430		forming	S315 NC	315	430	
	S355 NC	355	470			S355 NC	355	470	
	S420 NC	420	530			S420 NC	420	530	
British standard: BS 1449-1- 1.5 & 1.11 Cold rolled steel sheet based on minimum strength	34/20	200	340		British standard: 34/20	200	340		
	37/23	230	370		BS EN 10268	37/23	230	370	
	43/25	250	430		Cold-rolled steel	43/25	250	430	
	50/35	350	500		flat products with high yield strength	50/35	350	500	
	40/30	300	400		for cold forming – Technical delivery	40/30	300	400	
	43/35	350	430		conditions	43/35	350	430	
	40F30	300	400			40F30	300	400	
Australia standard: AS 1397 Steel sheet and strip	G250	250	320		Australia standard: G250	250	320		
	G300	300	340		AS 1397	300	340		
	G350	350	420		Steel sheet and	G350	350	420	
	G450	450	480		strip	G450	450	480	
	G500	500	520			G500	500	520	
	G550	550	550			G550	550	550	

Item	Current version				Amendments			
	Chinese standard: GB 50018 Technical code of cold-formed thin- wall steel structures	Q235	205	-	Chinese standard: GB 50018 Technical code of cold-formed thin- wall steel structures	Q235	205	-
4. 3 rd paragraph of Clause 8.7.9 ⁴	<p>For web members, buckling about principal axes and axes parallel to the legs should be considered. For angle sections connected by two or more bolts, the slenderness ratio should be calculated from the larger of the actual member length and the following:</p> <p>For buckling about minor v-v axis, $\lambda = 0.35 + 0.7\lambda_v / (93.9\varepsilon)$</p> <p>For buckling about x-x axis, $\lambda = 0.5 + 0.7\lambda_x / (93.9\varepsilon)$ (8.76)</p> <p>For buckling about y-y axis, $\lambda = 0.5 + 0.7\lambda_y / (93.9\varepsilon)$</p> <p>in which $\varepsilon = \sqrt{\frac{275}{p_y}}$ and λ is the effective slenderness ratio. λ_v, λ_x and λ_y are respectively the slenderness ratios</p>				<p>For web members, buckling about principal axes and axes parallel to the legs should be considered. For angle sections connected by two or more bolts, the slenderness ratio should be calculated from the following:</p> <p>For buckling about v-v axis, $\lambda_{eff,v} = 0.35 \times 85.8\varepsilon + 0.7\lambda_v$ or λ_v whichever is larger.</p> <p>For buckling about x-x axis, $\lambda_{eff,x} = 0.5 \times 85.8\varepsilon + 0.7\lambda_x$ or λ_x whichever is larger. (8.76)</p> <p>For buckling about y-y axis, $\lambda_{eff,y} = 0.5 \times 85.8\varepsilon + 0.7\lambda_y$ or λ_y whichever is larger.</p> <p>in which $\varepsilon = \sqrt{\frac{275}{p_y}}$ and λ_{eff} is the effective slenderness ratio. λ_v, λ_x and λ_y are respectively the slenderness ratios</p>			

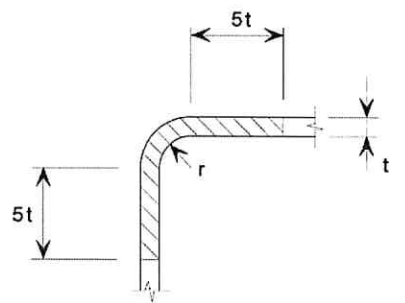
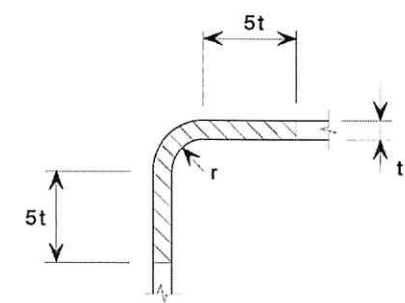
⁴ Revision of the formulas defining the effective slenderness ratios about different minor axes.

Item	Current version	Amendments
	about minor v-axis and the x- and y-axes parallel to the two legs.	about the minor v-axis, and the x- and y-axes of the angle sections .
5. Clause 11.7.5(iii) ⁵	<p>11.7.5 Welding at cold-formed zones</p> <p>Welding may be carried out within a length $5t$ either side of a cold-formed area, provided that one of the following conditions is satisfied:</p> <ul style="list-style-type: none"> (i) the cold formed areas are normalized after cold forming but before welding; (ii) the internal radius-to-thickness r/t ratio satisfies the relevant value given in Table 11.5; or (iii) the Responsible Engineer shall submit a Welding Procedure Specification (WPS) as stipulated in clause 14.3.3 for the approval of the Building Authority prior to the commencement and carrying out of welding works in cold-formed hollow sections. 	<p>11.7.5 Welding at cold-formed zones</p> <p>Welding may be carried out within a length $5t$ either side of a cold-formed area, provided that one of the following conditions is satisfied:</p> <ul style="list-style-type: none"> (a) the cold-formed areas are normalized after cold forming but before welding; (b) the internal radius-to-thickness r/t ratio satisfies the relevant value given in Table 11.5; or (c) the welding procedure shall fulfill the Welding Procedure Specification (WPS) as stipulated in clause 14.3.3.

⁵ Deletion of the requirement to submit Welding Procedure Specification prior to the commencement and carrying out of welding works in cold-formed hollow sections.

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6. Table 11.5 ⁶	<p>Table 11.5 Conditions for welding cold-formed areas and adjacent materials</p> <table border="1"> <thead> <tr> <th rowspan="3">Minimum internal radius/thickness (r/t) ratio</th> <th rowspan="3">Strain due to cold forming (%)</th> <th colspan="3">Maximum thickness (mm)</th> </tr> <tr> <th colspan="2">Generally</th> <th>Fully killed</th> </tr> <tr> <th>Predominantly static loading</th> <th>Where fatigue predominates</th> <th>Aluminium-killed steel (AL ≥ 0.02 %)</th> </tr> </thead> <tbody> <tr> <td>≥ 3.0</td> <td>≤ 14</td> <td>22</td> <td>12</td> <td>22</td> </tr> <tr> <td>≥ 2.0</td> <td>≤ 20</td> <td>12</td> <td>10</td> <td>12</td> </tr> <tr> <td>≥ 1.5</td> <td>≤ 25</td> <td>8</td> <td>8</td> <td>10</td> </tr> </tbody> </table>	Minimum internal radius/thickness (r/t) ratio	Strain due to cold forming (%)	Maximum thickness (mm)			Generally		Fully killed	Predominantly static loading	Where fatigue predominates	Aluminium-killed steel (AL ≥ 0.02 %)	≥ 3.0	≤ 14	22	12	22	≥ 2.0	≤ 20	12	10	12	≥ 1.5	≤ 25	8	8	10	<p>Table 11.5 Conditions for welding cold-formed areas and adjacent materials</p> <table border="1"> <thead> <tr> <th rowspan="3">Minimum internal radius/thickness (r/t) ratio</th> <th rowspan="3">Strain due to cold forming (%)</th> <th colspan="3">Maximum thickness (mm)</th> </tr> <tr> <th colspan="2">Generally</th> <th>Fully killed</th> </tr> <tr> <th>Predominantly static loading</th> <th>Where fatigue predominates</th> <th>Aluminium-killed steel (AL ≥ 0.02 %)</th> </tr> </thead> <tbody> <tr> <td>≥ 3.0</td> <td>≤ 14</td> <td>22</td> <td>12</td> <td>22</td> </tr> <tr> <td>≥ 2.0</td> <td>≤ 20</td> <td>12</td> <td>10</td> <td>12</td> </tr> <tr> <td>≥ 1.5</td> <td>≤ 25</td> <td>8</td> <td>8</td> <td>10</td> </tr> </tbody> </table>	Minimum internal radius/thickness (r/t) ratio	Strain due to cold forming (%)	Maximum thickness (mm)			Generally		Fully killed	Predominantly static loading	Where fatigue predominates	Aluminium-killed steel (AL ≥ 0.02 %)	≥ 3.0	≤ 14	22	12	22	≥ 2.0	≤ 20	12	10	12	≥ 1.5	≤ 25	8	8	10
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⁶ Elaboration of the conditions for welding cold-formed areas and adjacent materials.

Item	Current version					Amendments				
	≥ 1.0	≤ 33	4	4	6	≥ 1.0	≤ 33	4	4	6
										
						<p>NOTE: Cold-formed hollow sections according to BS EN 10219 which do not satisfy the limits given in Table 11.5 can be assumed to satisfy these limits if these sections have a thickness not exceeding 12.5 mm and are Aluminium-killed with a quality J2H, K2H, MH, MLH, NH or NLH as defined in BS EN 10219 and further satisfy $C \leq 0.18\%$, $P \leq 0.020\%$ and $S \leq 0.012\%$.</p> <p>In other cases welding is only permitted within a distance of $5t$ from the corners if it can be shown by tests that welding is permitted for that particular application.</p>				

Item	Current version	Amendments
7. Clause A1 of Annex A ⁷	<p>A1 ACCEPTABLE STANDARDS AND REFERENCES</p> <p>This annex contains the standards considered acceptable to the Building Authority to be used together with the Code. Where it is intended to use other standards or technical references it should be demonstrated that they can achieve a performance equivalent to the acceptable standards as specified in the Code.</p>	<p>A1 ACCEPTABLE STANDARDS AND REFERENCES</p> <p>This annex contains the standards considered acceptable to the Building Authority to be used together with the Code. Where it is intended to use other standards or technical references, or latest version of the standards given in Annex A, it should be demonstrated that they can achieve a performance equivalent to the acceptable standards as specified in the Code.</p>
8. Clause A1.1.5 of Annex A ⁸	<p>A1.1.5 UK and European standards</p> <p>BS EN 10025: 2004 Hot rolled products of non-alloy structural steels - Technical delivery conditions.</p> <p>BS EN 10164: 2004 Steel products with improved deformation properties perpendicular to the surface of the product - Technical delivery conditions.</p> <p>BS EN 10210-1: 2006 Hot finished structural hollow sections of non-alloy</p>	<p>A1.1.5 UK and European standards</p> <p>BS EN 10025: 2004 Hot rolled products of non-alloy structural steels - Technical delivery conditions.</p> <p>BS EN 10164: 2004 Steel products with improved deformation properties perpendicular to the surface of the product - Technical delivery conditions.</p> <p>BS EN 10210-1: 2006 Hot finished structural hollow sections of non-alloy</p>

⁷ Addition of a criterion for using the latest version of the standards listed in Annex A.

⁸ Addition of BS EN 10147:2000.

Item	Current version	Amendments
	<p>and fine grain structural steels. Part 1: Technical delivery requirements.</p> <p>BS EN 10248-1: 1996 Hot rolled sheet piling of non alloy steels. Part 1: Technical delivery conditions</p>	<p>and fine grain structural steels. Part 1: Technical delivery requirements.</p> <p>BS EN 10248-1: 1996 Hot rolled sheet piling of non alloy steels. Part 1: Technical delivery conditions</p> <p>BS EN 10147: 2000 Continuous hot dip zinc coated carbon steel sheet of structural quality</p>
9. Clause A1.7.5 of Annex A ⁹	<p>A1.7.5 UK, European and ISO standards</p> <p>BS 5950-7: 1992 Structural use of steelwork in building. Specification for materials and workmanship: cold formed sections</p> <p>BS EN 10149-1: 1996 Specification for hot-rolled flat products made of high yield strength steels for cold forming. Part 1: General delivery conditions</p> <p>BS EN 10149-2: 1996 Specification for hot-rolled flat products made of high yield strength steels for cold forming. Part 2: Delivery</p>	<p>A1.7.5 UK, European and ISO standards</p> <p>BS 5950-7: 1992 Structural use of steelwork in building. Specification for materials and workmanship: cold formed sections</p> <p>BS EN 10149-1: 1996 Specification for hot-rolled flat products made of high yield strength steels for cold forming. Part 1: General delivery conditions</p> <p>BS EN 10149-2: 1996 Specification for hot-rolled flat products made of high yield strength steels for cold forming. Part 2: Delivery</p>

⁹ Addition of BS EN 10268:2006.

Item	Current version	Amendments
	<p>conditions for thermomechanically rolled steels</p> <p>BS EN 10149-3: 1996 Specification for hot-rolled flat products made of high yield strength steels for cold forming. Part 3: Delivery conditions for normalized or normalized rolled steels</p> <p>BS EN 10219-1: 2006 Cold formed welded structural hollow sections of non-alloy and fine grain steels. Part 1: Technical delivery requirements</p> <p>BS EN 10249-1: 1996 Cold formed sheet piling of non alloy steels. Part 1: Technical delivery conditions</p>	<p>conditions for thermomechanically rolled steels</p> <p>BS EN 10149-3: 1996 Specification for hot-rolled flat products made of high yield strength steels for cold forming. Part 3: Delivery conditions for normalized or normalized rolled steels</p> <p>BS EN 10219-1: 2006 Cold formed welded structural hollow sections of non-alloy and fine grain steels. Part 1: Technical delivery requirements</p> <p>BS EN 10249-1: 1996 Cold formed sheet piling of non alloy steels. Part 1: Technical delivery conditions</p> <p>BS EN 10268: 2006 Cold-rolled steel flat products with high yield strength for cold forming – Technical delivery conditions</p>

Amendments to Code of Practice for the Structural Use of Steel 2011 (2021 Edition)
(March 2023)

Legends:

 Amended
 Deleted

(3/2023)

Major amendments to the Code of Practice for the Structural Use of Steel 2011 (2021 Edition) included:

- (a) clause 1.4.1 – revision of “acceptable Q A system” to “acceptable Quality Assurance system”;
- (b) clause 2.1.3 – revision relating to continuous design of high strength steels;
- (c) clause 3.1.1 and Table 3.1 – revision of general information of high strength steels;
- (d) clause 3.1.2 and Table 4.1 – revisions of material factors γ_{m1} and γ_{m2} , and the essentials of the basic requirements for various classes of steel;
- (e) Table 3.2 – revision of design strength p_y for steels supplied in accordance with BS EN standards;
- (f) Table 3.3 – revision of design strength p_y for steels supplied in accordance with Chinese standard GB50017;
- (g) clause 3.2 and Table 3.7 – revision of methodology to determine maximum element thickness for prevention of brittle fracture in accordance with EN 1993-1-10;
- (h) clause 3.3.1 – revision of limit of ultimate tensile strength for bolts;
- (i) clause 4.2.1 and Table 4.1 – revision of material factors for various classes of steel;
- (j) clause 5.5.2.1 – revision of galvanizing for high strength steels;
- (k) clause 7.1 – revision of general information of high strength steels;

/(l) ...


- (l) Table 8.3 – revision of bending strength p_b for welded sections;
- (m) Table 8.5 – revision of shear buckling strength q_w for steel sections;
- (n) Table 8.7 – revision of selection of buckling curves for different section types;
- (o) Table 8.8 – revision of design strength p_c of compression members;
- (p) clause 8.9.3 and Tables 8.10 to 8.12 – Alternative method of member buckling resistance;
- (q) Tables 9.2a & 9.2b – revision of design strength of fillet welds;
- (r) clauses 9.3.4 & 9.3.6.1.3 and Tables 9.5, 9.6 & 9.8 – revision of design parameters for bolts;
- (s) clause 11.7.3 – revision of requirements on mechanical properties;
- (t) Table 11.7.5 – revision of welding at cold-formed zones;
- (u) clause 12.1.3 – revision of fire protection for connection plates and stiffeners;
- (v) Table 14.2b – revision of hold time period before non-destructive testing of welds;
- (w) Annex A – revisions of acceptable standards and references; and
- (x) Annex D – revision of testing requirements of class 1H steel.

Amendments to Code of Practice for the Structural Use of Steel 2011 (2021 Edition) (March 2023)

Item	Current version	Amendments
1. Clause 1.1 ¹	<p>Design recommendations in Sections 7, 8 and 9 cover the use of hot rolled steel sections, flats, plates, hot finished and cold formed structural hollow sections with steel grades up to yield stresses of 460 N/mm² and allow use of yield stresses between 460 N/mm² and 690 N/mm² subject to restrictions. A new buckling curve a_0 is added for hot-finished hollow sections of design strength greater than S460 or hot-finished seamless hollow sections.</p> <p>Section 11 provides simplified guidance on the use of cold-formed thin gauge steel sections with a design yield strength up to 550 N/mm². The use of cold formed hollow sections and sheet pile sections are incorporated in this section.</p>	<p>Design recommendations in Sections 7, 8 and 9 cover the use of hot rolled steel sections, flats, plates, hot finished and cold formed structural hollow sections with steel grades up to yield stresses of 460 N/mm² and allow use of yield stresses between 460 N/mm² and 690 N/mm² subject to restrictions. ■</p> <p>Section 11 provides simplified guidance on the use of cold-formed thin gauge steel open sections and sheet profiles with a design yield strength up to 550 N/mm². The use of cold formed hollow sections and sheet pile sections are incorporated in this section.</p>
2. Clause 1.3 ²	<p>In order to provide a single consistent set of standards for steel materials and products, their workmanship and Quality Assurance procedures, such standards and procedures shall generally be defined in the Code or as given in the acceptable references in Annex A1.</p>	<p>In order to provide a single consistent set of standards for steel materials and products, their workmanship and quality assurance procedures, such standards and procedures shall generally be defined in the Code or as given in the acceptable references in Annex A1.</p>

¹ General clarification of section description.

² General clarification.

Item	Current version	Amendments
3. Clause 1.4.1 ³	<p>acceptable Q A system</p> <p>BA</p> <p>The Hong Kong Building Authority</p>	<p>acceptable Quality Assurance system</p> <p>BA</p> <p>The  Building Authority</p>
4. Clause 2.1.3 ⁴	<p>In plastic analysis, the joints should have sufficient moment capacity to justify analysis assuming plastic hinges in the members. They should also have sufficient rotational stiffness for in-plane stability.</p> <p>Stability should be properly considered in all the analyses.</p>	<p>In plastic analysis, the joints should have sufficient moment capacity to justify analysis assuming plastic hinges in the members. They should also have sufficient rotational stiffness for in-plane stability.</p> <p>Stability should be properly considered in all the analyses.</p> <p>For steel with yield strengths greater than 460 N/mm² but less than or equal to 690 N/mm², the global elastic analysis shall be adopted to design structural members while the cross section and the member resistances are determined in accordance with the cross-section classifications of the members.</p>
5. Clause 3.1.1 ⁵	<p>Class 1: Steel complying with one of the reference material standards in Annex A1.1 and basic requirements given in clause 3.1.2 and produced from a manufacturer with an acceptable Quality Assurance system.</p> <p>Class 2: Steel which has not been manufactured to one of the reference material standards in Annex A1.1 but is produced</p>	<p>Class 1: Steel complying with one of the reference material standards in Annex A1.1 and basic requirements given in clause 3.1.2 and produced from a manufacturer with an acceptable Quality Assurance system.</p> <p>Class 2: Steel which has not been manufactured to one of the reference material standards in Annex A1.1 but is produced</p>

³ General clarification of definitions.

⁴ Addition of design philosophy for Class 1H steel.

⁵ Revision of Class 1H steel in welded sections for normal use in steel structures and cold-formed steel hollow sections only.

Item	Current version	Amendments
	<p>from a manufacturer with an acceptable Quality Assurance system. Such steel shall be tested to show that it complies with one of the reference material standards in Annex A1.1 before being used. Requirements on the sampling rate for testing are given in Annex D1.</p> <p>Hot rolled steels and cold-formed structural hollow sections are covered in clause 3.1 and cold formed steel open sections and profiled sheets are covered in clause 3.8.</p> <p>Subject to additional requirements and restrictions given in clause 3.1.3, the Code covers an additional class of high strength steels with yield strengths greater than 460 N/mm² and not greater than 690 N/mm² produced under an acceptable Quality Assurance system:</p>	<p>from a manufacturer with an acceptable Quality Assurance system. Such steel shall be tested to show that it complies with one of the reference material standards in Annex A1.1 before being used. Requirements on the sampling rate for testing are given in Annex D1.</p> <p>Hot rolled steels and cold-formed structural hollow sections are covered in clause 3.1 and cold formed steel open sections and profiled sheets are covered in clause 3.8.</p> <p>[REDACTED]</p>
6. Clause 3.1.1 ⁶	<p>Class 1H: High strength steels with yield strengths greater than 460 N/mm² but less than or equal to 690 N/mm² and complying with one of the reference material standard in Annex A1.1. Basic requirements for the steel and producer are given in clause 3.1.3. Requirements on the sampling rate for testing are given in Annex D1.</p> <p>Class UH: Ultra high strength steel with yield strengths greater than</p>	<p>Class 1H: High strength steels with yield strengths greater than 460 N/mm² but less than or equal to 690 N/mm² and complying with one of the reference material standards in Annex A1.1. Basic requirements for the steel and producer are given in clause 3.1.2 and high strength steels shall be produced from a manufacturer with an acceptable Quality Assurance system. [REDACTED]</p> <p>Class UH: Ultra high strength steels with yield strengths greater than 690 N/mm² are not covered by the Code. Subject to the</p>

⁶ Addition of acceptable Quality Assurance system to steel manufacturer.

Item	Current version	Amendments
	<p>690 N/mm² are not covered by the Code. Subject to the approval of the Hong Kong Building Authority, they may be used in bolted tension applications in the form of proprietary high strength tie rods or bars, or in other applications. In these cases, the Responsible Engineer shall provide a full justification and ensure that all requirements are met in the submission of this material to the Hong Kong Building Authority.</p>	<p>approval of the Building Authority, they may be used in bolted tension applications in the form of proprietary high strength tie rods or bars, or in other applications. In these cases, the Responsible Engineer shall provide a full justification and ensure that all requirements are met in the submission of this material to the Building Authority.</p>
<p>7. Clause 3.1.1⁷</p>	<p>The Code covers both elastic and plastic analysis and design. Plastic analysis and design is not permitted for uncertified steels or for steels with yield strength greater than 460 N/mm². High strength steels may give advantages for certain ultimate limit states but with limited improvement against buckling. Their use does not improve the performance for fatigue and serviceability limit states.</p>	<p>The Code covers both elastic and plastic analysis and design. Plastic analysis and design is not permitted for uncertified steels or for steels with yield strength greater than 690 N/mm².</p> <p>High strength steels may give advantages for certain ultimate limit states such as compression resistances in heavily loaded columns and moment resistances in long span beams, but with limited improvement in very slender columns undergoing primarily elastic buckling. Pre-cambering may be adopted to reduce beam deflections under dead and imposed loads. Their use does not improve the performance for fatigue and serviceability limit states.</p>

⁷ Revision of yield strength limit of Class 1H steel.

Item	Current version						Amendments					
8. Table 3.1 ⁸	<i>Strength Grade</i>	<i>Class</i>	<i>Acceptable Quality Assurance system</i>	<i>Compliance with reference material Standard</i>	<i>Additional test Required</i>	<i>Remarks</i>	<i>Strength Grade</i>	<i>Class</i>	<i>Acceptable Quality Assurance system</i>	<i>Compliance with reference material Standard</i>	<i>Additional test Required</i>	<i>Remarks</i>
	460 < Y _s ≤ 690	1H	Y	Y	Y	Shall comply with basic requirements. Use is restricted.	460 < Y _s ≤ 690	1H	Y	Y	N	Normal use
9. Clause 3.1.2 ⁹	<p>Design strength for normal strength steels</p> <p>γ_{m1}, γ_{m2} are the material factors given in Table 4.1. For Class 1 and Class 1H steels, γ_{m1} has the value of 1.0 and γ_{m2} has the value of 1.2. (these material factors are minimum values and the design strengths should not be greater than those given in the respective material standards.)</p>						<p>Design strength for normal strength steels and high strength steels</p> <p>γ_{m1}, γ_{m2} are the material factors given in Table 4.1. These material factors are minimum values and the design strengths should not be greater than those given in the respective material standards.</p>					
10. Clause 3.1.2 ¹⁰	<ul style="list-style-type: none"> Strength: The design strength shall be the minimum yield strength but not greater than the minimum tensile strength divided by 1.2. 						<ul style="list-style-type: none"> Strength: The design strength shall be the minimum factored yield strength Y_z/γ_{m1} but not greater than the minimum tensile strength U_s/γ_{m2} where γ_{m1} and γ_{m2} are given in Table 4.1. 					

⁸ Revision of Class 1H steel in welded sections for normal use with no additional test is required.

⁹ Revision of material factor and Table 4.1.

¹⁰ Revision of material factor and Table 4.1.

Item	Current version	Amendments
11. Clause 3.1.2 ¹¹	<ul style="list-style-type: none"> Ductility: The elongation on a gauge length of $5.65\sqrt{S_0}$ is not to be less than 15% where S_0 is the cross sectional area of the section. 	<ul style="list-style-type: none"> Ductility: The elongation on a gauge length of $5.65\sqrt{S_0}$ ■ where S_0 is the cross sectional area of the section, should be as follows: For Classes 1 and 2 steel, the elongation at fracture is not to be less than 15%; For Class 1H steel, the elongation at fracture is not to be less than 10%; and The strain at the tensile strength should not be greater than 15 times the strain at the yield strength.
12. Clause 3.1.2 ¹²	<ul style="list-style-type: none"> Weldability: The chemical composition and maximum carbon equivalent value for Class 1 steel shall conform to the respective reference materials standard in Annex A1.1. The minimum requirements on the chemical composition of the materials for Class 2 steel and particularly for Class 3 steel when welding is involved are as follows. The maximum carbon equivalent value shall not exceed 0.48% on ladle analysis and the carbon content shall not exceed 0.24%. For general applications, the maximum sulphur content shall not exceed 0.03% and the maximum phosphorus content shall not exceed 0.03%. When through thickness quality (Z quality) steel is specified, the sulphur content shall not exceed 0.01%. 	<ul style="list-style-type: none"> Weldability: The chemical composition and maximum carbon equivalent value for Classes 1, 2 and 1H steel shall conform to the respective reference materials standard in Annex A1.1. The minimum requirements on the chemical composition of the materials ■ for Class 3 steel when welding is involved are as follows: a) The maximum carbon equivalent value shall not exceed 0.48% on ladle analysis and the carbon content shall not exceed 0.24%;

¹¹ Revision of elongation requirement of Class 1H steel.

¹² Revision of requirement of chemical composition.

Item	Current version	Amendments																															
	<p>The chemical compositions of various grades of steel shall also conform to the requirements stipulated in the national material standards to which where they are manufactured.</p>	<p>b) For general applications, the maximum sulphur content shall not exceed 0.03% and the maximum phosphorus content shall not exceed 0.03%; and</p> <p>c) When through thickness quality (Z quality) steel is specified, the sulphur content shall not exceed 0.01%.</p> <p>The chemical compositions of various grades of steel shall also conform to the requirements stipulated in the national material standards to which where they are manufactured.</p>																															
<p>13. Table 3.2¹³</p>	<p>Table 3.2 - Design strength p_y for steels supplied in accordance with BS EN standards (plates, hot rolled sections, hot finished and cold formed hollow sections)</p> <table border="1"> <thead> <tr> <th>Steel grade</th> <th>Thickness less than or equal to (mm)</th> <th>Design strength p_y (N/mm²)</th> </tr> </thead> <tbody> <tr> <td rowspan="5">S460</td> <td>16</td> <td>460</td> </tr> <tr> <td>40</td> <td>440</td> </tr> <tr> <td>63</td> <td>430</td> </tr> <tr> <td>80</td> <td>410</td> </tr> <tr> <td>100</td> <td>400</td> </tr> </tbody> </table>	Steel grade	Thickness less than or equal to (mm)	Design strength p_y (N/mm ²)	S460	16	460	40	440	63	430	80	410	100	400	<p>Table 3.2 - Design strength p_y for steels supplied in accordance with BS EN standards (plates, hot rolled sections, hot finished and cold formed hollow sections, cold formed sections and profiled sheets)</p> <table border="1"> <thead> <tr> <th>Steel grade</th> <th>Thickness less than or equal to (mm)</th> <th>Design strength p_y (N/mm²)</th> </tr> </thead> <tbody> <tr> <td rowspan="5">S460</td> <td>16</td> <td>460</td> </tr> <tr> <td>40</td> <td>440</td> </tr> <tr> <td>63</td> <td>430</td> </tr> <tr> <td>80</td> <td>410</td> </tr> <tr> <td>100</td> <td>400</td> </tr> <tr> <td>S550</td> <td>50</td> <td>550</td> </tr> </tbody> </table>	Steel grade	Thickness less than or equal to (mm)	Design strength p_y (N/mm ²)	S460	16	460	40	440	63	430	80	410	100	400	S550	50	550
Steel grade	Thickness less than or equal to (mm)	Design strength p_y (N/mm ²)																															
S460	16	460																															
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	63	430																															
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	100	400																															
S550	50	550																															

¹³ Addition of cold formed sections and profiled sheets to title of Table 3.2 and design strength values for S550 and S690 steel.

Item	Current version	Amendments																																										
	<p>Note that the thickness of the thickest element of the cross section should be used for strength classification of rolled sections.</p>	<table border="1"> <tr> <td></td> <td>100</td> <td>530</td> </tr> <tr> <td></td> <td>150</td> <td>490</td> </tr> <tr> <td rowspan="3">S690</td> <td>50</td> <td>690</td> </tr> <tr> <td>100</td> <td>650</td> </tr> <tr> <td>150</td> <td>630</td> </tr> </table> <p>Note that the thickness of the thickest element of the cross section should be used for strength classification of rolled sections.</p>		100	530		150	490	S690	50	690	100	650	150	630																													
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S690	50	690																																										
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	150	630																																										
<p>14. Table 3.3¹⁴</p>	<p>Table 3.3 - Design strength p_y for steels supplied in accordance with Chinese standard GB50017 (plates, hot rolled sections, hot finished and cold formed hollow sections)</p> <table border="1"> <thead> <tr> <th>Steel grade</th> <th>Thickness less than or equal to (mm)</th> <th>Design strength p_y (N/mm²)</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Q235</td> <td>16</td> <td>215</td> </tr> <tr> <td>40</td> <td>205</td> </tr> <tr> <td>60</td> <td>200</td> </tr> <tr> <td>100</td> <td>190</td> </tr> <tr> <td rowspan="4">Q345</td> <td>16</td> <td>310</td> </tr> <tr> <td>35</td> <td>295</td> </tr> <tr> <td>50</td> <td>265</td> </tr> <tr> <td>100</td> <td>250</td> </tr> <tr> <td>Q390</td> <td>16</td> <td>350</td> </tr> </tbody> </table>	Steel grade	Thickness less than or equal to (mm)	Design strength p_y (N/mm ²)	Q235	16	215	40	205	60	200	100	190	Q345	16	310	35	295	50	265	100	250	Q390	16	350	<p>Table 3.3 - Design strength p_y for steels supplied in accordance with Chinese standard GB50017 (plates, hot rolled sections, hot finished and cold formed hollow sections, cold formed sections and profiled sheets)</p> <p>a) - Q235 ~ Q460 steel</p> <table border="1"> <thead> <tr> <th>Steel grade</th> <th>Thickness less than or equal to (mm)</th> <th>Design strength p_y (N/mm²)</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Q235</td> <td>16</td> <td>215</td> </tr> <tr> <td>40</td> <td>205</td> </tr> <tr> <td>100</td> <td>200</td> </tr> <tr> <td>■</td> <td>■</td> </tr> <tr> <td>Q345</td> <td>16</td> <td>305</td> </tr> <tr> <td>Q355</td> <td>40</td> <td>295</td> </tr> </tbody> </table>	Steel grade	Thickness less than or equal to (mm)	Design strength p_y (N/mm ²)	Q235	16	215	40	205	100	200	■	■	Q345	16	305	Q355	40	295
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Q345	16	305																																										
Q355	40	295																																										

¹⁴ Addition of cold formed sections and profiled sheets to title of Table 3.3 and design strength values for Q460 to Q690 steel; Revision of design strength values for Q235 to Q420 steel.

Item	Current version		Amendments																
		35	335		63	290													
		50	315		80	280													
		100	295		100	270													
	Q420	16	380	Q390	16	345													
		35	360		40	330													
		50	340		63	310													
		100	325		100	295													
		16	375	Q420	16	375													
		40	355		40	355													
		63	320		63	320													
		100	305		100	305													
		16	410	Q460	16	410													
		40	390		40	390													
		63	355		63	355													
		100	340		100	340													
	a) Q550 ~ Q690 steel			<table border="1"> <thead> <tr> <th>Steel grade</th> <th>Thickness less than or equal to (mm)</th> <th>Design strength p_y (N/mm²)</th> </tr> </thead> <tbody> <tr> <td rowspan="5">Q550</td> <td>16</td> <td>520</td> </tr> <tr> <td>40</td> <td>500</td> </tr> <tr> <td>63</td> <td>475</td> </tr> <tr> <td>80</td> <td>455</td> </tr> <tr> <td>100</td> <td>445</td> </tr> </tbody> </table>			Steel grade	Thickness less than or equal to (mm)	Design strength p_y (N/mm ²)	Q550	16	520	40	500	63	475	80	455	100
Steel grade	Thickness less than or equal to (mm)	Design strength p_y (N/mm ²)																	
Q550	16	520																	
	40	500																	
	63	475																	
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	100	445																	

Item	Current version	Amendments												
		<table border="1"> <tr> <td>Q690</td> <td>16</td> <td>630</td> </tr> <tr> <td></td> <td>40</td> <td>615</td> </tr> <tr> <td></td> <td>63</td> <td>605</td> </tr> <tr> <td></td> <td>80</td> <td>585</td> </tr> </table>	Q690	16	630		40	615		63	605		80	585
Q690	16	630												
	40	615												
	63	605												
	80	585												
15. Table 3.4 ¹⁵	Table 3.4 - Design strength p_y for North American steel supplied to ASTM Standards (plates, hot rolled sections, hot finished and cold formed hollow sections)	Table 3.4 - Design strength p_y for North American steel supplied to ASTM Standards (plates, hot rolled sections, hot finished and cold formed hollow sections, cold formed sections and profiled sheets)												
16. Table 3.5 ¹⁶	Table 3.5 - Design strength p_y for steels supplied in accordance with Australian standards (plates, hot rolled sections, hot finished and cold formed hollow sections)	Table 3.5 - Design strength p_y for steels supplied in accordance with Australian standards (plates, hot rolled sections, hot finished and cold formed hollow sections, cold formed sections and profiled sheets)												
17. Table 3.6 ¹⁷	Table 3.6 - Design strength p_y for Japanese JIS SN Steel (rolled steel for building products) to JIS G 3136 supplied in accordance with JIS standards (plates, hot rolled sections, hot finished and cold formed hollow sections)	Table 3.6 - Design strength p_y for Japanese JIS SN Steel (rolled steel for building products) to JIS G 3136 supplied in accordance with JIS standards (plates, hot rolled sections, hot finished and cold formed hollow sections, cold formed sections and profiled sheets)												

¹⁵ Addition of cold formed sections and profiled sheets to title of Table 3.4.

¹⁶ Addition of cold formed sections and profiled sheets to title of Table 3.5.

¹⁷ Addition of cold formed sections and profiled sheets to title of Table 3.6.

Item	Current version	Amendments
18. Clause 3.1.3 ¹⁸	<p>3.1.3 Design strength for high strength steels</p> <p>For high strength steels with a design strength greater than 460 N/mm² and not exceeding 690 N/mm² produced in accordance with the basic requirements in Annex D1.1, the design strength p_y may be taken as $Y_s/1.0$ but not greater than $U_s/1.2$, where Y_s and U_s are respectively the minimum yield strength (R_{eH}) and minimum tensile strength (R_m) specified in the relevant reference material standard or derived by the manufacturer using an acceptable Quality Assurance system. These materials typically obtain their strength through a quenching and tempering heat-treatment and there are additional restraints on fabrication and design, particularly with welding, because heat may affect the strength of the parent steel. Bolted connection should be considered for certain high strength steels when welding is not allowed. The Responsible Engineer shall justify each design on a case-by-case basis using justified parameters and formulae proposed by manufacturers and verified by himself. Correct welding procedure specifications are essential and shall be specified. When high strength steel is used in compression, it shall be limited to compact sections where local buckling of outstands will not occur.</p> <p>The essentials of the basic requirements for high strength steels</p>	<p>3.1.3 Design strength for ultra high strength steels</p> <p>For ultra high strength steels with a design strength greater than 690 N/mm² produced in accordance with the basic requirements in Annex D1.1, the design strength p_y may be taken as Y_s/γ_{m1} but not greater than U_s/γ_{m2}, where Y_s and U_s are respectively the minimum yield strength (R_{eH}) and minimum tensile strength (R_m) specified in the relevant reference material standard or derived by the manufacturer using an acceptable Quality Assurance system, while γ_{m1} and γ_{m2} are the material factors according to manufacturer's recommendations.</p> <p>These materials typically obtain their strength through a quenching and tempering heat-treatment or a thermo-mechanically controlled process. There are additional restraints on fabrication and design, particularly with welding, because heat may affect the strength of the parent steel.</p>

¹⁸ Revision of design strength of ultra high strength steel.

Item	Current version	Amendments
	<p>are as stated in Annex D1.1 except that the maximum carbon content shall not exceed 0.20% and the maximum sulphur and phosphorus contents shall not exceed 0.025%.</p>	
<p>19. Clause 3.1.5¹⁹</p>	<p>3.1.5 Through thickness properties</p> <p>The design strengths given in the standards refer to the longitudinal and transverse directions.</p>	<p>3.1.5 Through thickness properties</p> <p>The essential requirement is an adequate deformation capacity perpendicular to the plate surface to provide ductility and toughness against fracture under tension.</p> <p>The design strengths given in most material specifications refer to the longitudinal and transverse directions.</p>
<p>20. Clause 3.2²⁰</p>	<p>3.2 PREVENTION OF BRITTLE FRACTURE</p> <p>Brittle fracture should be avoided by ensuring fabrication is free from significant defects and by using a steel quality with adequate notch toughness as quantified by the Charpy impact properties. The factors to be considered include the minimum service temperature, the thickness, the steel grade, the type of detail, the stress level and the strain rate or level.</p> <p>The welding consumables and welding procedures should also be chosen to ensure the Charpy impact test properties in the weld metal and the heat affected zone of the joint that are equivalent to,</p>	<p>3.2 PREVENTION OF BRITTLE FRACTURE</p> <p>Brittle fracture should be avoided by ensuring fabrication is free from significant defects and by using a steel quality with adequate notch toughness as quantified by the Charpy impact properties. The factors to be considered include the minimum service temperature, the thickness, the steel grade, the type of detail, the stress level and the strain rate [REDACTED].</p> <p>The welding consumables and welding procedures should also be chosen to ensure the Charpy impact test properties in the weld metal and the heat affected zone of the joint that are equivalent to,</p>

¹⁹ Revision of requirement of through thickness properties.

²⁰ Revision of requirement of Prevention of Brittle Fracture.

Item	Current version	Amendments
	<p>or better than the minimum specified for the parent material, see clause 3.4.</p> <p>In Hong Kong the minimum service temperature T_{min} in the steel should normally be taken as 0.1°C for external steelwork. For locations subject to exceptionally low temperatures, such as cold storage or structures to be constructed in other countries, T_{min} should be taken as the minimum temperature expected to occur in the steel within the design working life.</p> <p>The steel quality to be selected for each component should be such that the thickness t of each element satisfies:</p> $t \leq K t_1 \quad (3.1)$ <p>where</p> <p>K is a factor that depends upon the type of detail, the general stress level, the stress concentration effects and the strain conditions, see Table 3.6;</p> <p>t_1 is the limiting thickness at the appropriate minimum service temperature T_{min}. For a given steel grade and quality, the value of t_1 may be determined from the following:</p> <ul style="list-style-type: none"> - If $T_{27J} \leq T_{min} + 20^\circ\text{C}$: $t_1 \leq 50 (1.2)^N \left[\frac{355}{Y_{min}} \right]^{-1.4} \quad (3.2)$ <ul style="list-style-type: none"> - If $T_{27J} > T_{min} + 20^\circ\text{C}$: $t_1 \leq 50 (1.2)^N \left(\frac{35 + T_{min} - T_{27J}}{15} \right) \left[\frac{355}{Y_{min}} \right]^{-1.4} \quad (3.3)$ <p>in which:</p> $N = \left(\frac{T_{min} - T_{27J}}{10} \right) \quad (3.4)$ <p>where</p> <p>T_{min} is the minimum service temperature (in °C) expected to occur in the steel within the design working life of the part;</p> <p>T_{27J} is the test temperature (in °C) for which a minimum Charpy impact value C_T of 27J is specified in the product standard.</p> <p>Y_{min} is the nominal yield stress (in N/mm²) for the specified thickness, this may be taken as the design strength D_y.</p> <p>Table 3.7 lists values of t_1 for the normal strength range and T_{27J} values.</p>	<p>or better than the minimum specified for the parent material, see clauses 3.4 and 14.3.</p> <p>In Hong Kong the minimum service temperature T_{min} in the steel should normally be taken as 0.1°C for external steelwork. For locations subject to exceptionally low temperatures, such as cold storage or structures to be constructed in other countries, T_{min} should be taken as the minimum temperature expected to occur in the steel within the design working life.</p> <p style="text-align: center;">■</p> <p>The guidance given in this section should be used for the selection of material for new construction. It is not intended to cover the assessment of materials in service. The rules should be used to select a suitable grade of steel from the steel products as listed in Annex A1.</p> <p>The rules are applicable to tension elements, welded and fatigue stressed elements in which some portions of the stress cycle are tensile. Fracture toughness need not be specified for elements only in compression.</p> <p>The rules shall be applied to the properties of materials specified for the toughness quality in the relevant steel product standard. Material of a lower grade shall not be used even though test results show compliance with the specific grade.</p>

Item	Current version	Amendments																																																																																																	
	<p>Table 3.7 - Maximum basic thickness t_b (mm) for minimum service temperature ($^{\circ}\text{C}$), 27J Charpy impact value and strength grade of steel</p> <table border="1"> <thead> <tr> <th rowspan="2">Strength Grade</th> <th colspan="5">Specified temperature for 27J minimum in Charpy test ($^{\circ}\text{C}$)</th> </tr> <tr> <th>0</th> <th>-20</th> <th>-30</th> <th>-50</th> <th>-60</th> </tr> </thead> <tbody> <tr> <td>215</td> <td>101</td> <td>145</td> <td>174</td> <td>251</td> <td>301</td> </tr> <tr> <td>235</td> <td>89</td> <td>128</td> <td>154</td> <td>222</td> <td>266</td> </tr> <tr> <td>275</td> <td>71</td> <td>103</td> <td>124</td> <td>178</td> <td>213</td> </tr> <tr> <td>310</td> <td>60</td> <td>87</td> <td>104</td> <td>150</td> <td>180</td> </tr> <tr> <td>350</td> <td>51</td> <td>73</td> <td>86</td> <td>127</td> <td>152</td> </tr> <tr> <td>355</td> <td>50</td> <td>72</td> <td>86</td> <td>124</td> <td>149</td> </tr> <tr> <td>380</td> <td>45</td> <td>65</td> <td>79</td> <td>113</td> <td>138</td> </tr> <tr> <td>460</td> <td>35</td> <td>50</td> <td>60</td> <td>87</td> <td>104</td> </tr> </tbody> </table> <p>Note: these thicknesses must be multiplied by the appropriate K factor from Table 3.8 to determine the actual thickness permitted for the grade of steel.</p> <p>In addition, the maximum thickness of the component (t) should not exceed the maximum thickness at which the full Charpy impact value applies to the selected steel quality for that product type and steel grade, according to the relevant acceptable standard given in Annex A1.1 for the particular steel product.</p> <p>For rolled sections, t and t_b should be related to the same element of the cross-section as the factor K, but the maximum thickness as defined above should be related to the thickest element of the cross-section.</p> <p>Table 3.8 - Factor K for type of detail, stress level and strain conditions</p> <table border="1"> <thead> <tr> <th rowspan="2">Type of details or location</th> <th colspan="2">Components in tension due to factored loads</th> <th rowspan="2">Components not subject to applied tension</th> </tr> <tr> <th>Stress $\geq 0.3Y_{FeM}$</th> <th>Stress $< 0.3Y_{FeM}$</th> </tr> </thead> <tbody> <tr> <td>Plain steel</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>Drilled holes or reamed holes</td> <td>1.5</td> <td>2</td> <td>3</td> </tr> <tr> <td>Punched holes (un-reamed)</td> <td>1</td> <td>1.5</td> <td>2</td> </tr> <tr> <td>Flame cut edges</td> <td>1</td> <td>1.5</td> <td>2</td> </tr> <tr> <td>Welded, generally</td> <td>1</td> <td>1.5</td> <td>2</td> </tr> <tr> <td>Welded, partial penetration and fillet welds</td> <td>0.8</td> <td>1</td> <td>1.5</td> </tr> <tr> <td>Welded connections to unstiffened flanges,</td> <td>0.5</td> <td>0.75</td> <td>1</td> </tr> <tr> <td>Welded across ends of cover plates</td> <td>0.5</td> <td>0.75</td> <td>1</td> </tr> </tbody> </table> <p>NOTE 1 Where parts are required to withstand significant plastic deformation at the minimum service temperature (such as crash barriers or crane stops) K should be halved</p> <p>NOTE 2 Steel plates attached to columns by normal welds only, for the purpose of location in use and security in transit, should be classified as plain steel.</p> <p>NOTE 3 Welded attachments not exceeding 150 mm in length should not be classed as crane plates.</p> <p>NOTE 4 For the welded condition the Charpy impact energy of the weld metal and the HAZ shall match that of the parent material. Compliance with the requirement shall be demonstrated through welding procedure trials.</p>	Strength Grade	Specified temperature for 27J minimum in Charpy test ($^{\circ}\text{C}$)					0	-20	-30	-50	-60	215	101	145	174	251	301	235	89	128	154	222	266	275	71	103	124	178	213	310	60	87	104	150	180	350	51	73	86	127	152	355	50	72	86	124	149	380	45	65	79	113	138	460	35	50	60	87	104	Type of details or location	Components in tension due to factored loads		Components not subject to applied tension	Stress $\geq 0.3Y_{FeM}$	Stress $< 0.3Y_{FeM}$	Plain steel	2	3	4	Drilled holes or reamed holes	1.5	2	3	Punched holes (un-reamed)	1	1.5	2	Flame cut edges	1	1.5	2	Welded, generally	1	1.5	2	Welded, partial penetration and fillet welds	0.8	1	1.5	Welded connections to unstiffened flanges,	0.5	0.75	1	Welded across ends of cover plates	0.5	0.75	1	<p>3.2.1 Procedure</p> <p>3.2.1.1 The steel grade should be selected after taking account of:</p> <p>a) Steel material properties:</p> <ul style="list-style-type: none"> - Yield strength depending on the material thickness $p_y(t)$ - Toughness quality expressed in terms of T and J_{min} where T is the temperature under Charpy impact test; and J_{min} is the guaranteed value of Charpy impact energy <p>b) Member characteristics:</p> <ul style="list-style-type: none"> - Member shape and detail - Element thickness (t) <p>c) Design situations:</p> <ul style="list-style-type: none"> - Design value of minimum service temperature, T_{min} - Maximum stress σ derived from the design condition described in clause 3.2.1.3 below - For cold-formed steel sections with significant transverse bending, for example, cold-formed circular and rectangular hollow sections, the minimum service temperature should be reduced by 5°C.
Strength Grade	Specified temperature for 27J minimum in Charpy test ($^{\circ}\text{C}$)																																																																																																		
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3.2.1.2 The permitted thickness of steel elements against brittle fracture should be obtained from clause 3.2.2 and Table 3.7.

3.2.1.3 The maximum stress σ derived of each structural element or connection should be determined by elastic analysis after considering various load combination including temperature effect under serviceability limit states in accordance with clause 4.3.7.

3.2.1.4 The maximum stress σ is determined using an elastic analysis under serviceability limit states.

3.2.2 Determination of maximum permissible values of element thickness

Table 3.7 gives the maximum permissible values of element thickness in terms of three stress levels expressed as proportions of the nominal yield strength:

a) $\sigma = 0.75p_y(t)$ [N/mm²]

b) $\sigma = 0.50p_y(t)$ [N/mm²]

c) $\sigma = 0.25p_y(t)$ [N/mm²]

where $p_y(t)$ may be determined either from

$$p_y(t) = p_y - 0.25t \text{ [N/mm}^2\text{]}$$

Item	Current version	Amendments
		<p>where t is the thickness of the plate in mm or taken as R_{CH}-values from the relevant steel material specifications or standards.</p> <p>The tabulated values are given in terms of a choice of seven reference temperatures: +10, 0, -10, -20, -30, -40 and -50°C.</p>

Item	Current version	Amendments																																																																																																																																																																																																																
		<p style="text-align: center;">Table 3.7 Maximum permissible values of element thickness t in mm</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="3">Steel grade</th> <th rowspan="3">Steel grade EN</th> <th rowspan="3">Delivery condition</th> <th rowspan="3">Crucy product shape</th> <th colspan="16">Minimum service temperature T_{min} [°C]</th> </tr> <tr> <th colspan="4">T_{min} = 0</th> <th colspan="4">T_{min} = -20</th> <th colspan="4">T_{min} = -40</th> <th colspan="4">T_{min} = -60</th> </tr> <tr> <th>16</th><th>10</th><th>10</th><th>10</th> <th>16</th><th>10</th><th>10</th><th>10</th> <th>16</th><th>10</th><th>10</th><th>10</th> <th>16</th><th>10</th><th>10</th><th>10</th> </tr> </thead> <tbody> <tr> <td rowspan="3">S235</td> <td rowspan="3">S235</td> <td rowspan="3">A</td> <td rowspan="3">Flat</td> <td>16</td><td>10</td><td>10</td><td>10</td><td>16</td><td>10</td><td>10</td><td>10</td><td>16</td><td>10</td><td>10</td><td>10</td><td>16</td><td>10</td><td>10</td><td>10</td> </tr> <tr> <td>20</td><td>14</td><td>14</td><td>14</td><td>20</td><td>14</td><td>14</td><td>14</td><td>20</td><td>14</td><td>14</td><td>14</td><td>20</td><td>14</td><td>14</td><td>14</td> </tr> <tr> <td>25</td><td>18</td><td>18</td><td>18</td><td>25</td><td>18</td><td>18</td><td>18</td><td>25</td><td>18</td><td>18</td><td>18</td><td>25</td><td>18</td><td>18</td><td>18</td> </tr> <tr> <td rowspan="3">S275</td> <td rowspan="3">S275</td> <td rowspan="3">A</td> <td rowspan="3">Flat</td> <td>16</td><td>10</td><td>10</td><td>10</td><td>16</td><td>10</td><td>10</td><td>10</td><td>16</td><td>10</td><td>10</td><td>10</td><td>16</td><td>10</td><td>10</td><td>10</td> </tr> <tr> <td>20</td><td>14</td><td>14</td><td>14</td><td>20</td><td>14</td><td>14</td><td>14</td><td>20</td><td>14</td><td>14</td><td>14</td><td>20</td><td>14</td><td>14</td><td>14</td> </tr> <tr> <td>25</td><td>18</td><td>18</td><td>18</td><td>25</td><td>18</td><td>18</td><td>18</td><td>25</td><td>18</td><td>18</td><td>18</td><td>25</td><td>18</td><td>18</td><td>18</td> </tr> <tr> <td rowspan="3">S355</td> <td rowspan="3">S355</td> <td rowspan="3">A</td> <td rowspan="3">Flat</td> <td>16</td><td>10</td><td>10</td><td>10</td><td>16</td><td>10</td><td>10</td><td>10</td><td>16</td><td>10</td><td>10</td><td>10</td><td>16</td><td>10</td><td>10</td><td>10</td> </tr> <tr> <td>20</td><td>14</td><td>14</td><td>14</td><td>20</td><td>14</td><td>14</td><td>14</td><td>20</td><td>14</td><td>14</td><td>14</td><td>20</td><td>14</td><td>14</td><td>14</td> </tr> <tr> <td>25</td><td>18</td><td>18</td><td>18</td><td>25</td><td>18</td><td>18</td><td>18</td><td>25</td><td>18</td><td>18</td><td>18</td><td>25</td><td>18</td><td>18</td><td>18</td> </tr> </tbody> </table> <p>Notes:</p> <ol style="list-style-type: none"> 1. Local (mechanical) can be used in applying Table 3.7. Steel applications require C values between 0.75 (p) and 0.5 (p), and service temperature (T_{min}) is given for information purposes. Extrapolations based on the extreme values are not valid. 2. Table 3.7 has been derived from guarantee values of Charpy impact energy in the direction of rolling of the product. 3. Table 3.7 is also applicable for steel products applied to other steel materials applications (such as Annex A1 with supplementary grades), having the same or similar material guaranteed values of Charpy impact energy. 4. TMCP denotes the manufacturing process of thermomechanically controlled process according to BS EN 10225-4. 5. CT denotes the manufacturing process of quenching and tempering process according to BS EN 10225-4. 	Steel grade	Steel grade EN	Delivery condition	Crucy product shape	Minimum service temperature T _{min} [°C]																T _{min} = 0				T _{min} = -20				T _{min} = -40				T _{min} = -60				16	10	10	10	16	10	10	10	16	10	10	10	16	10	10	10	S235	S235	A	Flat	16	10	10	10	16	10	10	10	16	10	10	10	16	10	10	10	20	14	14	14	20	14	14	14	20	14	14	14	20	14	14	14	25	18	18	18	25	18	18	18	25	18	18	18	25	18	18	18	S275	S275	A	Flat	16	10	10	10	16	10	10	10	16	10	10	10	16	10	10	10	20	14	14	14	20	14	14	14	20	14	14	14	20	14	14	14	25	18	18	18	25	18	18	18	25	18	18	18	25	18	18	18	S355	S355	A	Flat	16	10	10	10	16	10	10	10	16	10	10	10	16	10	10	10	20	14	14	14	20	14	14	14	20	14	14	14	20	14	14	14	25	18	18	18	25	18	18	18	25	18	18	18	25	18	18	18
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Item	Current version	Amendments
21. Clause 3.3.1 ²¹	Bolts with an ultimate tensile strength exceeding 1000 N/mm ² should not be used unless test results demonstrate their acceptability in a particular design application.	Bolts with an ultimate tensile strength exceeding 1200 N/mm ² should not be used unless test results demonstrate their acceptability in a particular design application.
22. Table 3.4 ²²	<p>3.4 WELDING CONSUMABLES</p> <p>All welding consumables shall conform to the requirements of the reference standards given in Annex A1.4. For steel with design strength not exceeding 460 N/mm² the specified yield strength, ultimate tensile strength, elongation at failure and Charpy energy value of the welding consumables shall be equal to or better than the corresponding values specified for the grade of steel being welded. The most onerous grade shall govern if dissimilar grades are welded together. For high and ultra-high strength steels, the welding material may, if necessary to produce a suitable joint, be of a lower strength; the elongation to failure and Charpy impact value should still match those of the parent material. In that case, the design strength of the weld must be based on the weld material.</p>	<p>3.4 WELDING CONSUMABLES</p> <p>All welding consumables shall conform to the requirements of the reference standards given in Annex A1.4. For steel with design strength not exceeding 690 N/mm², the specified yield strength, ultimate tensile strength, elongation at failure and Charpy impact value of the welding consumables shall be equal to or better than the corresponding values specified for the grade of steel being welded. The most onerous grade shall govern if dissimilar grades are welded together. For ultra-high strength steels, the welding consumables may, if necessary to produce a suitable joint, be of a lower strength; the elongation to failure and Charpy impact value should still match those of the parent material. In that case, the design strength of the weld must be based on the weld material.</p>

²¹ Revision of limit of ultimate tensile strength of bolt.

²² Revision of limit of design strength of steel.

Item	Current version	Amendments
23. Clause 3.8.1.3 ²³	<p><i>High strength steel with limited ductility</i></p> <p>For Class 1H steel strips that failed to comply with the ductility requirements list in clause 3.8.1.2, the use of steel materials should be limited to members under lateral loads primarily, and the design yield strength should be reduced as follows:</p>	<p><i>High strength steel strips with limited ductility</i></p> <p>For high strength S550 steel strips that failed to comply with the ductility requirements listed in clause 3.8.1.2, the use of steel materials should be limited to members under lateral loads primarily, and the design yield strength should be reduced as follows:</p>
24. Table 3.8 ²⁴	<p>Table 3.9 - Yield and ultimate strengths for steels supplied in accordance with various national standards</p>	<p>Table 3.8 - Yield and tensile strengths for steels supplied in accordance with various national standards</p>
25. Table 3.8 (Cont') ²⁵	<p>Table 3.9 - Yield and ultimate strengths for steels supplied in accordance with various national standards (continued)</p>	<p>Table 3.8 - Yield and tensile strengths for steels supplied in accordance with various national standards (continued)</p>

²³ Addition of high strength S550 steel.


²⁴ Revision of title of Table 3.9.

²⁵ Revision of title of Table 3.9 (continued).

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27. Clause 4.2.1 ²⁷	<p>For high strength Class 1H steel plates and sections with a yield stress greater than 460 N/mm² and which are supplied from a known source complying with the specification requirements in Annex A1.1 of the Code, the partial material factor γ_{m1} should be 1.0.</p> <p>For ultra high strength Class UH steel plates and sections with a yield stress greater than 690 N/mm² and which are supplied from a recognized source complying with specific requirements, the partial material factor γ_{m1} should refer to manufacturer's recommendations.</p>	<p>For high strength Class 1H steel plates and sections with a yield stress greater than 460 N/mm² but less than or equal to 690 N/mm² and complying with one of the reference material standards in Annex A1.1 , the partial material factors are given in Table 4.1</p> <p>For ultra high strength Class UH steel plates and sections with a yield stress greater than 690 N/mm² and complying with one of the reference material standards in Annex 1.1, the partial material factor should refer to manufacturer's recommendations.</p>																																																																																																																																										

²⁶ Revision of page index of Clause 3.

²⁷ Revision of Class 1H steel for normal use in steel structures and material factors.

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28. Table 4.1 ²⁸	<p>Table 4.1 - Material factors γ_{m1} and γ_{m2} for various classes of steels</p> <table border="1"> <thead> <tr> <th rowspan="2">Class</th> <th colspan="2">$Y_s \leq 460 \text{ N/mm}^2$</th> <th colspan="2">$460 < Y_s \leq 690 \text{ N/mm}^2$</th> </tr> <tr> <th>$\gamma_{m1}$</th> <th>$\gamma_{m2}$</th> <th>$\gamma_{m1}$</th> <th>$\gamma_{m2}$</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1.0</td> <td>1.2</td> <td>-</td> <td>-</td> </tr> <tr> <td>2</td> <td>1.1</td> <td>1.3</td> <td>-</td> <td>-</td> </tr> <tr> <td>3</td> <td>*</td> <td>*</td> <td>-</td> <td>-</td> </tr> <tr> <td>1H</td> <td>-</td> <td>-</td> <td>1.0</td> <td>1.2</td> </tr> </tbody> </table>	Class	$Y_s \leq 460 \text{ N/mm}^2$		$460 < Y_s \leq 690 \text{ N/mm}^2$		γ_{m1}	γ_{m2}	γ_{m1}	γ_{m2}	1	1.0	1.2	-	-	2	1.1	1.3	-	-	3	*	*	-	-	1H	-	-	1.0	1.2	<p>Table 4.1 – Material factors γ_{m1} and γ_{m2} for various classes of steels</p> <table border="1"> <thead> <tr> <th rowspan="2">Class</th> <th colspan="2">$Y_s \leq 460 \text{ N/mm}^2$</th> <th colspan="2">$460 < Y_s \leq 690 \text{ N/mm}^2$</th> </tr> <tr> <th>$\gamma_{m1}$</th> <th>$\gamma_{m2}$</th> <th>$\gamma_{m1}$</th> <th>$\gamma_{m2}$</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1.0</td> <td>1.1</td> <td>-</td> <td>-</td> </tr> <tr> <td>2</td> <td>1.1</td> <td>1.2</td> <td>-</td> <td>-</td> </tr> <tr> <td>3</td> <td>*</td> <td>*</td> <td>-</td> <td>-</td> </tr> <tr> <td>1H</td> <td>-</td> <td>-</td> <td>1.0</td> <td>1.05</td> </tr> </tbody> </table>	Class	$Y_s \leq 460 \text{ N/mm}^2$		$460 < Y_s \leq 690 \text{ N/mm}^2$		γ_{m1}	γ_{m2}	γ_{m1}	γ_{m2}	1	1.0	1.1	-	-	2	1.1	1.2	-	-	3	*	*	-	-	1H	-	-	1.0	1.05
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29. Clause 5.5.2.1 ²⁹	<p>High strength steels (in plate, rolled section or bar) of design strength greater than 460 N/mm² should not be galvanized in order to avoid metallurgical change or annealing. Bolts of ISO Grade 10.9 or higher grade or equivalent should not be galvanized, but should be sheradized and coated with zinc-rich or appropriate protective paint.</p> <p>Hollow sections should be vented if they are to be galvanized.</p>	<p> Bolts of ISO Grade 10.9 or higher grade or equivalent should not be galvanized, but should be sheradized and coated with zinc-rich or appropriate protective paint.</p> <p>Hollow sections should be vented if they are to be galvanized.</p> <p>Some high strength steels with yield strength greater than 460 N/mm² may be sensitive to cracking during galvanization and therefore special care should be taken. Hence, suitable venting should be provided while special dipping procedures shall be executed in order to alleviate the risk of cracking and distortion.</p> <p>BS EN ISO 14713-2 has provided further guidance, including information on the influence of various factors, including steel chemical composition, on the coating formation.</p>																																																										

²⁸ Revision of material factor for Class 1, Class 2 and Class 1H steel.

²⁹ Deletion of restriction of galvanization to steel with design strength greater than 460 N/mm²; Addition of recommendation for cracking due to galvanization with guideline from BS EN ISO 14713-2.

Item	Current version	Amendments
30. Clause 7.1 ³⁰	This section covers steel grades with design strength not greater than 460 MPa and its extension to higher steel grades should be justified.	This section covers steel grades with design strength not greater than 690 N/mm ² and its extension to higher steel grades should be justified.
31. Clause 8.1 ³¹	<p>When Class 3 uncertified steel is used, the buckling curves for the steel material should be obtained from a reliable source and the material buckling strength so determined should be limited to the material strength given in clause 3.1.4.</p> <p>Formulae in this section are applicable to high strength steel of Class 1H provided that it meets the requirements for weldability, strength, ductility and resistance to brittle fracture specified in clause 3.1.3. For design against buckling tests may be required to determine the Robertson constant as defined in Appendix 8.4 where design curves are not available from the manufacturer.</p>	<p>When Class 3 uncertified steel is used, the buckling curves for the steel material should be obtained from a reliable source and the material buckling strength so determined should be limited to the material strength given in clause 3.1.4.</p> <p>■</p>
32. Clause 8.2.2.1 ³²	When high or ultra-high strength steel is used, the use of a plastic modulus is not permitted.	When high ■ strength steel is used, the use of a Class 4 slender section is not permitted. When ultra high strength steel is used, the use of a plastic modulus is not permitted.

³⁰ Revision of Class 1H steel for normal use in steel structures.

³¹ Revision of Class 1H steel for normal use in steel structures; Deletion of condition for design Class 1H steel with formulae in Section 8.

³² Revision of section limit for Class 1H steel.

Item	Current version	Amendments
33. Clause 8.3.5.2 ³³	<p>ρ_b is the buckling strength of the beam, determined from Table 8.3a for hot-rolled sections and Table 8.3b for welded sections using a suitable equivalent slenderness λ_{LT} in clause 8.3.5.3 and relevant design strength ρ_y.</p> <p>Alternatively, formulae in Appendix 8.1 may be used to compute ρ_b.</p>	<p>ρ_b is the buckling strength of the beam, determined from Table 8.3a for hot-rolled sections and Table 8.3b for welded sections using a suitable equivalent slenderness λ_{LT} in clause 8.3.5.3 and relevant design strength ρ_y.</p> <p>When high strength steel is used, the use of a Class 4 slender section is not permitted.</p> <p>Alternatively, formulae in Appendix 8.1 may be used to compute ρ_b.</p>
34. Table 8.3b ³⁴	Table 8.3b - Bending strength ρ_b (N/mm ²) for welded sections	<p>Table 8.3b - Bending strength ρ_b (N/mm²) for welded sections</p> <p>(i) S275 ~ S460 steel</p>

³³ Addition of section limit for Class 1H steel.

³⁴ Addition of bending strength for S550 and S690 steel.

Table 8.3b - Bending strength p_b (N/mm²) for welded sections (Cont'd)

(ii) S550 ~ S690 steel

λ_{eff}	Strength grade and design strength p_b (N/mm ²)					
	S550			S690		
	400	530	550	630	650	690
25	490	527	543	608	621	652
30	458	484	499	554	568	595
35	417	443	455	505	517	540
40	381	403	414	457	467	487
45	347	368	375	411	422	446
50	315	334	345	381	401	422
55	297	319	329	369	378	396
60	284	303	312	345	353	368
65	269	285	293	321	327	339
70	254	267	274	294	297	303
75	238	248	252	264	267	272
80	219	228	228	239	241	245
85	200	205	208	216	218	221
90	183	187	189	198	198	201
95	168	171	173	179	180	183
100	154	157	159	164	165	167
105	142	145	146	150	151	153
110	131	134	135	138	139	141
115	121	124	125	128	129	130
120	113	115	115	118	119	120
125	105	107	107	110	110	111
130	98	99	100	102	103	104
135	92	93	93	95	96	97
140	86	87	87	89	90	90
145	80	82	82	84	84	85
150	76	77	77	79	79	79
155	71	72	73	74	74	75
160	67	68	68	70	70	70
165	64	64	65	66	66	66
170	60	61	61	62	62	63
175	57	58	58	59	59	59
180	54	55	55	56	56	56
185	51	52	52	53	53	53
190	49	49	50	50	51	51
195	47	47	47	48	48	48
200	44	45	45	46	46	46
210	41	41	41	42	42	42
220	37	37	38	38	38	38
230	34	34	35	35	35	35
240	32	32	32	32	32	32
250	29	29	29	30	30	30
λ_{lim}	25.7	24.7	24.3	22.7	22.3	21.7

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35. Table 8.3c ³⁵	<p style="text-align: center;">Table 8.3c - Bending strength p_b (N/mm²) for other steel source</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="3">λ_{LT}</th> <th colspan="4" style="text-align: center;">Bending strength for rolled sections</th> <th colspan="4" style="text-align: center;">Bending strength for welded sections</th> </tr> <tr> <th colspan="4" style="text-align: center;">Steel grade and design strength (N/mm²)</th> <th colspan="4" style="text-align: center;">Steel grade and design strength (N/mm²)</th> </tr> <tr> <th>Q235</th> <th>Q345</th> <th>Q390</th> <th>Q420</th> <th>Q235</th> <th>Q345</th> <th>Q390</th> <th>Q420</th> </tr> </thead> <tbody> <tr><td>25</td><td>215</td><td>310</td><td>350</td><td>380</td><td>25</td><td>215</td><td>310</td><td>350</td><td>380</td></tr> <tr><td>30</td><td>215</td><td>310</td><td>350</td><td>377</td><td>30</td><td>215</td><td>310</td><td>350</td><td>374</td></tr> <tr><td>35</td><td>215</td><td>303</td><td>336</td><td>361</td><td>35</td><td>215</td><td>296</td><td>324</td><td>344</td></tr> <tr><td>40</td><td>212</td><td>289</td><td>321</td><td>344</td><td>40</td><td>210</td><td>272</td><td>297</td><td>316</td></tr> <tr><td>45</td><td>203</td><td>276</td><td>305</td><td>326</td><td>45</td><td>194</td><td>250</td><td>273</td><td>289</td></tr> <tr><td>50</td><td>194</td><td>262</td><td>288</td><td>307</td><td>50</td><td>178</td><td>230</td><td>250</td><td>265</td></tr> <tr><td>55</td><td>185</td><td>247</td><td>271</td><td>288</td><td>55</td><td>165</td><td>211</td><td>229</td><td>242</td></tr> <tr><td>60</td><td>176</td><td>232</td><td>254</td><td>268</td><td>60</td><td>152</td><td>194</td><td>210</td><td>225</td></tr> <tr><td>65</td><td>167</td><td>218</td><td>236</td><td>249</td><td>65</td><td>141</td><td>179</td><td>201</td><td>217</td></tr> <tr><td>70</td><td>158</td><td>203</td><td>219</td><td>230</td><td>70</td><td>131</td><td>173</td><td>194</td><td>208</td></tr> <tr><td>75</td><td>149</td><td>189</td><td>203</td><td>212</td><td>75</td><td>121</td><td>167</td><td>185</td><td>198</td></tr> <tr><td>80</td><td>141</td><td>176</td><td>188</td><td>198</td><td>80</td><td>115</td><td>161</td><td>177</td><td>188</td></tr> <tr><td>85</td><td>133</td><td>164</td><td>174</td><td>180</td><td>85</td><td>112</td><td>154</td><td>168</td><td>178</td></tr> <tr><td>90</td><td>125</td><td>152</td><td>161</td><td>166</td><td>90</td><td>109</td><td>147</td><td>160</td><td>166</td></tr> <tr><td>95</td><td>117</td><td>141</td><td>149</td><td>153</td><td>95</td><td>105</td><td>140</td><td>149</td><td>153</td></tr> <tr><td>100</td><td>110</td><td>131</td><td>138</td><td>142</td><td>100</td><td>102</td><td>131</td><td>138</td><td>142</td></tr> <tr><td>105</td><td>103</td><td>122</td><td>128</td><td>131</td><td>105</td><td>98</td><td>122</td><td>128</td><td>131</td></tr> <tr><td>110</td><td>97</td><td>114</td><td>119</td><td>122</td><td>110</td><td>95</td><td>114</td><td>119</td><td>122</td></tr> <tr><td>115</td><td>91</td><td>106</td><td>110</td><td>113</td><td>115</td><td>91</td><td>106</td><td>110</td><td>113</td></tr> <tr><td>120</td><td>86</td><td>99</td><td>103</td><td>105</td><td>120</td><td>88</td><td>99</td><td>103</td><td>105</td></tr> <tr><td>125</td><td>81</td><td>93</td><td>96</td><td>98</td><td>125</td><td>81</td><td>93</td><td>96</td><td>98</td></tr> <tr><td>130</td><td>77</td><td>87</td><td>90</td><td>92</td><td>130</td><td>77</td><td>87</td><td>90</td><td>92</td></tr> <tr><td>135</td><td>72</td><td>82</td><td>84</td><td>88</td><td>135</td><td>72</td><td>82</td><td>84</td><td>88</td></tr> <tr><td>140</td><td>68</td><td>77</td><td>79</td><td>81</td><td>140</td><td>68</td><td>77</td><td>79</td><td>81</td></tr> <tr><td>145</td><td>65</td><td>72</td><td>75</td><td>76</td><td>145</td><td>65</td><td>72</td><td>75</td><td>76</td></tr> <tr><td>150</td><td>61</td><td>68</td><td>70</td><td>72</td><td>150</td><td>61</td><td>68</td><td>70</td><td>72</td></tr> <tr><td>155</td><td>58</td><td>65</td><td>68</td><td>69</td><td>155</td><td>58</td><td>65</td><td>68</td><td>69</td></tr> <tr><td>160</td><td>55</td><td>61</td><td>63</td><td>64</td><td>160</td><td>55</td><td>61</td><td>63</td><td>64</td></tr> <tr><td>165</td><td>52</td><td>58</td><td>59</td><td>60</td><td>165</td><td>52</td><td>58</td><td>59</td><td>60</td></tr> <tr><td>170</td><td>50</td><td>55</td><td>56</td><td>57</td><td>170</td><td>50</td><td>55</td><td>56</td><td>57</td></tr> <tr><td>175</td><td>47</td><td>52</td><td>53</td><td>54</td><td>175</td><td>47</td><td>52</td><td>53</td><td>54</td></tr> <tr><td>180</td><td>45</td><td>50</td><td>51</td><td>51</td><td>180</td><td>45</td><td>50</td><td>51</td><td>51</td></tr> <tr><td>185</td><td>43</td><td>47</td><td>48</td><td>49</td><td>185</td><td>43</td><td>47</td><td>48</td><td>49</td></tr> <tr><td>190</td><td>41</td><td>45</td><td>46</td><td>47</td><td>190</td><td>41</td><td>45</td><td>46</td><td>47</td></tr> <tr><td>195</td><td>39</td><td>43</td><td>44</td><td>44</td><td>195</td><td>39</td><td>43</td><td>44</td><td>44</td></tr> <tr><td>200</td><td>38</td><td>41</td><td>42</td><td>42</td><td>200</td><td>38</td><td>41</td><td>42</td><td>42</td></tr> <tr><td>210</td><td>35</td><td>37</td><td>38</td><td>39</td><td>210</td><td>35</td><td>37</td><td>38</td><td>39</td></tr> <tr><td>220</td><td>32</td><td>34</td><td>35</td><td>35</td><td>220</td><td>32</td><td>34</td><td>35</td><td>35</td></tr> <tr><td>230</td><td>29</td><td>32</td><td>32</td><td>33</td><td>230</td><td>29</td><td>32</td><td>32</td><td>33</td></tr> <tr><td>240</td><td>27</td><td>29</td><td>30</td><td>30</td><td>240</td><td>27</td><td>29</td><td>30</td><td>30</td></tr> <tr><td>250</td><td>25</td><td>27</td><td>28</td><td>28</td><td>250</td><td>25</td><td>27</td><td>28</td><td>28</td></tr> <tr><td>λ_{L0}</td><td>38.8</td><td>32.3</td><td>30.4</td><td>29.2</td><td>λ_{L0}</td><td>38.8</td><td>32.3</td><td>30.4</td><td>29.2</td></tr> </tbody> </table> <p style="text-align: center;">λ_{L0} is the maximum slenderness ratio of the member having negligible buckling effect.</p>	λ_{LT}	Bending strength for rolled sections				Bending strength for welded sections				Steel grade and design strength (N/mm ²)				Steel grade and design strength (N/mm ²)				Q235	Q345	Q390	Q420	Q235	Q345	Q390	Q420	25	215	310	350	380	25	215	310	350	380	30	215	310	350	377	30	215	310	350	374	35	215	303	336	361	35	215	296	324	344	40	212	289	321	344	40	210	272	297	316	45	203	276	305	326	45	194	250	273	289	50	194	262	288	307	50	178	230	250	265	55	185	247	271	288	55	165	211	229	242	60	176	232	254	268	60	152	194	210	225	65	167	218	236	249	65	141	179	201	217	70	158	203	219	230	70	131	173	194	208	75	149	189	203	212	75	121	167	185	198	80	141	176	188	198	80	115	161	177	188	85	133	164	174	180	85	112	154	168	178	90	125	152	161	166	90	109	147	160	166	95	117	141	149	153	95	105	140	149	153	100	110	131	138	142	100	102	131	138	142	105	103	122	128	131	105	98	122	128	131	110	97	114	119	122	110	95	114	119	122	115	91	106	110	113	115	91	106	110	113	120	86	99	103	105	120	88	99	103	105	125	81	93	96	98	125	81	93	96	98	130	77	87	90	92	130	77	87	90	92	135	72	82	84	88	135	72	82	84	88	140	68	77	79	81	140	68	77	79	81	145	65	72	75	76	145	65	72	75	76	150	61	68	70	72	150	61	68	70	72	155	58	65	68	69	155	58	65	68	69	160	55	61	63	64	160	55	61	63	64	165	52	58	59	60	165	52	58	59	60	170	50	55	56	57	170	50	55	56	57	175	47	52	53	54	175	47	52	53	54	180	45	50	51	51	180	45	50	51	51	185	43	47	48	49	185	43	47	48	49	190	41	45	46	47	190	41	45	46	47	195	39	43	44	44	195	39	43	44	44	200	38	41	42	42	200	38	41	42	42	210	35	37	38	39	210	35	37	38	39	220	32	34	35	35	220	32	34	35	35	230	29	32	32	33	230	29	32	32	33	240	27	29	30	30	240	27	29	30	30	250	25	27	28	28	250	25	27	28	28	λ_{L0}	38.8	32.3	30.4	29.2	λ_{L0}	38.8	32.3	30.4	29.2	<p style="text-align: center;">Table 8.3c - Bending strength p_b (N/mm²) for other steel source</p> <p style="text-align: center;">(i) Bending strength for rolled sections</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="3">λ_{LT}</th> <th colspan="8" style="text-align: center;">Steel grade and design strength (N/mm²)</th> </tr> <tr> <th>Q235</th> <th>Q345/Q355</th> <th>Q390</th> <th>Q420</th> <th>Q480</th> <th>Q550</th> <th colspan="2">Q690</th> </tr> <tr> <th>215</th> <th>305</th> <th>345</th> <th>375</th> <th>410</th> <th>520</th> <th>615</th> <th>630</th> </tr> </thead> <tbody> <tr><td>25</td><td>215</td><td>305</td><td>345</td><td>375</td><td>410</td><td>520</td><td>604</td><td>618</td></tr> <tr><td>30</td><td>215</td><td>305</td><td>345</td><td>373</td><td>403</td><td>497</td><td>577</td><td>589</td></tr> <tr><td>35</td><td>215</td><td>299</td><td>332</td><td>357</td><td>386</td><td>473</td><td>546</td><td>557</td></tr> <tr><td>40</td><td>212</td><td>286</td><td>317</td><td>340</td><td>367</td><td>447</td><td>512</td><td>522</td></tr> <tr><td>45</td><td>204</td><td>272</td><td>302</td><td>323</td><td>347</td><td>419</td><td>475</td><td>484</td></tr> <tr><td>50</td><td>195</td><td>259</td><td>285</td><td>305</td><td>326</td><td>389</td><td>436</td><td>443</td></tr> <tr><td>55</td><td>185</td><td>245</td><td>268</td><td>286</td><td>305</td><td>358</td><td>398</td><td>402</td></tr> <tr><td>60</td><td>177</td><td>230</td><td>251</td><td>266</td><td>283</td><td>327</td><td>358</td><td>363</td></tr> <tr><td>65</td><td>168</td><td>218</td><td>234</td><td>247</td><td>261</td><td>298</td><td>323</td><td>326</td></tr> <tr><td>70</td><td>159</td><td>202</td><td>218</td><td>229</td><td>241</td><td>271</td><td>291</td><td>294</td></tr> <tr><td>75</td><td>150</td><td>188</td><td>202</td><td>211</td><td>221</td><td>246</td><td>262</td><td>264</td></tr> <tr><td>80</td><td>141</td><td>175</td><td>187</td><td>195</td><td>203</td><td>224</td><td>237</td><td>239</td></tr> <tr><td>85</td><td>133</td><td>163</td><td>173</td><td>180</td><td>187</td><td>204</td><td>215</td><td>216</td></tr> <tr><td>90</td><td>125</td><td>151</td><td>160</td><td>166</td><td>172</td><td>188</td><td>195</td><td>196</td></tr> <tr><td>95</td><td>118</td><td>141</td><td>148</td><td>153</td><td>158</td><td>171</td><td>178</td><td>179</td></tr> <tr><td>100</td><td>111</td><td>131</td><td>137</td><td>142</td><td>146</td><td>157</td><td>163</td><td>164</td></tr> <tr><td>105</td><td>104</td><td>122</td><td>128</td><td>131</td><td>135</td><td>144</td><td>150</td><td>150</td></tr> <tr><td>110</td><td>98</td><td>114</td><td>119</td><td>122</td><td>125</td><td>133</td><td>138</td><td>138</td></tr> <tr><td>115</td><td>92</td><td>106</td><td>110</td><td>113</td><td>116</td><td>123</td><td>127</td><td>128</td></tr> 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		<p>Table 8.3c - Bending strength p_b (N/mm²) for other steel source</p> <p>(ii) Bending strength for welded sections</p> <table border="1"> <thead> <tr> <th rowspan="2">λ_{LT}</th> <th colspan="8">Steel grade and design strength (N/mm²)</th> </tr> <tr> <th>Q235</th> <th>Q345/Q355</th> <th>Q390</th> <th>Q420</th> <th>Q460</th> <th>Q550</th> <th colspan="2">Q690</th> </tr> </thead> <tbody> <tr><td>25</td><td>215</td><td>305</td><td>345</td><td>375</td><td>410</td><td>520</td><td>594</td><td>608</td></tr> <tr><td>30</td><td>215</td><td>305</td><td>345</td><td>371</td><td>397</td><td>477</td><td>544</td><td>554</td></tr> <tr><td>35</td><td>215</td><td>293</td><td>321</td><td>341</td><td>365</td><td>437</td><td>498</td><td>505</td></tr> <tr><td>40</td><td>211</td><td>269</td><td>295</td><td>313</td><td>334</td><td>398</td><td>440</td><td>457</td></tr> 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²)								Q235	Q345/Q355	Q390	Q420	Q460	Q550	Q690		25	215	305	345	375	410	520	594	608	30	215	305	345	371	397	477	544	554	35	215	293	321	341	365	437	498	505	40	211	269	295	313	334	398	440	457	45	194	248	270	287	306	361	405	411	50	179	228	248	263	279	328	382	391	55	165	209	227	240	255	314	362	369	60	153	193	209	223	242	298	340	345	65	141	177	199	215	232	281	318	321	70	131	171	192	206	222	264	291	294	75	122	165	184	197	210	248	282	284	80	116	159	176	187	199	224	237	239	85	113	152	167	177	187	204	215	216	90	109	146	159	166	172	188	195	196	95	106	139	148	153	158	171	178	179	100	102	131	137	142	146	157	163	164	105	99	122	128	131	135	144	150	150	110	95	114	119	122	125	133	138	138	115	91	106	110	113	116	123	127	128	120	87	99	103	106	108	114	118	118	125	82	93	96	99	101	106	109	110	130	77	87	90	92	94	99	102	102	135	73	82	85	86	88	93	95	95	140	69	77	80	81	83	87	89	89	145	65	73	75	76	78	81	83	84	150	62	69	71	72	73	76	78	79	155	59	65	67	68	69	72	74	74	160	56	61	63	64	65	68	69	70	165	53	58	60	61	62	64	66	66	170	50	55	57	58	58	61	62	62	175	48	52	54	55	55	57	59	59	180	46	50	51	52	53	55	56	56	185	44	47	49	49	50	52	53	53	190	42	45	46	47	48	49	50	50	195	40	43	44	45	45	47	48	48	200	38	41	42	43	43	45	46	46	210	35	38	39	39	40	41	42	42	220	32	35	35	36	36	37	38	38	230	30	32	33	33	33	34	35	35	240	28	30	30	31	31	32	32	32	250	26	27	28	28	29	29	30	30	λ_{LT}	38.8	32.3	30.6	29.4	28.1	25.0	22.9	22.7
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95	106	139	148	153	158	171	178	179																																																																																																																																																																																																																																																																																																																																																																																																					
100	102	131	137	142	146	157	163	164																																																																																																																																																																																																																																																																																																																																																																																																					
105	99	122	128	131	135	144	150	150																																																																																																																																																																																																																																																																																																																																																																																																					
110	95	114	119	122	125	133	138	138																																																																																																																																																																																																																																																																																																																																																																																																					
115	91	106	110	113	116	123	127	128																																																																																																																																																																																																																																																																																																																																																																																																					
120	87	99	103	106	108	114	118	118																																																																																																																																																																																																																																																																																																																																																																																																					
125	82	93	96	99	101	106	109	110																																																																																																																																																																																																																																																																																																																																																																																																					
130	77	87	90	92	94	99	102	102																																																																																																																																																																																																																																																																																																																																																																																																					
135	73	82	85	86	88	93	95	95																																																																																																																																																																																																																																																																																																																																																																																																					
140	69	77	80	81	83	87	89	89																																																																																																																																																																																																																																																																																																																																																																																																					
145	65	73	75	76	78	81	83	84																																																																																																																																																																																																																																																																																																																																																																																																					
150	62	69	71	72	73	76	78	79																																																																																																																																																																																																																																																																																																																																																																																																					
155	59	65	67	68	69	72	74	74																																																																																																																																																																																																																																																																																																																																																																																																					
160	56	61	63	64	65	68	69	70																																																																																																																																																																																																																																																																																																																																																																																																					
165	53	58	60	61	62	64	66	66																																																																																																																																																																																																																																																																																																																																																																																																					
170	50	55	57	58	58	61	62	62																																																																																																																																																																																																																																																																																																																																																																																																					
175	48	52	54	55	55	57	59	59																																																																																																																																																																																																																																																																																																																																																																																																					
180	46	50	51	52	53	55	56	56																																																																																																																																																																																																																																																																																																																																																																																																					
185	44	47	49	49	50	52	53	53																																																																																																																																																																																																																																																																																																																																																																																																					
190	42	45	46	47	48	49	50	50																																																																																																																																																																																																																																																																																																																																																																																																					
195	40	43	44	45	45	47	48	48																																																																																																																																																																																																																																																																																																																																																																																																					
200	38	41	42	43	43	45	46	46																																																																																																																																																																																																																																																																																																																																																																																																					
210	35	38	39	39	40	41	42	42																																																																																																																																																																																																																																																																																																																																																																																																					
220	32	35	35	36	36	37	38	38																																																																																																																																																																																																																																																																																																																																																																																																					
230	30	32	33	33	33	34	35	35																																																																																																																																																																																																																																																																																																																																																																																																					
240	28	30	30	31	31	32	32	32																																																																																																																																																																																																																																																																																																																																																																																																					
250	26	27	28	28	29	29	30	30																																																																																																																																																																																																																																																																																																																																																																																																					
λ_{LT}	38.8	32.3	30.6	29.4	28.1	25.0	22.9	22.7																																																																																																																																																																																																																																																																																																																																																																																																					

Item

Current version

Amendments

36. Table 8.5b³⁶

Table 8.5b - Shear buckling strength q_w (N/mm²) of a web (for 16mm ≤ t ≤ 40mm)

2) Grade S275 steel, web thickness >16mm ≤ 40mm – design strength $p_y = 265\text{N/mm}^2$															
d/t	Stiffener spacing ratio a/d														
	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞
55	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
60	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
65	159	159	159	159	159	159	159	159	159	159	159	159	159	159	157
70	159	159	159	159	159	159	159	159	159	159	159	158	158	154	151
75	159	159	159	159	159	159	159	159	156	154	152	150	148	145	
80	159	159	159	159	159	159	159	157	153	150	148	147	144	142	138
85	159	159	159	159	159	159	158	152	148	145	143	141	138	136	132
90	159	159	159	159	159	158	153	147	143	139	137	135	132	130	126
95	159	159	159	159	159	154	149	142	137	134	131	129	126	124	120
100	159	159	159	159	155	150	144	137	132	128	126	124	120	118	113
105	159	159	159	159	152	145	139	132	127	123	120	118	114	112	108
110	159	159	159	159	148	141	134	127	121	117	114	112	109	107	103
115	159	159	159	152	144	136	130	122	116	112	110	108	104	103	99
120	159	159	158	149	140	132	125	117	111	108	105	103	100	98	95
125	159	159	155	145	138	127	120	112	107	103	101	99	96	94	91
130	159	159	152	141	132	123	116	108	103	99	97	95	92	91	87
135	159	159	148	137	127	119	111	104	99	96	93	92	89	87	84
140	159	158	145	134	123	114	107	100	95	92	90	88	86	84	81
145	159	155	142	130	119	110	104	97	92	89	87	85	83	81	78
150	159	152	139	126	115	107	100	93	88	86	84	82	80	79	76
155	159	149	135	122	111	103	97	90	86	83	81	80	77	76	73
160	159	147	132	119	108	100	94	87	83	81	79	77	75	74	71
165	159	144	129	115	105	97	91	85	81	78	76	75	73	72	69
170	158	141	125	112	102	94	88	82	78	76	74	73	71	69	67
175	158	138	122	108	99	91	85	80	76	74	72	71	69	67	65
180	153	135	119	105	96	89	83	78	74	72	70	69	67	66	63
185	151	132	115	102	93	86	81	76	72	70	68	67	65	64	61
190	149	129	112	100	91	84	79	74	70	68	66	65	63	62	60
195	146	127	109	97	89	82	77	72	68	66	65	63	62	61	58
200	144	124	107	95	86	80	75	70	67	65	63	62	60	59	57
205	141	121	104	92	84	78	73	68	65	63	61	60	59	58	55
210	139	118	102	90	82	76	71	67	64	61	60	59	57	56	54
215	137	115	99	88	80	74	70	65	62	60	59	58	56	55	53
220	134	112	97	86	78	73	68	64	61	59	57	56	55	54	52
225	132	110	95	84	77	71	67	62	59	57	56	55	53	52	50
230	130	108	93	82	75	70	65	61	58	56	55	54	52	51	49
235	127	105	91	81	73	68	64	60	57	55	54	53	51	50	48
240	125	103	89	79	72	67	63	58	56	54	52	52	50	49	47
245	123	101	87	77	70	65	61	57	54	53	51	50	49	48	46
250	120	99	85	76	69	64	60	56	53	52	50	49	48	47	45

Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.

Table 8.5b - Shear buckling strength q_w (N/mm²) of a web (for 16mm ≤ t ≤ 40mm)

2) Grade S275 steel, web thickness >16mm ≤ 40mm – design strength $p_y = 265\text{N/mm}^2$															
d/t	Stiffener spacing ratio a/d														
	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞
55	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
60	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
65	159	159	159	159	159	159	159	159	159	159	159	159	159	159	157
70	159	159	159	159	159	159	159	159	159	159	159	159	159	158	154
75	159	159	159	159	159	159	159	159	159	159	159	159	159	156	152
80	159	159	159	159	159	159	159	159	159	159	159	159	159	157	153
85	159	159	159	159	159	159	158	152	148	145	143	141	138	136	132
90	159	159	159	159	159	158	153	147	143	139	137	135	132	130	126
95	159	159	159	159	159	154	149	142	137	134	131	129	126	124	120
100	159	159	159	159	155	150	144	137	132	128	126	124	120	118	113
105	159	159	159	159	152	145	139	132	127	123	120	118	114	112	108
110	159	159	159	159	148	141	134	127	121	117	114	112	109	107	103
115	159	159	159	152	144	136	130	122	116	112	110	108	104	103	99
120	159	159	158	149	140	132	125	117	111	108	105	103	100	98	95
125	159	159	155	145	138	127	120	112	107	103	101	99	96	94	91
130	159	159	152	141	132	123	116	108	103	99	97	95	92	91	87
135	159	159	148	137	127	119	111	104	99	96	93	92	89	87	84
140	159	158	145	134	123	114	107	100	95	92	90	88	86	84	81
145	159	155	142	130	119	110	104	97	92	89	87	85	83	81	78
150	159	152	139	126	115	107	100	93	88	86	84	82	80	79	76
155	159	149	135	122	111	103	97	90	86	83	81	80	77	76	73
160	159	147	132	119	108	100	94	87	83	81	79	77	75	74	71
165	159	144	129	115	105	97	91	85	81	78	76	75	73	72	69
170	158	141	125	112	102	94	88	82	78	76	74	73	71	69	67
175	158	138	122	108	99	91	85	80	76	74	72	71	69	67	65
180	153	135	119	105	96	89	83	78	74	72	70	69	67	66	63
185	151	132	115	102	93	86	81	76	72	70	68	67	65	64	61
190	149	129	112	100	91	84	79	74	70	68	66	65	63	62	60
195	146	127	109	97	89	82	77	72	68	66	65	63	62	61	58
200	144	124	107	95	86	80	75	70	67	65	63	62	60	59	57
205	141	121	104	92	84	78	73	68	65	63	61	60	59	58	55
210	139	118	102	90	82	76	71	67	64	61	60	59	57	56	54
215	137	115	99	88	80	74	70	65	62	60	59	58	56	55	53
220	134	112	97	86	78	73	68	64	61	59	57	56	55	54	52
225	132	110	95	84	77	71	67	62	59	57	56	55	53	52	50
230	130	108	93	82	75	70	65	61	58	56	55	54	52	51	49
235	127	105	91	81	73	68	64	60	57	55	54	53	51	50	48
240	125	103	89	79	72	67	63	58	56	54	52	52	50	49	47
245	123	101	87	77	70	65	61	57	54	53	51	50	49	48	46
250	120	99	85	76	69	64	60	56	53	52	50	49	48	47	45

Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.

³⁶ Revision of web thickness.

Item

Current version

Amendments

37. Table 8.5d³⁷

Table 8.5d - Shear buckling strength q_w (N/mm²) of a web (for 16mm $\leq t \leq 40$ mm)

4) Grade S355 steel, web thickness >16mm \leq 40mm – design strength $p_y = 345$ N/mm ²															
d/t	Stiffener spacing ratio a/d														
	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞
55	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207
60	207	207	207	207	207	207	207	207	207	207	207	207	205	203	199
65	207	207	207	207	207	207	207	207	204	201	200	198	194	190	180
70	207	207	207	207	207	207	205	200	196	193	191	187	185	180	171
75	207	207	207	207	207	205	197	192	188	185	183	179	177	171	160
80	207	207	207	207	205	198	190	184	180	176	174	170	168	162	153
85	207	207	207	207	206	198	191	182	176	172	168	165	161	159	144
90	207	207	207	207	200	192	184	175	168	163	160	157	152	150	144
95	207	207	207	205	194	185	177	167	160	155	151	149	144	142	136
100	207	207	207	199	188	178	170	160	152	147	144	141	137	135	129
105	207	207	206	194	182	172	163	152	145	140	137	134	131	128	123
110	207	207	202	188	176	165	156	145	138	134	131	128	125	123	118
115	207	207	197	182	170	159	149	139	132	128	125	123	119	117	113
120	207	207	192	177	164	152	143	133	127	123	120	118	114	112	108
125	207	204	187	171	158	146	137	128	122	118	115	113	110	108	104
130	207	200	182	166	152	140	132	123	117	113	111	109	105	104	100
135	207	195	177	160	146	135	127	118	113	109	106	105	102	100	96
140	207	191	172	155	141	130	122	114	109	105	103	101	98	96	92
145	207	187	167	149	136	126	118	110	105	102	99	97	95	93	89
150	205	183	162	144	131	122	114	106	102	98	96	94	91	90	86
155	201	178	157	140	127	118	111	103	98	95	93	91	88	87	84
160	198	174	152	135	123	114	107	100	95	92	90	88	86	84	81
165	194	170	147	131	119	111	104	97	92	89	87	86	83	82	78
170	191	165	143	127	116	107	101	94	90	87	85	83	81	79	76
175	187	161	139	124	113	104	98	91	87	84	82	81	78	77	74
180	184	167	135	120	109	101	95	89	85	82	80	78	76	75	72
185	180	163	131	117	106	99	93	88	82	80	78	76	74	73	70
190	177	149	128	114	104	98	90	84	80	77	76	74	72	71	68
195	173	145	125	111	101	94	88	82	78	76	74	72	70	69	66
200	170	141	122	108	98	91	85	80	76	74	72	71	69	67	65
205	166	138	119	106	96	89	84	78	74	72	70	69	67	66	63
210	163	134	116	103	94	87	82	76	73	70	68	67	65	64	62
215	159	131	113	101	92	85	80	74	71	68	67	66	64	63	60
220	156	128	111	98	90	83	78	73	69	67	65	64	62	61	59
225	152	125	108	96	88	81	76	71	68	65	64	63	61	60	58
230	149	123	106	94	86	79	74	69	66	64	62	61	60	59	56
235	146	120	103	92	84	78	73	68	65	63	61	60	58	57	55
240	143	118	101	90	82	76	71	67	63	61	60	59	57	56	54
245	140	115	99	88	80	74	70	66	62	60	59	58	56	55	53
250	137	113	97	87	79	73	69	64	61	59	57	56	54	53	52

Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.

Table 8.5d - Shear buckling strength q_w (N/mm²) of a web (for 16mm $\leq t \leq 40$ mm)

4) Grade S355 steel, web thickness >16mm \leq 40mm – design strength $p_y = 345$ N/mm ²															
d/t	Stiffener spacing ratio a/d														
	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞
55	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207
60	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207
65	207	207	207	207	207	207	207	207	207	207	207	207	207	204	201
70	207	207	207	207	207	207	207	207	207	207	207	207	205	200	196
75	207	207	207	207	207	207	205	197	192	188	185	183	179	177	171
80	207	207	207	207	205	198	190	184	180	176	174	170	168	162	153
85	207	207	207	207	206	198	191	182	176	172	168	165	161	159	144
90	207	207	207	207	200	192	184	175	168	163	160	157	152	150	144
95	207	207	207	205	194	185	177	167	160	155	151	149	144	142	136
100	207	207	207	199	188	178	170	160	152	147	144	141	137	135	129
105	207	207	206	194	182	172	163	152	145	140	137	134	131	128	123
110	207	207	202	188	176	165	156	145	138	134	131	128	125	123	118
115	207	207	197	182	170	159	149	139	132	128	125	123	119	117	113
120	207	207	192	177	164	152	143	133	127	123	120	118	114	112	108
125	207	204	187	171	158	146	137	128	122	118	115	113	110	108	104
130	207	200	182	166	152	140	132	123	117	113	111	109	105	104	100
135	207	195	177	160	146	135	127	118	113	109	106	105	102	100	96
140	207	191	172	155	141	130	122	114	109	105	103	101	98	96	92
145	207	187	167	149	136	126	118	110	105	102	99	97	95	93	89
150	205	183	162	144	131	122	114	106	102	98	96	94	91	90	86
155	201	178	157	140	127	118	111	103	98	95	93	91	88	87	84
160	198	174	152	135	123	114	107	100	95	92	90	88	86	84	81
165	194	170	147	131	119	111	104	97	92	89	87	86	83	82	78
170	191	165	143	127	116	107	101	94	90	87	85	83	81	79	76
175	187	161	139	124	113	104	98	91	87	84	82	81	78	77	74
180	184	167	135	120	109	101	95	89	85	82	80	78	76	75	72
185	180	163	131	117	106	99	93	88	82	80	78	76	74	73	70
190	177	149	128	114	104	98	90	84	80	77	76	74	72	71	68
195	173	145	125	111	101	94	88	82	78	76	74	72	70	69	66
200	170	141	122	108	98	91	85	80	76	74	72	71	69	67	65
205	166	138	119	106	96	89	84	78	74	72	70	69	67	66	63
210	163	134	116	103	94	87	82	76	73	70	68	67	65	64	62
215	159	131	113	101	92	85	80	74	71	68	67	66	64	63	60
220	156	128	111	98	90	83	78	73	69	67	65	64	62	61	59
225	152	125	108	96	88	81	76	71	68	65	64	63	61	60	58
230	149	123	106	94	86	79	74	69	66	64	62	61	60	59	56
235	146	120	103	92	84	78	73	68	65	63	61	60	58	57	55
240	143	118	101	90	82	76	71	67	63	61	60	59	57	56	54
245	140	115	99	88	80	74	70	66	62	60	59	58	56	55	53
250	137	113	97	87	79	73	69	64	61	59	57	56	54	53	52

Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.

³⁷ Revision of web thickness.

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Table 8.5e ³⁸	<p style="text-align: center;">Table 8.5e - Shear buckling strength q_w (N/mm²) of a web (for $t \leq 16$mm)</p> <p style="text-align: center;">5) Grade Q235 steel, web thickness ≤ 16mm – design strength $p_y = 215$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="14">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>60</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>65</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>70</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>75</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>80</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>127</td><td>126</td><td>124</td><td>123</td><td>120</td></tr> <tr><td>85</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>127</td><td>125</td><td>123</td><td>122</td><td>119</td><td>118</td><td>115</td></tr> <tr><td>90</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>126</td><td>123</td><td>121</td><td>119</td><td>117</td><td>115</td><td>114</td><td>111</td></tr> <tr><td>95</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>127</td><td>122</td><td>119</td><td>117</td><td>115</td><td>113</td><td>111</td><td>110</td><td>108</td></tr> <tr><td>100</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>128</td><td>124</td><td>119</td><td>115</td><td>113</td><td>111</td><td>109</td><td>107</td><td>105</td><td>102</td></tr> <tr><td>105</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>125</td><td>120</td><td>115</td><td>111</td><td>109</td><td>106</td><td>105</td><td>102</td><td>101</td><td>97</td></tr> <tr><td>110</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>127</td><td>122</td><td>117</td><td>111</td><td>107</td><td>105</td><td>102</td><td>101</td><td>98</td><td>92</td></tr> <tr><td>115</td><td>129</td><td>129</td><td>129</td><td>129</td><td>124</td><td>118</td><td>113</td><td>108</td><td>104</td><td>101</td><td>98</td><td>97</td><td>94</td><td>92</td><td>88</td></tr> <tr><td>120</td><td>129</td><td>129</td><td>129</td><td>129</td><td>127</td><td>121</td><td>115</td><td>110</td><td>104</td><td>100</td><td>97</td><td>94</td><td>92</td><td>90</td><td>85</td></tr> <tr><td>125</td><td>129</td><td>129</td><td>129</td><td>124</td><td>118</td><td>112</td><td>107</td><td>100</td><td>96</td><td>92</td><td>90</td><td>89</td><td>88</td><td>85</td><td>81</td></tr> <tr><td>130</td><td>129</td><td>129</td><td>129</td><td>122</td><td>115</td><td>109</td><td>103</td><td>97</td><td>92</td><td>89</td><td>87</td><td>85</td><td>83</td><td>81</td><td>78</td></tr> <tr><td>135</td><td>129</td><td>129</td><td>127</td><td>119</td><td>112</td><td>105</td><td>100</td><td>93</td><td>89</td><td>86</td><td>84</td><td>82</td><td>80</td><td>78</td><td>75</td></tr> <tr><td>140</td><td>129</td><td>129</td><td>125</td><td>116</td><td>109</td><td>102</td><td>96</td><td>90</td><td>85</td><td>83</td><td>81</td><td>79</td><td>77</td><td>75</td><td>73</td></tr> <tr><td>145</td><td>129</td><td>129</td><td>122</td><td>114</td><td>108</td><td>99</td><td>93</td><td>88</td><td>82</td><td>80</td><td>78</td><td>76</td><td>74</td><td>73</td><td>70</td></tr> <tr><td>150</td><td>129</td><td>128</td><td>120</td><td>111</td><td>103</td><td>98</td><td>90</td><td>84</td><td>80</td><td>77</td><td>75</td><td>74</td><td>72</td><td>70</td><td>68</td></tr> <tr><td>155</td><td>129</td><td>128</td><td>117</td><td>108</td><td>100</td><td>92</td><td>87</td><td>81</td><td>77</td><td>74</td><td>73</td><td>71</td><td>69</td><td>68</td><td>65</td></tr> <tr><td>160</td><td>129</td><td>128</td><td>115</td><td>105</td><td>97</td><td>90</td><td>84</td><td>78</td><td>75</td><td>72</td><td>70</td><td>69</td><td>67</td><td>66</td><td>63</td></tr> <tr><td>165</td><td>129</td><td>124</td><td>113</td><td>103</td><td>94</td><td>87</td><td>81</td><td>76</td><td>72</td><td>70</td><td>68</td><td>67</td><td>65</td><td>64</td><td>61</td></tr> <tr><td>170</td><td>129</td><td>122</td><td>110</td><td>100</td><td>91</td><td>84</td><td>79</td><td>74</td><td>70</td><td>68</td><td>66</td><td>65</td><td>63</td><td>62</td><td>60</td></tr> <tr><td>175</td><td>129</td><td>120</td><td>108</td><td>97</td><td>88</td><td>82</td><td>77</td><td>72</td><td>68</td><td>66</td><td>64</td><td>63</td><td>61</td><td>60</td><td>58</td></tr> <tr><td>180</td><td>129</td><td>117</td><td>105</td><td>94</td><td>86</td><td>80</td><td>75</td><td>70</td><td>66</td><td>64</td><td>63</td><td>61</td><td>60</td><td>59</td><td>56</td></tr> <tr><td>185</td><td>129</td><td>115</td><td>103</td><td>92</td><td>84</td><td>77</td><td>73</td><td>68</td><td>64</td><td>62</td><td>61</td><td>60</td><td>58</td><td>57</td><td>55</td></tr> <tr><td>190</td><td>127</td><td>113</td><td>100</td><td>89</td><td>81</td><td>75</td><td>71</td><td>66</td><td>63</td><td>61</td><td>59</td><td>58</td><td>56</td><td>55</td><td>53</td></tr> <tr><td>195</td><td>128</td><td>111</td><td>98</td><td>87</td><td>79</td><td>73</td><td>69</td><td>64</td><td>61</td><td>59</td><td>58</td><td>57</td><td>55</td><td>54</td><td>52</td></tr> <tr><td>200</td><td>124</td><td>109</td><td>96</td><td>85</td><td>77</td><td>72</td><td>67</td><td>63</td><td>60</td><td>58</td><td>56</td><td>55</td><td>54</td><td>53</td><td>51</td></tr> <tr><td>205</td><td>122</td><td>107</td><td>93</td><td>83</td><td>75</td><td>70</td><td>66</td><td>61</td><td>58</td><td>56</td><td>55</td><td>54</td><td>52</td><td>51</td><td>49</td></tr> <tr><td>210</td><td>120</td><td>105</td><td>91</td><td>81</td><td>74</td><td>68</td><td>64</td><td>60</td><td>57</td><td>55</td><td>54</td><td>53</td><td>51</td><td>50</td><td>48</td></tr> <tr><td>215</td><td>119</td><td>103</td><td>89</td><td>79</td><td>72</td><td>66</td><td>62</td><td>58</td><td>55</td><td>54</td><td>52</td><td>51</td><td>50</td><td>49</td><td>47</td></tr> <tr><td>220</td><td>117</td><td>101</td><td>87</td><td>77</td><td>70</td><td>65</td><td>61</td><td>57</td><td>54</td><td>52</td><td>51</td><td>50</td><td>49</td><td>48</td><td>46</td></tr> <tr><td>225</td><td>115</td><td>99</td><td>85</td><td>75</td><td>69</td><td>64</td><td>60</td><td>56</td><td>53</td><td>51</td><td>50</td><td>49</td><td>48</td><td>47</td><td>45</td></tr> <tr><td>230</td><td>113</td><td>97</td><td>83</td><td>74</td><td>67</td><td>62</td><td>58</td><td>54</td><td>52</td><td>50</td><td>49</td><td>48</td><td>47</td><td>46</td><td>44</td></tr> <tr><td>235</td><td>112</td><td>94</td><td>81</td><td>72</td><td>66</td><td>61</td><td>57</td><td>53</td><td>51</td><td>49</td><td>48</td><td>47</td><td>46</td><td>45</td><td>43</td></tr> <tr><td>240</td><td>110</td><td>92</td><td>79</td><td>71</td><td>64</td><td>60</td><td>56</td><td>52</td><td>50</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>42</td></tr> <tr><td>245</td><td>108</td><td>90</td><td>78</td><td>69</td><td>63</td><td>58</td><td>55</td><td>51</td><td>49</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>41</td></tr> <tr><td>250</td><td>107</td><td>89</td><td>76</td><td>68</td><td>62</td><td>57</td><td>54</td><td>50</td><td>48</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>40</td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d														0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	60	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	65	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	70	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	75	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	80	129	129	129	129	129	129	129	129	129	129	127	126	124	123	120	85	129	129	129	129	129	129	129	129	127	125	123	122	119	118	115	90	129	129	129	129	129	129	129	126	123	121	119	117	115	114	111	95	129	129	129	129	129	129	127	122	119	117	115	113	111	110	108	100	129	129	129	129	129	128	124	119	115	113	111	109	107	105	102	105	129	129	129	129	129	125	120	115	111	109	106	105	102	101	97	110	129	129	129	129	129	127	122	117	111	107	105	102	101	98	92	115	129	129	129	129	124	118	113	108	104	101	98	97	94	92	88	120	129	129	129	129	127	121	115	110	104	100	97	94	92	90	85	125	129	129	129	124	118	112	107	100	96	92	90	89	88	85	81	130	129	129	129	122	115	109	103	97	92	89	87	85	83	81	78	135	129	129	127	119	112	105	100	93	89	86	84	82	80	78	75	140	129	129	125	116	109	102	96	90	85	83	81	79	77	75	73	145	129	129	122	114	108	99	93	88	82	80	78	76	74	73	70	150	129	128	120	111	103	98	90	84	80	77	75	74	72	70	68	155	129	128	117	108	100	92	87	81	77	74	73	71	69	68	65	160	129	128	115	105	97	90	84	78	75	72	70	69	67	66	63	165	129	124	113	103	94	87	81	76	72	70	68	67	65	64	61	170	129	122	110	100	91	84	79	74	70	68	66	65	63	62	60	175	129	120	108	97	88	82	77	72	68	66	64	63	61	60	58	180	129	117	105	94	86	80	75	70	66	64	63	61	60	59	56	185	129	115	103	92	84	77	73	68	64	62	61	60	58	57	55	190	127	113	100	89	81	75	71	66	63	61	59	58	56	55	53	195	128	111	98	87	79	73	69	64	61	59	58	57	55	54	52	200	124	109	96	85	77	72	67	63	60	58	56	55	54	53	51	205	122	107	93	83	75	70	66	61	58	56	55	54	52	51	49	210	120	105	91	81	74	68	64	60	57	55	54	53	51	50	48	215	119	103	89	79	72	66	62	58	55	54	52	51	50	49	47	220	117	101	87	77	70	65	61	57	54	52	51	50	49	48	46	225	115	99	85	75	69	64	60	56	53	51	50	49	48	47	45	230	113	97	83	74	67	62	58	54	52	50	49	48	47	46	44	235	112	94	81	72	66	61	57	53	51	49	48	47	46	45	43	240	110	92	79	71	64	60	56	52	50	48	47	46	45	44	42	245	108	90	78	69	63	58	55	51	49	47	46	45	44	43	41	250	107	89	76	68	62	57	54	50	48	46	45	44	43	42	40	<p style="text-align: center;">Table 8.5e - Shear buckling strength q_w (N/mm²) of a web (for $t \leq 16$mm)</p> <p style="text-align: center;">5) Grade S460 steel, web thickness ≤ 16mm – design strength $p_y = 460$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="14">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>276</td><td>276</td><td>276</td><td>276</td><td>276</td><td>276</td><td>276</td><td>276</td><td>276</td><td>276</td><td>276</td><td>276</td><td>276</td><td>276</td><td>276</td></tr> 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<tr><td>140</td><td>262</td><td>230</td><td>201</td><td>178</td><td>162</td><td>150</td><td>141</td><td>132</td><td>126</td><td>121</td><td>119</td><td>116</td><td>113</td><td>111</td><td>107</td></tr> <tr><td>145</td><td>257</td><td>224</td><td>194</td><td>172</td><td>157</td><td>145</td><td>136</td><td>127</td><td>121</td><td>117</td><td>114</td><td>112</td><td>109</td><td>107</td><td>103</td></tr> <tr><td>150</td><td>252</td><td>217</td><td>187</td><td>167</td><td>152</td><td>140</td><td>132</td><td>123</td><td>117</td><td>113</td><td>111</td><td>109</td><td>105</td><td>104</td><td>100</td></tr> <tr><td>155</td><td>246</td><td>210</td><td>181</td><td>161</td><td>147</td><td>138</td><td>128</td><td>119</td><td>113</td><td>110</td><td>107</td><td>105</td><td>102</td><td>100</td><td>96</td></tr> <tr><td>160</td><td>241</td><td>204</td><td>176</td><td>156</td><td>142</td><td>132</td><td>124</td><td>115</td><td>110</td><td>106</td><td>104</td><td>102</td><td>99</td><td>97</td><td>93</td></tr> <tr><td>165</td><td>235</td><td>197</td><td>170</td><td>151</td><td>138</td><td>128</td><td>120</td><td>112</td><td>107</td><td>103</td><td>101</td><td>99</td><td>96</td><td>94</td><td>91</td></tr> <tr><td>170</td><td>230</td><td>192</td><td>165</td><td>147</td><td>134</td><td>124</td><td>116</td><td>108</td><td>103</td><td>100</td><td>98</td><td>96</td><td>93</td><td>92</td><td>88</td></tr> <tr><td>175</td><td>225</td><td>186</td><td>160</td><td>143</td><td>130</td><td>120</td><td>113</td><td>105</td><td>100</td><td>97</td><td>95</td><td>93</td><td>90</td><td>89</td><td>85</td></tr> <tr><td>180</td><td>219</td><td>181</td><td>156</td><td>139</td><td>126</td><td>117</td><td>110</td><td>102</td><td>98</td><td>94</td><td>92</td><td>91</td><td>88</td><td>86</td><td>83</td></tr> <tr><td>185</td><td>214</td><td>176</td><td>152</td><td>135</td><td>123</td><td>114</td><td>107</td><td>100</td><td>96</td><td>92</td><td>90</td><td>88</td><td>85</td><td>84</td><td>81</td></tr> <tr><td>190</td><td>208</td><td>172</td><td>148</td><td>131</td><td>120</td><td>111</td><td>104</td><td>97</td><td>93</td><td>89</td><td>87</td><td>86</td><td>83</td><td>82</td><td>79</td></tr> <tr><td>195</td><td>203</td><td>167</td><td>144</td><td>128</td><td>117</td><td>108</td><td>101</td><td>95</td><td>90</td><td>87</td><td>85</td><td>84</td><td>81</td><td>80</td><td>77</td></tr> <tr><td>200</td><td>198</td><td>163</td><td>140</td><td>125</td><td>114</td><td>105</td><td>99</td><td>92</td><td>88</td><td>85</td><td>83</td><td>81</td><td>79</td><td>78</td><td>75</td></tr> <tr><td>205</td><td>193</td><td>159</td><td>137</td><td>122</td><td>111</td><td>103</td><td>96</td><td>90</td><td>86</td><td>83</td><td>81</td><td>79</td><td>77</td><td>76</td><td>73</td></tr> 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a/d														0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	60	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	65	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	70	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	75	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	80	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	85	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	90	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	95	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	100	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	105	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	110	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	115	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	120	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	125	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	130	273	243	218	192	167	152	142	136	131	128	125	122	120	115	111	135	268	237	208	185	168	156	147	137	130	126	123	121	117	115	111	140	262	230	201	178	162	150	141	132	126	121	119	116	113	111	107	145	257	224	194	172	157	145	136	127	121	117	114	112	109	107	103	150	252	217	187	167	152	140	132	123	117	113	111	109	105	104	100	155	246	210	181	161	147	138	128	119	113	110	107	105	102	100	96	160	241	204	176	156	142	132	124	115	110	106	104	102	99	97	93	165	235	197	170	151	138	128	120	112	107	103	101	99	96	94	91	170	230	192	165	147	134	124	116	108	103	100	98	96	93	92	88	175	225	186	160	143	130	120	113	105	100	97	95	93	90	89	85	180	219	181	156	139	126	117	110	102	98	94	92	91	88	86	83	185	214	176	152	135	123	114	107	100	96	92	90	88	85	84	81	190	208	172	148	131	120	111	104	97	93	89	87	86	83	82	79	195	203	167	144	128	117	108	101	95	90	87	85	84	81	80	77	200	198	163	140	125	114	105	99	92	88	85	83	81	79	78	75	205	193	159	137	122	111	103	96	90	86	83	81	79	77	76	73	210	188	155	134	119	108	100	94	88	84	81	79	78	75	74	71	215	184	152	131	116	106	98	92	86	82	79	77	76	74	72	70	220	180	148	128	114	103	96	90	84	80	77	75	74	72	71	68	225	176	145	125	111	101	94	88	82	78	76	74	72	70	69	66	230	172	142	122	109	99	92	86	80	76	74	72	71	69	68	65	235	168	139	120	106	97	90	84	78	75	72	71	69	67	66	64	240	165	136	117	104	95	88	82	77	73	71	69	68	66	65	62	245	161	133	115	102	93	86	81	75	72	69	68	67	65	64	61	250	158	130	112	100	91	84	79	74	70	68	66	65	63	62	60
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<tr><td>125</td><td>123</td><td>123</td><td>123</td><td>120</td><td>114</td><td>108</td><td>104</td><td>98</td><td>93</td><td>90</td><td>88</td><td>87</td><td>84</td><td>83</td><td>79</td></tr> <tr><td>130</td><td>123</td><td>123</td><td>123</td><td>118</td><td>111</td><td>105</td><td>100</td><td>94</td><td>90</td><td>87</td><td>85</td><td>83</td><td>81</td><td>79</td><td>78</td></tr> <tr><td>135</td><td>123</td><td>123</td><td>123</td><td>115</td><td>108</td><td>102</td><td>97</td><td>91</td><td>88</td><td>84</td><td>82</td><td>80</td><td>78</td><td>78</td><td>73</td></tr> <tr><td>140</td><td>123</td><td>123</td><td>120</td><td>113</td><td>108</td><td>99</td><td>94</td><td>87</td><td>83</td><td>81</td><td>79</td><td>77</td><td>75</td><td>74</td><td>71</td></tr> <tr><td>145</td><td>123</td><td>123</td><td>118</td><td>110</td><td>103</td><td>98</td><td>91</td><td>84</td><td>80</td><td>78</td><td>78</td><td>75</td><td>72</td><td>71</td><td>68</td></tr> <tr><td>150</td><td>123</td><td>123</td><td>116</td><td>108</td><td>100</td><td>93</td><td>88</td><td>82</td><td>78</td><td>75</td><td>73</td><td>72</td><td>70</td><td>69</td><td>66</td></tr> <tr><td>155</td><td>123</td><td>123</td><td>114</td><td>105</td><td>97</td><td>90</td><td>85</td><td>79</td><td>75</td><td>73</td><td>71</td><td>70</td><td>68</td><td>67</td><td>64</td></tr> <tr><td>160</td><td>123</td><td>121</td><td>111</td><td>102</td><td>94</td><td>87</td><td>82</td><td>76</td><td>73</td><td>70</td><td>69</td><td>67</td><td>66</td><td>64</td><td>62</td></tr> <tr><td>165</td><td>123</td><td>119</td><td>109</td><td>100</td><td>92</td><td>85</td><td>80</td><td>74</td><td>71</td><td>68</td><td>67</td><td>65</td><td>64</td><td>62</td><td>60</td></tr> <tr><td>170</td><td>123</td><td>118</td><td>107</td><td>97</td><td>89</td><td>82</td><td>77</td><td>72</td><td>69</td><td>66</td><td>65</td><td>63</td><td>62</td><td>61</td><td>58</td></tr> <tr><td>175</td><td>123</td><td>116</td><td>105</td><td>95</td><td>88</td><td>80</td><td>75</td><td>70</td><td>67</td><td>64</td><td>63</td><td>62</td><td>60</td><td>59</td><td>57</td></tr> <tr><td>180</td><td>123</td><td>114</td><td>102</td><td>92</td><td>84</td><td>78</td><td>73</td><td>68</td><td>65</td><td>63</td><td>61</td><td>60</td><td>58</td><td>57</td><td>55</td></tr> <tr><td>185</td><td>123</td><td>112</td><td>100</td><td>90</td><td>82</td><td>76</td><td>71</td><td>66</td><td>63</td><td>61</td><td>59</td><td>58</td><td>57</td><td>56</td><td>53</td></tr> <tr><td>190</td><td>123</td><td>110</td><td>98</td><td>87</td><td>79</td><td>74</td><td>69</td><td>64</td><td>61</td><td>59</td><td>58</td><td>57</td><td>55</td><td>54</td><td>52</td></tr> <tr><td>195</td><td>121</td><td>108</td><td>96</td><td>85</td><td>77</td><td>72</td><td>67</td><td>63</td><td>60</td><td>58</td><td>58</td><td>55</td><td>54</td><td>53</td><td>51</td></tr> <tr><td>200</td><td>120</td><td>106</td><td>93</td><td>83</td><td>75</td><td>70</td><td>66</td><td>61</td><td>58</td><td>56</td><td>55</td><td>54</td><td>52</td><td>51</td><td>49</td></tr> <tr><td>205</td><td>118</td><td>104</td><td>91</td><td>81</td><td>74</td><td>68</td><td>64</td><td>60</td><td>57</td><td>55</td><td>54</td><td>53</td><td>51</td><td>50</td><td>48</td></tr> <tr><td>210</td><td>116</td><td>102</td><td>89</td><td>79</td><td>72</td><td>68</td><td>62</td><td>58</td><td>55</td><td>54</td><td>52</td><td>51</td><td>50</td><td>49</td><td>47</td></tr> <tr><td>215</td><td>115</td><td>100</td><td>87</td><td>77</td><td>70</td><td>65</td><td>61</td><td>57</td><td>54</td><td>52</td><td>51</td><td>50</td><td>49</td><td>48</td><td>46</td></tr> <tr><td>220</td><td>113</td><td>98</td><td>85</td><td>75</td><td>68</td><td>63</td><td>60</td><td>56</td><td>53</td><td>51</td><td>50</td><td>49</td><td>48</td><td>47</td><td>45</td></tr> <tr><td>225</td><td>112</td><td>96</td><td>83</td><td>74</td><td>67</td><td>62</td><td>58</td><td>54</td><td>52</td><td>50</td><td>49</td><td>48</td><td>46</td><td>46</td><td>44</td></tr> <tr><td>230</td><td>110</td><td>94</td><td>81</td><td>72</td><td>65</td><td>61</td><td>57</td><td>53</td><td>51</td><td>49</td><td>48</td><td>47</td><td>46</td><td>45</td><td>43</td></tr> <tr><td>235</td><td>108</td><td>92</td><td>79</td><td>70</td><td>64</td><td>59</td><td>56</td><td>52</td><td>49</td><td>48</td><td>47</td><td>46</td><td>44</td><td>44</td><td>42</td></tr> <tr><td>240</td><td>107</td><td>90</td><td>78</td><td>69</td><td>63</td><td>58</td><td>55</td><td>51</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>41</td></tr> <tr><td>245</td><td>105</td><td>88</td><td>76</td><td>68</td><td>61</td><td>57</td><td>53</td><td>50</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>40</td></tr> <tr><td>250</td><td>104</td><td>87</td><td>74</td><td>66</td><td>60</td><td>56</td><td>52</td><td>49</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>39</td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d														0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	60	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	65	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	70	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	75	123	123	123	123	123	123	123	123	123	123	123	123	123	123	120	80	123	123	123	123	123	123	123	123	123	123	121	120	118	116		85	123	123	123	123	123	123	123	123	122	120	119	118	116	114	112	90	123	123	123	123	123	123	123	122	119	117	115	114	112	110	107	95	123	123	123	123	123	123	123	118	115	113	111	110	108	105	103	100	123	123	123	123	123	123	120	115	112	109	107	106	104	102	99	105	123	123	123	123	123	120	116	111	108	105	103	102	100	98	95	110	123	123	123	123	122	117	113	108	104	102	100	98	96	94	90	115	123	123	123	123	120	114	110	105	101	98	96	94	91	90	88	120	123	123	123	123	117	111	107	101	97	94	92	90	88	88	83	125	123	123	123	120	114	108	104	98	93	90	88	87	84	83	79	130	123	123	123	118	111	105	100	94	90	87	85	83	81	79	78	135	123	123	123	115	108	102	97	91	88	84	82	80	78	78	73	140	123	123	120	113	108	99	94	87	83	81	79	77	75	74	71	145	123	123	118	110	103	98	91	84	80	78	78	75	72	71	68	150	123	123	116	108	100	93	88	82	78	75	73	72	70	69	66	155	123	123	114	105	97	90	85	79	75	73	71	70	68	67	64	160	123	121	111	102	94	87	82	76	73	70	69	67	66	64	62	165	123	119	109	100	92	85	80	74	71	68	67	65	64	62	60	170	123	118	107	97	89	82	77	72	69	66	65	63	62	61	58	175	123	116	105	95	88	80	75	70	67	64	63	62	60	59	57	180	123	114	102	92	84	78	73	68	65	63	61	60	58	57	55	185	123	112	100	90	82	76	71	66	63	61	59	58	57	56	53	190	123	110	98	87	79	74	69	64	61	59	58	57	55	54	52	195	121	108	96	85	77	72	67	63	60	58	58	55	54	53	51	200	120	106	93	83	75	70	66	61	58	56	55	54	52	51	49	205	118	104	91	81	74	68	64	60	57	55	54	53	51	50	48	210	116	102	89	79	72	68	62	58	55	54	52	51	50	49	47	215	115	100	87	77	70	65	61	57	54	52	51	50	49	48	46	220	113	98	85	75	68	63	60	56	53	51	50	49	48	47	45	225	112	96	83	74	67	62	58	54	52	50	49	48	46	46	44	230	110	94	81	72	65	61	57	53	51	49	48	47	46	45	43	235	108	92	79	70	64	59	56	52	49	48	47	46	44	44	42	240	107	90	78	69	63	58	55	51	48	47	46	45	44	43	41	245	105	88	76	68	61	57	53	50	47	46	45	44	43	42	40	250	104	87	74	66	60	56	52	49	46	45	44	43	42	41	39	<p style="text-align: center;">Table 8.5f - Shear buckling strength q_w (N/mm²) of a web (for 16mm < t ≤ 40mm)</p> <p style="text-align: center;">6) Grade S460 steel, web thickness >16mm ≤ 40mm – design strength $p_y = 440$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="14">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>60</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>65</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>70</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>75</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>80</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>85</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>90</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>95</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>100</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>105</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>110</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>115</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>120</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>125</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>130</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>135</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>140</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>145</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>150</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td><td>264</td></tr> <tr><td>155</td><td>230</td><td>206</td><td>177</td><td>158</td><td>143</td><td>133</td><td>125</td><td>116</td><td>111</td><td>107</td><td>106</td><td>103</td><td>100</td><td>98</td><td>94</td></tr> <tr><td>160</td><td>234</td><td>199</td><td>172</td><td>153</td><td>139</td><td>129</td><td>121</td><td>113</td><td>107</td><td>104</td><td>101</td><td>100</td><td>97</td><td>95</td><td>91</td></tr> <tr><td>165</td><td>229</td><td>193</td><td>166</td><td>148</td><td>135</td><td>125</td><td>117</td><td>109</td><td>104</td><td>101</td><td>98</td><td>97</td><td>94</td><td>92</td><td>89</td></tr> <tr><td>170</td><td>224</td><td>187</td><td>160</td><td>142</td><td>131</td><td>121</td><td>114</td><td>106</td><td>101</td><td>98</td><td>95</td><td>94</td><td>91</td><td>90</td><td>86</td></tr> <tr><td>175</td><td>219</td><td>182</td><td>157</td><td>140</td><td>127</td><td>118</td><td>111</td><td>103</td><td>98</td><td>95</td><td>93</td><td>91</td><td>88</td><td>87</td><td>84</td></tr> <tr><td>180</td><td>214</td><td>177</td><td>153</td><td>136</td><td>124</td><td>114</td><td>107</td><td>100</td><td>96</td><td>92</td><td>90</td><td>89</td><td>86</td><td>85</td><td>81</td></tr> 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a/d														0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	60	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	65	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	70	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	75	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	80	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	85	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	90	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	95	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	100	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	105	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	110	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	115	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	120	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	125	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	130	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	135	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	140	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	145	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	150	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	155	230	206	177	158	143	133	125	116	111	107	106	103	100	98	94	160	234	199	172	153	139	129	121	113	107	104	101	100	97	95	91	165	229	193	166	148	135	125	117	109	104	101	98	97	94	92	89	170	224	187	160	142	131	121	114	106	101	98	95	94	91	90	86	175	219	182	157	140	127	118	111	103	98	95	93	91	88	87	84	180	214	177	153	136	124	114	107	100	96	92	90	89	86	85	81	185	209	172	148	132	120	111	105	97	93	90	89	88	84	82	79	190	204	166	145	129	117	108	102	95	90	88	85	84	81	80	77	195	199	163	141	125	114	106	99	92	88	85	83	82	79	78	75	200	194	159	137	122	111	103	97	90	86	83	81	80	77	76	73	205	189	155	134	119	108	100	94	88	84	81	79	78	75	74	71	210	184	152	131	116	106	98	92	86	82	79	77	76	74	72	70	215	180	148	128	114	103	96	90	84	80	77	75	74	72	71	68	220	176	145	125	111	101	94	88	82	78	76	74	72	70	69	66	225	172	142	122	109	99	92	86	80	76	74	72	71	69	68	65	230	168	139	119	106	97	90	84	78	75	72	71	69	67	66	64	235	165	136	117	104	95	88	82	77	73	71	69	68	65	65	62	240	161	133	114	102	93	86	81	75	72	69	68	66	64	63	61	245	158	130	112	100	91	84	79	74	70	68	66	65	63	62	60	250	155	127	110	98	89	82	77	72	69	67	65	64	62	61	58
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<tr><td>170</td><td>177</td><td>155</td><td>135</td><td>120</td><td>109</td><td>101</td><td>95</td><td>89</td><td>84</td><td>82</td><td>80</td><td>78</td><td>76</td><td>75</td><td>72</td></tr> <tr><td>175</td><td>174</td><td>151</td><td>131</td><td>117</td><td>106</td><td>98</td><td>92</td><td>86</td><td>82</td><td>79</td><td>77</td><td>76</td><td>74</td><td>73</td><td>70</td></tr> <tr><td>180</td><td>171</td><td>148</td><td>128</td><td>113</td><td>103</td><td>96</td><td>90</td><td>84</td><td>80</td><td>77</td><td>75</td><td>74</td><td>72</td><td>70</td><td>68</td></tr> <tr><td>185</td><td>168</td><td>144</td><td>124</td><td>110</td><td>100</td><td>93</td><td>87</td><td>81</td><td>78</td><td>75</td><td>73</td><td>72</td><td>70</td><td>69</td><td>66</td></tr> <tr><td>190</td><td>165</td><td>140</td><td>121</td><td>107</td><td>98</td><td>91</td><td>85</td><td>79</td><td>75</td><td>73</td><td>71</td><td>70</td><td>68</td><td>67</td><td>64</td></tr> <tr><td>195</td><td>162</td><td>137</td><td>118</td><td>105</td><td>96</td><td>88</td><td>83</td><td>77</td><td>74</td><td>71</td><td>69</td><td>68</td><td>66</td><td>65</td><td>62</td></tr> <tr><td>200</td><td>159</td><td>133</td><td>115</td><td>102</td><td>93</td><td>86</td><td>81</td><td>75</td><td>72</td><td>69</td><td>68</td><td>66</td><td>64</td><td>63</td><td>61</td></tr> <tr><td>205</td><td>158</td><td>130</td><td>112</td><td>100</td><td>91</td><td>84</td><td>79</td><td>73</td><td>70</td><td>68</td><td>66</td><td>65</td><td>63</td><td>62</td><td>59</td></tr> <tr><td>210</td><td>153</td><td>127</td><td>109</td><td>97</td><td>88</td><td>82</td><td>77</td><td>72</td><td>68</td><td>66</td><td>64</td><td>63</td><td>61</td><td>60</td><td>58</td></tr> <tr><td>215</td><td>150</td><td>124</td><td>107</td><td>95</td><td>86</td><td>80</td><td>75</td><td>70</td><td>67</td><td>64</td><td>63</td><td>62</td><td>60</td><td>59</td><td>57</td></tr> <tr><td>220</td><td>147</td><td>121</td><td>104</td><td>93</td><td>84</td><td>78</td><td>73</td><td>68</td><td>65</td><td>63</td><td>61</td><td>60</td><td>59</td><td>58</td><td>55</td></tr> <tr><td>225</td><td>144</td><td>118</td><td>102</td><td>91</td><td>82</td><td>76</td><td>72</td><td>67</td><td>64</td><td>62</td><td>60</td><td>59</td><td>57</td><td>56</td><td>54</td></tr> <tr><td>230</td><td>141</td><td>116</td><td>100</td><td>89</td><td>81</td><td>75</td><td>70</td><td>65</td><td>62</td><td>60</td><td>59</td><td>58</td><td>56</td><td>55</td><td>53</td></tr> <tr><td>235</td><td>138</td><td>113</td><td>98</td><td>87</td><td>79</td><td>73</td><td>69</td><td>64</td><td>61</td><td>59</td><td>57</td><td>56</td><td>55</td><td>54</td><td>52</td></tr> <tr><td>240</td><td>135</td><td>111</td><td>96</td><td>85</td><td>77</td><td>72</td><td>67</td><td>63</td><td>60</td><td>58</td><td>56</td><td>55</td><td>54</td><td>53</td><td>51</td></tr> <tr><td>245</td><td>132</td><td>109</td><td>94</td><td>83</td><td>76</td><td>70</td><td>66</td><td>61</td><td>58</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>50</td></tr> <tr><td>250</td><td>129</td><td>107</td><td>92</td><td>82</td><td>74</td><td>69</td><td>64</td><td>60</td><td>57</td><td>55</td><td>54</td><td>53</td><td>51</td><td>51</td><td>49</td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d															0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	60	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	65	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	70	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	75	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	80	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	85	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	90	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	95	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	100	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	105	188	188	188	179	169	160	153	144	137	132	129	127	123	121	116	110	188	188	188	174	164	155	147	137	131	126	123	121	118	116	111	115	188	188	181	169	159	149	141	131	125	121	118	116	112	111	108	120	188	188	177	165	154	144	135	126	120	116	113	111	108	108	102	125	188	188	173	160	148	138	129	121	115	111	108	107	103	102	98	130	188	184	169	155	143	133	124	116	111	107	104	102	99	98	94	135	188	180	165	151	138	128	120	112	108	103	100	99	96	94	90	140	188	177	160	146	133	123	115	108	103	99	97	95	92	91	87	145	188	173	156	141	128	119	111	104	99	96	93	92	89	88	84	150	188	168	152	136	124	115	108	100	96	93	90	89	86	85	81	155	188	168	148	132	120	111	104	97	93	90	87	86	83	82	79	160	183	162	144	128	116	108	101	94	90	87	85	83	81	79	76	165	180	159	139	124	113	104	98	91	87	84	82	81	78	77	74	170	177	155	135	120	109	101	95	89	84	82	80	78	76	75	72	175	174	151	131	117	106	98	92	86	82	79	77	76	74	73	70	180	171	148	128	113	103	96	90	84	80	77	75	74	72	70	68	185	168	144	124	110	100	93	87	81	78	75	73	72	70	69	66	190	165	140	121	107	98	91	85	79	75	73	71	70	68	67	64	195	162	137	118	105	96	88	83	77	74	71	69	68	66	65	62	200	159	133	115	102	93	86	81	75	72	69	68	66	64	63	61	205	158	130	112	100	91	84	79	73	70	68	66	65	63	62	59	210	153	127	109	97	88	82	77	72	68	66	64	63	61	60	58	215	150	124	107	95	86	80	75	70	67	64	63	62	60	59	57	220	147	121	104	93	84	78	73	68	65	63	61	60	59	58	55	225	144	118	102	91	82	76	72	67	64	62	60	59	57	56	54	230	141	116	100	89	81	75	70	65	62	60	59	58	56	55	53	235	138	113	98	87	79	73	69	64	61	59	57	56	55	54	52	240	135	111	96	85	77	72	67	63	60	58	56	55	54	53	51	245	132	109	94	83	76	70	66	61	58	56	55	54	53	52	50	250	129	107	92	82	74	69	64	60	57	55	54	53	51	51	49	<p style="text-align: center;">Table 8.5g - Shear buckling strength q_w (N/mm²) of a web (for $t \leq 50$mm)</p> <p style="text-align: center;">7) Grade S550 steel, web thickness ≤ 50mm – design strength $p_y = 550$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="15">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td></tr> <tr><td>60</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td></tr> <tr><td>65</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td></tr> <tr><td>70</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td></tr> <tr><td>75</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td></tr> <tr><td>80</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td></tr> <tr><td>85</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td></tr> <tr><td>90</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td></tr> <tr><td>95</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td></tr> <tr><td>100</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td><td>330</td></tr> <tr><td>105</td><td>330</td><td>315</td><td>286</td><td>260</td><td>237</td><td>219</td><td>206</td><td>192</td><td>183</td><td>177</td><td>173</td><td>170</td><td>165</td><td>162</td><td>156</td></tr> <tr><td>110</td><td>330</td><td>306</td><td>276</td><td>249</td><td>226</td><td>209</td><td>197</td><td>183</td><td>175</td><td>169</td><td>165</td><td>162</td><td>157</td><td>155</td><td>149</td></tr> <tr><td>115</td><td>330</td><td>297</td><td>268</td><td>238</td><td>218</td><td>200</td><td>188</td><td>175</td><td>167</td><td>162</td><td>158</td><td>155</td><td>150</td><td>148</td><td>142</td></tr> <tr><td>120</td><td>325</td><td>289</td><td>256</td><td>228</td><td>207</td><td>192</td><td>180</td><td>168</td><td>160</td><td>155</td><td>151</td><td>148</td><td>144</td><td>142</td><td>136</td></tr> <tr><td>125</td><td>318</td><td>280</td><td>246</td><td>219</td><td>199</td><td>184</td><td>173</td><td>161</td><td>154</td><td>149</td><td>145</td><td>143</td><td>138</td><td>136</td><td>131</td></tr> <tr><td>130</td><td>311</td><td>272</td><td>238</td><td>210</td><td>191</td><td>177</td><td>166</td><td>155</td><td>148</td><td>143</td><td>140</td><td>137</td><td>133</td><td>131</td><td>126</td></tr> <tr><td>135</td><td>304</td><td>263</td><td>227</td><td>202</td><td>184</td><td>171</td><td>160</td><td>149</td><td>142</td><td>138</td><td>134</td><td>132</td><td>128</td><td>126</td><td>121</td></tr> <tr><td>140</td><td>297</td><td>255</td><td>219</td><td>195</td><td>178</td><td>165</td><td>154</td><td>144</td><td>137</td><td>133</td><td>130</td><td>127</td><td>124</td><td>122</td><td>117</td></tr> <tr><td>145</td><td>290</td><td>248</td><td>212</td><td>188</td><td>171</td><td>159</td><td>149</td><td>139</td><td>133</td><td>128</td><td>125</td><td>123</td><td>119</td><td>117</td><td>113</td></tr> <tr><td>150</td><td>283</td><td>238</td><td>205</td><td>182</td><td>166</td><td>154</td><td>144</td><td>134</td><td>128</td><td>124</td><td>121</td><td>119</td><td>115</td><td>113</td><td>109</td></tr> <tr><td>155</td><td>276</td><td>230</td><td>198</td><td>176</td><td>160</td><td>148</td><td>140</td><td>130</td><td>124</td><td>120</td><td>117</td><td>115</td><td>112</td><td>110</td><td>105</td></tr> <tr><td>160</td><td>269</td><td>223</td><td>192</td><td>171</td><td>155</td><td>144</td><td>135</td><td>126</td><td>120</td><td>116</td><td>113</td><td>111</td><td>108</td><td>106</td><td>102</td></tr> <tr><td>165</td><td>262</td><td>216</td><td>186</td><td>166</td><td>151</td><td>140</td><td>131</td><td>122</td><td>117</td><td>113</td><td>110</td><td>108</td><td>105</td><td>103</td><td>99</td></tr> <tr><td>170</td><td>255</td><td>210</td><td>181</td><td>161</td><td>146</td><td>135</td><td>127</td><td>119</td><td>113</td><td>109</td><td>107</td><td>105</td><td>102</td><td>100</td><td>96</td></tr> <tr><td>175</td><td>248</td><td>204</td><td>175</td><td>156</td><td>142</td><td>132</td><td>124</td><td>115</td><td>110</td><td>106</td><td>104</td><td>102</td><td>99</td><td>97</td><td>93</td></tr> <tr><td>180</td><td>240</td><td>198</td><td>171</td><td>152</td><td>138</td><td>128</td><td>120</td><td>112</td><td>107</td><td>103</td><td>101</td><td>99</td><td>96</td><td>95</td><td>91</td></tr> <tr><td>185</td><td>234</td><td>193</td><td>166</td><td>146</td><td>134</td><td>124</td><td>117</td><td>109</td><td>104</td><td>100</td><td>98</td><td>96</td><td>94</td><td>92</td><td>88</td></tr> <tr><td>190</td><td>228</td><td>188</td><td>162</td><td>144</td><td>131</td><td>121</td><td>114</td><td>106</td><td>101</td><td>98</td><td>95</td><td>94</td><td>91</td><td>90</td><td>86</td></tr> <tr><td>195</td><td>222</td><td>183</td><td>157</td><td>140</td><td>127</td><td>118</td><td>111</td><td>103</td><td>99</td><td>95</td><td>93</td><td>91</td><td>89</td><td>87</td><td>84</td></tr> <tr><td>200</td><td>216</td><td>178</td><td>154</td><td>137</td><td>124</td><td>115</td><td>108</td><td>101</td><td>98</td><td>93</td><td>91</td><td>89</td><td>87</td><td>85</td><td>82</td></tr> <tr><td>205</td><td>211</td><td>174</td><td>150</td><td>133</td><td>121</td><td>112</td><td>106</td><td>98</td><td>94</td><td>91</td><td>89</td><td>87</td><td>84</td><td>83</td><td>80</td></tr> <tr><td>210</td><td>206</td><td>170</td><td>146</td><td>130</td><td>118</td><td>110</td><td>103</td><td>96</td><td>92</td><td>89</td><td>86</td><td>85</td><td>82</td><td>81</td><td>78</td></tr> <tr><td>215</td><td>201</td><td>166</td><td>143</td><td>127</td><td>116</td><td>107</td><td>101</td><td>94</td><td>89</td><td>86</td><td>84</td><td>83</td><td>80</td><td>79</td><td>76</td></tr> <tr><td>220</td><td>197</td><td>162</td><td>140</td><td>124</td><td>113</td><td>105</td><td>98</td><td>92</td><td>87</td><td>85</td><td>82</td><td>81</td><td>79</td><td>77</td><td>74</td></tr> <tr><td>225</td><td>192</td><td>158</td><td>136</td><td>121</td><td>110</td><td>102</td><td>96</td><td>90</td><td>85</td><td>83</td><td>81</td><td>79</td><td>77</td><td>76</td><td>73</td></tr> <tr><td>230</td><td>188</td><td>155</td><td>134</td><td>119</td><td>108</td><td>100</td><td>94</td><td>88</td><td>84</td><td>81</td><td>79</td><td>77</td><td>75</td><td>74</td><td>71</td></tr> <tr><td>235</td><td>184</td><td>152</td><td>131</td><td>116</td><td>106</td><td>98</td><td>92</td><td>86</td><td>82</td><td>79</td><td>77</td><td>76</td><td>74</td><td>72</td><td>70</td></tr> <tr><td>240</td><td>180</td><td>148</td><td>128</td><td>114</td><td>104</td><td>96</td><td>90</td><td>84</td><td>80</td><td>77</td><td>76</td><td>74</td><td>72</td><td>71</td><td>68</td></tr> <tr><td>245</td><td>177</td><td>145</td><td>125</td><td>111</td><td>101</td><td>94</td><td>88</td><td>82</td><td>78</td><td>76</td><td>74</td><td>73</td><td>71</td><td>69</td><td>67</td></tr> <tr><td>250</td><td>173</td><td>143</td><td>123</td><td>109</td><td>99</td><td>92</td><td>87</td><td>81</td><td>77</td><td>74</td><td>73</td><td>71</td><td>69</td><td>68</td><td>65</td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d															0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	60	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	65	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	70	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	75	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	80	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	85	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	90	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	95	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	100	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	105	330	315	286	260	237	219	206	192	183	177	173	170	165	162	156	110	330	306	276	249	226	209	197	183	175	169	165	162	157	155	149	115	330	297	268	238	218	200	188	175	167	162	158	155	150	148	142	120	325	289	256	228	207	192	180	168	160	155	151	148	144	142	136	125	318	280	246	219	199	184	173	161	154	149	145	143	138	136	131	130	311	272	238	210	191	177	166	155	148	143	140	137	133	131	126	135	304	263	227	202	184	171	160	149	142	138	134	132	128	126	121	140	297	255	219	195	178	165	154	144	137	133	130	127	124	122	117	145	290	248	212	188	171	159	149	139	133	128	125	123	119	117	113	150	283	238	205	182	166	154	144	134	128	124	121	119	115	113	109	155	276	230	198	176	160	148	140	130	124	120	117	115	112	110	105	160	269	223	192	171	155	144	135	126	120	116	113	111	108	106	102	165	262	216	186	166	151	140	131	122	117	113	110	108	105	103	99	170	255	210	181	161	146	135	127	119	113	109	107	105	102	100	96	175	248	204	175	156	142	132	124	115	110	106	104	102	99	97	93	180	240	198	171	152	138	128	120	112	107	103	101	99	96	95	91	185	234	193	166	146	134	124	117	109	104	100	98	96	94	92	88	190	228	188	162	144	131	121	114	106	101	98	95	94	91	90	86	195	222	183	157	140	127	118	111	103	99	95	93	91	89	87	84	200	216	178	154	137	124	115	108	101	98	93	91	89	87	85	82	205	211	174	150	133	121	112	106	98	94	91	89	87	84	83	80	210	206	170	146	130	118	110	103	96	92	89	86	85	82	81	78	215	201	166	143	127	116	107	101	94	89	86	84	83	80	79	76	220	197	162	140	124	113	105	98	92	87	85	82	81	79	77	74	225	192	158	136	121	110	102	96	90	85	83	81	79	77	76	73	230	188	155	134	119	108	100	94	88	84	81	79	77	75	74	71	235	184	152	131	116	106	98	92	86	82	79	77	76	74	72	70	240	180	148	128	114	104	96	90	84	80	77	76	74	72	71	68	245	177	145	125	111	101	94	88	82	78	76	74	73	71	69	67	250	173	143	123	109	99	92	87	81	77	74	73	71	69	68	65
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<tr><td>200</td><td>154</td><td>130</td><td>112</td><td>100</td><td>91</td><td>84</td><td>79</td><td>73</td><td>70</td><td>68</td><td>66</td><td>65</td><td>63</td><td>62</td><td>59</td></tr> <tr><td>205</td><td>151</td><td>127</td><td>109</td><td>97</td><td>88</td><td>82</td><td>77</td><td>72</td><td>68</td><td>66</td><td>64</td><td>63</td><td>61</td><td>60</td><td>58</td></tr> <tr><td>210</td><td>148</td><td>124</td><td>107</td><td>95</td><td>86</td><td>80</td><td>75</td><td>70</td><td>67</td><td>64</td><td>63</td><td>62</td><td>60</td><td>59</td><td>57</td></tr> <tr><td>215</td><td>146</td><td>121</td><td>104</td><td>93</td><td>84</td><td>78</td><td>73</td><td>68</td><td>65</td><td>63</td><td>61</td><td>60</td><td>58</td><td>57</td><td>55</td></tr> <tr><td>220</td><td>143</td><td>118</td><td>102</td><td>90</td><td>82</td><td>76</td><td>71</td><td>67</td><td>63</td><td>61</td><td>60</td><td>59</td><td>57</td><td>56</td><td>54</td></tr> <tr><td>225</td><td>140</td><td>115</td><td>99</td><td>88</td><td>80</td><td>74</td><td>70</td><td>66</td><td>62</td><td>60</td><td>59</td><td>57</td><td>56</td><td>55</td><td>53</td></tr> <tr><td>230</td><td>137</td><td>113</td><td>97</td><td>86</td><td>79</td><td>73</td><td>68</td><td>64</td><td>61</td><td>59</td><td>57</td><td>56</td><td>55</td><td>54</td><td>52</td></tr> <tr><td>235</td><td>134</td><td>111</td><td>95</td><td>85</td><td>77</td><td>71</td><td>67</td><td>62</td><td>59</td><td>57</td><td>56</td><td>55</td><td>53</td><td>53</td><td>50</td></tr> <tr><td>240</td><td>132</td><td>108</td><td>93</td><td>83</td><td>75</td><td>70</td><td>65</td><td>61</td><td>58</td><td>56</td><td>55</td><td>54</td><td>52</td><td>51</td><td>49</td></tr> <tr><td>245</td><td>129</td><td>106</td><td>91</td><td>81</td><td>74</td><td>68</td><td>64</td><td>60</td><td>57</td><td>55</td><td>54</td><td>53</td><td>51</td><td>50</td><td>48</td></tr> <tr><td>250</td><td>126</td><td>104</td><td>89</td><td>80</td><td>72</td><td>67</td><td>63</td><td>59</td><td>56</td><td>54</td><td>53</td><td>52</td><td>50</td><td>49</td><td>47</td></tr> </tbody> </table> <p align="center">Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d														0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	60	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	65	177	177	177	177	177	177	177	177	177	177	177	177	175	173	169	70	177	177	177	177	177	177	177	177	174	172	170	168	165	162		75	177	177	177	177	177	177	177	175	171	168	165	164	161	159	155	80	177	177	177	177	177	177	178	170	165	162	159	157	154	152	147	85	177	177	177	177	177	178	170	164	159	155	152	150	147	145	140	90	177	177	177	177	177	171	165	158	152	149	148	144	140	138	133	95	177	177	177	177	173	168	159	152	146	142	139	137	133	131	126	100	177	177	177	177	168	161	154	146	140	136	133	130	126	124	119	105	177	177	177	173	163	155	148	140	134	129	126	124	120	118	114	110	177	177	177	168	159	150	143	134	128	123	120	118	115	113	108	115	177	177	175	164	154	145	137	128	122	118	115	113	110	108	104	120	177	177	171	169	149	140	132	123	117	113	110	108	105	103	99	125	177	177	167	155	144	135	128	118	112	108	105	104	101	99	95	130	177	177	163	151	139	129	121	113	108	104	102	100	97	95	92	135	177	174	159	146	135	124	117	109	104	100	98	96	93	92	88	140	177	170	155	142	130	120	113	105	100	97	94	93	90	89	85	145	177	167	151	137	125	116	109	101	97	93	91	89	87	85	82	150	177	164	148	133	121	112	105	98	93	90	88	86	84	83	79	155	177	160	144	129	117	108	102	95	90	87	85	84	81	80	77	160	178	157	140	125	113	105	98	92	87	85	83	81	79	77	74	165	173	154	136	121	110	102	95	89	85	82	80	79	76	75	72	170	170	150	132	117	107	99	93	86	82	80	78	76	74	73	70	175	168	147	128	114	104	96	90	84	80	77	75	74	72	71	68	180	165	144	124	111	101	93	87	82	78	75	73	72	70	69	66	185	162	140	121	108	98	91	85	79	76	73	71	70	68	67	64	190	159	137	118	105	95	88	83	77	74	71	69	68	66	65	63	195	157	134	115	102	93	86	81	75	72	69	68	66	64	63	61	200	154	130	112	100	91	84	79	73	70	68	66	65	63	62	59	205	151	127	109	97	88	82	77	72	68	66	64	63	61	60	58	210	148	124	107	95	86	80	75	70	67	64	63	62	60	59	57	215	146	121	104	93	84	78	73	68	65	63	61	60	58	57	55	220	143	118	102	90	82	76	71	67	63	61	60	59	57	56	54	225	140	115	99	88	80	74	70	66	62	60	59	57	56	55	53	230	137	113	97	86	79	73	68	64	61	59	57	56	55	54	52	235	134	111	95	85	77	71	67	62	59	57	56	55	53	53	50	240	132	108	93	83	75	70	65	61	58	56	55	54	52	51	49	245	129	106	91	81	74	68	64	60	57	55	54	53	51	50	48	250	126	104	89	80	72	67	63	59	56	54	53	52	50	49	47	<p align="center">Table 8.5h - Shear buckling strength q_w (N/mm²) of a web (for 50mm < $t \leq 100$mm)</p> <p align="center">8) Grade S550 steel, web thickness >50mm ≤ 100mm – design strength $p_r = 530$N/mm²</p> <table border="1"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="14">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>318</td><td>318</td><td>318</td><td>318</td><td>318</td><td>318</td><td>318</td><td>318</td><td>318</td><td>318</td><td>318</td><td>318</td><td>318</td><td>318</td><td>318</td></tr> <tr><td>60</td><td>318</td><td>318</td><td>318</td><td>318</td><td>318</td><td>318</td><td>318</td><td>316</td><td>305</td><td>296</td><td>290</td><td>286</td><td>282</td><td>278</td><td>273</td></tr> <tr><td>65</td><td>318</td><td>318</td><td>318</td><td>318</td><td>318</td><td>318</td><td>313</td><td>303</td><td>290</td><td>281</td><td>275</td><td>270</td><td>266</td><td>260</td><td>256</td></tr> <tr><td>70</td><td>318</td><td>318</td><td>318</td><td>318</td><td>318</td><td>314</td><td>301</td><td>290</td><td>276</td><td>266</td><td>259</td><td>254</td><td>250</td><td>243</td><td>239</td></tr> <tr><td>75</td><td>318</td><td>318</td><td>318</td><td>318</td><td>302</td><td>288</td><td>278</td><td>262</td><td>251</td><td>244</td><td>238</td><td>233</td><td>226</td><td>223</td><td>214</td></tr> <tr><td>80</td><td>318</td><td>318</td><td>318</td><td>307</td><td>291</td><td>276</td><td>263</td><td>247</td><td>236</td><td>228</td><td>223</td><td>219</td><td>212</td><td>209</td><td>201</td></tr> <tr><td>85</td><td>318</td><td>318</td><td>317</td><td>297</td><td>279</td><td>263</td><td>250</td><td>233</td><td>222</td><td>215</td><td>210</td><td>206</td><td>200</td><td>197</td><td>189</td></tr> <tr><td>90</td><td>318</td><td>318</td><td>307</td><td>286</td><td>267</td><td>251</td><td>236</td><td>220</td><td>210</td><td>203</td><td>198</td><td>194</td><td>189</td><td>186</td><td>178</td></tr> <tr><td>95</td><td>318</td><td>318</td><td>298</td><td>276</td><td>256</td><td>238</td><td>223</td><td>206</td><td>199</td><td>192</td><td>187</td><td>184</td><td>179</td><td>176</td><td>169</td></tr> <tr><td>100</td><td>318</td><td>314</td><td>288</td><td>265</td><td>244</td><td>226</td><td>212</td><td>196</td><td>189</td><td>182</td><td>178</td><td>175</td><td>170</td><td>167</td><td>160</td></tr> <tr><td>105</td><td>318</td><td>306</td><td>279</td><td>255</td><td>233</td><td>215</td><td>202</td><td>186</td><td>180</td><td>174</td><td>170</td><td>167</td><td>162</td><td>159</td><td>153</td></tr> <tr><td>110</td><td>318</td><td>298</td><td>270</td><td>244</td><td>222</td><td>206</td><td>193</td><td>180</td><td>172</td><td>166</td><td>162</td><td>159</td><td>154</td><td>152</td><td>146</td></tr> <tr><td>115</td><td>318</td><td>290</td><td>260</td><td>233</td><td>212</td><td>197</td><td>185</td><td>172</td><td>164</td><td>159</td><td>155</td><td>152</td><td>148</td><td>145</td><td>140</td></tr> <tr><td>120</td><td>316</td><td>282</td><td>251</td><td>223</td><td>203</td><td>188</td><td>177</td><td>165</td><td>157</td><td>152</td><td>148</td><td>146</td><td>142</td><td>139</td><td>134</td></tr> <tr><td>125</td><td>310</td><td>274</td><td>241</td><td>214</td><td>195</td><td>181</td><td>170</td><td>158</td><td>151</td><td>146</td><td>142</td><td>140</td><td>136</td><td>134</td><td>128</td></tr> <tr><td>130</td><td>303</td><td>266</td><td>232</td><td>206</td><td>188</td><td>174</td><td>163</td><td>152</td><td>145</td><td>140</td><td>137</td><td>135</td><td>131</td><td>128</td><td>123</td></tr> <tr><td>135</td><td>298</td><td>258</td><td>223</td><td>199</td><td>181</td><td>167</td><td>157</td><td>147</td><td>140</td><td>135</td><td>132</td><td>130</td><td>126</td><td>124</td><td>119</td></tr> <tr><td>140</td><td>290</td><td>250</td><td>215</td><td>192</td><td>174</td><td>161</td><td>152</td><td>143</td><td>136</td><td>130</td><td>127</td><td>125</td><td>121</td><td>119</td><td>115</td></tr> <tr><td>145</td><td>283</td><td>242</td><td>208</td><td>185</td><td>168</td><td>156</td><td>146</td><td>138</td><td>130</td><td>126</td><td>123</td><td>121</td><td>117</td><td>115</td><td>111</td></tr> <tr><td>150</td><td>276</td><td>233</td><td>201</td><td>179</td><td>163</td><td>151</td><td>142</td><td>132</td><td>126</td><td>122</td><td>119</td><td>117</td><td>113</td><td>111</td><td>107</td></tr> <tr><td>155</td><td>270</td><td>226</td><td>194</td><td>173</td><td>157</td><td>146</td><td>137</td><td>128</td><td>122</td><td>118</td><td>115</td><td>113</td><td>110</td><td>108</td><td>104</td></tr> <tr><td>160</td><td>263</td><td>219</td><td>188</td><td>168</td><td>153</td><td>141</td><td>133</td><td>124</td><td>118</td><td>114</td><td>111</td><td>109</td><td>106</td><td>104</td><td>100</td></tr> 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<tr><td>215</td><td>197</td><td>163</td><td>140</td><td>125</td><td>114</td><td>105</td><td>99</td><td>92</td><td>88</td><td>85</td><td>83</td><td>81</td><td>79</td><td>78</td><td>75</td></tr> <tr><td>220</td><td>193</td><td>159</td><td>137</td><td>122</td><td>111</td><td>103</td><td>97</td><td>90</td><td>86</td><td>83</td><td>81</td><td>79</td><td>77</td><td>76</td><td>73</td></tr> <tr><td>225</td><td>189</td><td>155</td><td>134</td><td>119</td><td>108</td><td>100</td><td>94</td><td>88</td><td>84</td><td>81</td><td>79</td><td>78</td><td>75</td><td>74</td><td>71</td></tr> <tr><td>230</td><td>185</td><td>152</td><td>131</td><td>117</td><td>106</td><td>98</td><td>92</td><td>86</td><td>82</td><td>79</td><td>77</td><td>76</td><td>74</td><td>73</td><td>70</td></tr> <tr><td>235</td><td>181</td><td>149</td><td>128</td><td>114</td><td>104</td><td>96</td><td>90</td><td>84</td><td>80</td><td>78</td><td>76</td><td>74</td><td>72</td><td>71</td><td>68</td></tr> <tr><td>240</td><td>177</td><td>146</td><td>126</td><td>112</td><td>102</td><td>94</td><td>88</td><td>82</td><td>79</td><td>76</td><td>74</td><td>73</td><td>71</td><td>70</td><td>67</td></tr> <tr><td>245</td><td>173</td><td>143</td><td>123</td><td>109</td><td>100</td><td>92</td><td>87</td><td>81</td><td>77</td><td>74</td><td>73</td><td>71</td><td>69</td><td>68</td><td>66</td></tr> <tr><td>250</td><td>170</td><td>140</td><td>121</td><td>107</td><td>98</td><td>90</td><td>85</td><td>79</td><td>75</td><td>73</td><td>71</td><td>70</td><td>68</td><td>67</td><td>64</td></tr> </tbody> </table> <p align="center">Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d														0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	318	318	318	318	318	318	318	318	318	318	318	318	318	318	318	60	318	318	318	318	318	318	318	316	305	296	290	286	282	278	273	65	318	318	318	318	318	318	313	303	290	281	275	270	266	260	256	70	318	318	318	318	318	314	301	290	276	266	259	254	250	243	239	75	318	318	318	318	302	288	278	262	251	244	238	233	226	223	214	80	318	318	318	307	291	276	263	247	236	228	223	219	212	209	201	85	318	318	317	297	279	263	250	233	222	215	210	206	200	197	189	90	318	318	307	286	267	251	236	220	210	203	198	194	189	186	178	95	318	318	298	276	256	238	223	206	199	192	187	184	179	176	169	100	318	314	288	265	244	226	212	196	189	182	178	175	170	167	160	105	318	306	279	255	233	215	202	186	180	174	170	167	162	159	153	110	318	298	270	244	222	206	193	180	172	166	162	159	154	152	146	115	318	290	260	233	212	197	185	172	164	159	155	152	148	145	140	120	316	282	251	223	203	188	177	165	157	152	148	146	142	139	134	125	310	274	241	214	195	181	170	158	151	146	142	140	136	134	128	130	303	266	232	206	188	174	163	152	145	140	137	135	131	128	123	135	298	258	223	199	181	167	157	147	140	135	132	130	126	124	119	140	290	250	215	192	174	161	152	143	136	130	127	125	121	119	115	145	283	242	208	185	168	156	146	138	130	126	123	121	117	115	111	150	276	233	201	179	163	151	142	132	126	122	119	117	113	111	107	155	270	226	194	173	157	146	137	128	122	118	115	113	110	108	104	160	263	219	188	168	153	141	133	124	118	114	111	109	106	104	100	165	256	212	183	162	148	137	129	120	114	111	108	106	103	101	97	170	250	206	177	158	144	133	125	116	111	107	105	103	100	98	94	175	243	200	172	153	139	129	121	113	108	104	102	100	97	95	92	180	236	194	167	149	136	126	118	110	105	101	99	97	94	93	89	185	230	189	163	145	132	122	115	107	102	99	96	95	92	90	87	190	223	184	159	141	128	119	112	104	99	96	94	92	89	88	84	195	218	179	155	137	125	116	109	101	97	94	91	90	87	86	82	200	212	175	151	134	122	113	106	99	94	91	89	87	85	84	80	205	207	171	147	131	119	110	104	97	92	89	87	85	83	81	78	210	202	167	144	128	116	108	101	94	90	87	85	83	81	80	76	215	197	163	140	125	114	105	99	92	88	85	83	81	79	78	75	220	193	159	137	122	111	103	97	90	86	83	81	79	77	76	73	225	189	155	134	119	108	100	94	88	84	81	79	78	75	74	71	230	185	152	131	117	106	98	92	86	82	79	77	76	74	73	70	235	181	149	128	114	104	96	90	84	80	78	76	74	72	71	68	240	177	146	126	112	102	94	88	82	79	76	74	73	71	70	67	245	173	143	123	109	100	92	87	81	77	74	73	71	69	68	66	250	170	140	121	107	98	90	85	79	75	73	71	70	68	67	64
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Table 8.5i ⁴²	<p style="text-align: center;">Table 8.5i - Shear buckling strength q_w (N/mm²) of a web (for $t \leq 16$mm)</p> <p style="text-align: center;">9) Grade Q390 steel, web thickness ≤ 16mm – design strength $p_y = 350$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="13">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>210</td><td>210</td><td>210</td><td>210</td><td>210</td><td>210</td><td>210</td><td>210</td><td>210</td><td>210</td><td>210</td><td>210</td><td>210</td><td>210</td><td>210</td></tr> 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<tr><td>240</td><td>143</td><td>118</td><td>102</td><td>90</td><td>82</td><td>76</td><td>71</td><td>67</td><td>63</td><td>61</td><td>60</td><td>59</td><td>57</td><td>56</td><td>54</td></tr> <tr><td>245</td><td>140</td><td>116</td><td>99</td><td>88</td><td>80</td><td>74</td><td>70</td><td>65</td><td>62</td><td>60</td><td>59</td><td>58</td><td>56</td><td>55</td><td>53</td></tr> <tr><td>250</td><td>138</td><td>113</td><td>97</td><td>87</td><td>79</td><td>73</td><td>69</td><td>64</td><td>61</td><td>59</td><td>57</td><td>56</td><td>55</td><td>54</td><td>52</td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d													0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	60	210	210	210	210	210	210	210	210	210	210	210	210	207	205	200	65	210	210	210	210	210	210	210	210	209	206	203	201	198	196	191	70	210	210	210	210	210	210	210	207	201	197	195	192	189	187	181	75	210	210	210	210	210	210	207	199	193	189	188	184	180	178	172	80	210	210	210	210	210	207	200	191	185	181	178	175	171	168	163	85	210	210	210	210	208	200	192	184	177	172	169	166	162	159	153	90	210	210	210	210	202	193	185	178	169	164	160	158	153	150	144	95	210	210	210	208	198	188	178	168	161	156	152	149	145	142	137	100	210	210	210	201	190	180	171	160	153	148	144	142	138	135	130	105	210	210	208	195	183	173	164	153	146	141	137	135	131	129	124	110	210	210	203	189	177	166	157	146	139	134	131	129	125	123	118	115	210	210	198	184	171	159	150	139	133	128	125	123	120	118	113	120	210	210	193	178	165	153	143	134	127	123	120	118	115	113	108	125	210	205	188	172	158	148	138	128	122	118	115	113	110	108	104	130	210	201	183	167	152	141	132	123	117	114	111	109	106	104	100	135	210	197	178	161	146	136	127	119	113	109	107	105	102	100	96	140	210	192	173	155	141	131	123	114	109	105	103	101	98	96	93	145	210	188	168	150	136	126	118	110	105	102	99	98	95	93	89	150	207	184	163	145	132	122	115	107	102	98	96	94	92	90	86	155	203	179	158	140	127	118	111	103	98	95	93	91	89	87	84	160	200	175	153	138	123	114	107	100	95	92	90	88	86	84	81	165	198	171	148	132	120	111	104	97	92	89	87	86	83	82	78	170	192	166	144	128	116	108	101	94	90	87	85	83	81	79	76	175	189	162	139	124	113	104	98	91	87	84	82	81	78	77	74	180	185	158	136	121	110	102	95	89	85	82	80	78	76	75	72	185	182	153	132	117	107	99	93	86	82	80	78	76	74	73	70	190	178	149	128	114	104	96	90	84	80	78	76	74	72	71	68	195	174	145	125	111	101	94	88	82	78	76	74	72	70	69	66	200	171	142	122	108	99	91	85	80	76	74	72	71	69	67	65	205	167	138	119	106	96	89	84	78	74	72	70	69	67	66	63	210	164	135	116	103	94	87	82	76	73	70	68	67	65	64	62	215	160	132	113	101	92	85	80	74	71	68	67	66	64	63	60	220	157	129	111	99	90	83	78	73	69	67	65	64	62	61	59	225	153	126	108	96	88	81	76	71	68	65	64	63	61	60	57	230	150	123	106	94	86	79	75	69	66	64	62	61	60	59	56	235	146	120	104	92	84	78	73	68	65	63	61	60	58	57	55	240	143	118	102	90	82	76	71	67	63	61	60	59	57	56	54	245	140	116	99	88	80	74	70	65	62	60	59	58	56	55	53	250	138	113	97	87	79	73	69	64	61	59	57	56	55	54	52	<p style="text-align: center;">Table 8.5i - Shear buckling strength q_w (N/mm²) of a web (for $t \leq 50$mm)</p> <p style="text-align: center;">9) Grade S690 steel, web thickness ≤ 50mm – design strength $p_y = 690$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="13">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>414</td><td>414</td><td>414</td><td>414</td><td>414</td><td>414</td><td>414</td><td>402</td><td>389</td><td>376</td><td>367</td><td>360</td><td>356</td><td>348</td><td>343</td><td>332</td></tr> <tr><td>60</td><td>414</td><td>414</td><td>414</td><td>414</td><td>413</td><td>397</td><td>382</td><td>365</td><td>353</td><td>344</td><td>337</td><td>331</td><td>323</td><td>318</td><td>306</td><td></td></tr> <tr><td>65</td><td>414</td><td>414</td><td>414</td><td>414</td><td>396</td><td>378</td><td>363</td><td>344</td><td>330</td><td>320</td><td>313</td><td>307</td><td>298</td><td>293</td><td>282</td><td></td></tr> <tr><td>70</td><td>414</td><td>414</td><td>414</td><td>400</td><td>379</td><td>360</td><td>343</td><td>323</td><td>308</td><td>297</td><td>290</td><td>285</td><td>277</td><td>272</td><td>262</td><td></td></tr> <tr><td>75</td><td>414</td><td>414</td><td>411</td><td>385</td><td>362</td><td>341</td><td>323</td><td>301</td><td>287</td><td>278</td><td>271</td><td>266</td><td>258</td><td>254</td><td>244</td><td></td></tr> <tr><td>80</td><td>414</td><td>414</td><td>397</td><td>369</td><td>344</td><td>322</td><td>303</td><td>282</td><td>269</td><td>260</td><td>254</td><td>249</td><td>242</td><td>238</td><td>229</td><td></td></tr> <tr><td>85</td><td>414</td><td>414</td><td>393</td><td>353</td><td>327</td><td>304</td><td>285</td><td>266</td><td>253</td><td>245</td><td>239</td><td>235</td><td>228</td><td>224</td><td>215</td><td></td></tr> <tr><td>90</td><td>414</td><td>404</td><td>369</td><td>338</td><td>310</td><td>287</td><td>269</td><td>251</td><td>239</td><td>231</td><td>226</td><td>222</td><td>215</td><td>212</td><td>203</td><td></td></tr> <tr><td>95</td><td>414</td><td>392</td><td>355</td><td>322</td><td>293</td><td>272</td><td>255</td><td>238</td><td>227</td><td>219</td><td>214</td><td>210</td><td>204</td><td>201</td><td>193</td><td></td></tr> <tr><td>100</td><td>414</td><td>380</td><td>341</td><td>306</td><td>278</td><td>258</td><td>242</td><td>226</td><td>215</td><td>208</td><td>203</td><td>200</td><td>194</td><td>191</td><td>183</td><td></td></tr> <tr><td>105</td><td>412</td><td>368</td><td>327</td><td>291</td><td>265</td><td>246</td><td>231</td><td>215</td><td>205</td><td>198</td><td>194</td><td>190</td><td>185</td><td>182</td><td>174</td><td></td></tr> <tr><td>110</td><td>402</td><td>356</td><td>313</td><td>278</td><td>253</td><td>235</td><td>220</td><td>205</td><td>196</td><td>189</td><td>185</td><td>181</td><td>176</td><td>173</td><td>166</td><td></td></tr> <tr><td>115</td><td>392</td><td>344</td><td>299</td><td>266</td><td>242</td><td>224</td><td>211</td><td>196</td><td>187</td><td>181</td><td>177</td><td>174</td><td>169</td><td>166</td><td>159</td><td></td></tr> <tr><td>120</td><td>382</td><td>331</td><td>287</td><td>255</td><td>232</td><td>215</td><td>202</td><td>188</td><td>179</td><td>174</td><td>169</td><td>166</td><td>161</td><td>159</td><td>153</td><td></td></tr> <tr><td>125</td><td>372</td><td>310</td><td>275</td><td>245</td><td>223</td><td>206</td><td>194</td><td>181</td><td>172</td><td>167</td><td>163</td><td>160</td><td>155</td><td>152</td><td>146</td><td></td></tr> <tr><td>130</td><td>363</td><td>307</td><td>265</td><td>235</td><td>214</td><td>198</td><td>186</td><td>174</td><td>166</td><td>160</td><td>156</td><td>154</td><td>149</td><td>147</td><td>141</td><td></td></tr> <tr><td>135</td><td>353</td><td>296</td><td>255</td><td>227</td><td>206</td><td>191</td><td>179</td><td>167</td><td>160</td><td>154</td><td>151</td><td>148</td><td>144</td><td>141</td><td>136</td><td></td></tr> <tr><td>140</td><td>343</td><td>285</td><td>246</td><td>219</td><td>199</td><td>184</td><td>173</td><td>161</td><td>154</td><td>149</td><td>145</td><td>143</td><td>138</td><td>136</td><td>131</td><td></td></tr> <tr><td>145</td><td>333</td><td>275</td><td>237</td><td>211</td><td>192</td><td>178</td><td>167</td><td>156</td><td>149</td><td>144</td><td>140</td><td>138</td><td>134</td><td>131</td><td>126</td><td></td></tr> <tr><td>150</td><td>323</td><td>266</td><td>229</td><td>204</td><td>186</td><td>172</td><td>161</td><td>151</td><td>144</td><td>139</td><td>135</td><td>133</td><td>129</td><td>127</td><td>122</td><td></td></tr> <tr><td>155</td><td>313</td><td>257</td><td>222</td><td>197</td><td>180</td><td>166</td><td>156</td><td>146</td><td>139</td><td>134</td><td>131</td><td>129</td><td>125</td><td>123</td><td>118</td><td></td></tr> <tr><td>160</td><td>303</td><td>249</td><td>215</td><td>191</td><td>174</td><td>161</td><td>151</td><td>141</td><td>135</td><td>130</td><td>127</td><td>125</td><td>121</td><td>119</td><td>114</td><td></td></tr> <tr><td>165</td><td>294</td><td>242</td><td>208</td><td>185</td><td>169</td><td>156</td><td>147</td><td>137</td><td>131</td><td>126</td><td>123</td><td>121</td><td>117</td><td>115</td><td>111</td><td></td></tr> <tr><td>170</td><td>285</td><td>235</td><td>202</td><td>180</td><td>164</td><td>152</td><td>142</td><td>133</td><td>127</td><td>122</td><td>120</td><td>117</td><td>114</td><td>112</td><td>108</td><td></td></tr> <tr><td>175</td><td>277</td><td>228</td><td>197</td><td>175</td><td>159</td><td>147</td><td>138</td><td>129</td><td>123</td><td>119</td><td>116</td><td>114</td><td>111</td><td>109</td><td>105</td><td></td></tr> <tr><td>180</td><td>269</td><td>222</td><td>191</td><td>170</td><td>155</td><td>143</td><td>135</td><td>125</td><td>120</td><td>116</td><td>113</td><td>111</td><td>108</td><td>106</td><td>102</td><td></td></tr> <tr><td>185</td><td>262</td><td>216</td><td>186</td><td>165</td><td>151</td><td>139</td><td>131</td><td>122</td><td>116</td><td>113</td><td>110</td><td>108</td><td>105</td><td>103</td><td>99</td><td></td></tr> <tr><td>190</td><td>255</td><td>210</td><td>181</td><td>161</td><td>147</td><td>136</td><td>127</td><td>119</td><td>113</td><td>110</td><td>107</td><td>105</td><td>102</td><td>100</td><td>96</td><td></td></tr> <tr><td>195</td><td>248</td><td>205</td><td>176</td><td>157</td><td>143</td><td>132</td><td>124</td><td>116</td><td>110</td><td>107</td><td>104</td><td>102</td><td>99</td><td>98</td><td>94</td><td></td></tr> 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<tr><td>220</td><td>220</td><td>181</td><td>156</td><td>139</td><td>127</td><td>117</td><td>110</td><td>103</td><td>98</td><td>95</td><td>92</td><td>91</td><td>88</td><td>87</td><td>83</td><td></td></tr> <tr><td>225</td><td>215</td><td>177</td><td>153</td><td>136</td><td>124</td><td>115</td><td>108</td><td>100</td><td>96</td><td>93</td><td>90</td><td>89</td><td>86</td><td>85</td><td>81</td><td></td></tr> <tr><td>230</td><td>211</td><td>174</td><td>150</td><td>133</td><td>121</td><td>112</td><td>105</td><td>98</td><td>94</td><td>91</td><td>88</td><td>87</td><td>84</td><td>83</td><td>80</td><td></td></tr> <tr><td>235</td><td>206</td><td>170</td><td>146</td><td>130</td><td>118</td><td>110</td><td>103</td><td>96</td><td>92</td><td>89</td><td>88</td><td>85</td><td>82</td><td>81</td><td>78</td><td></td></tr> <tr><td>240</td><td>202</td><td>166</td><td>143</td><td>127</td><td>116</td><td>107</td><td>101</td><td>94</td><td>90</td><td>87</td><td>85</td><td>83</td><td>81</td><td>79</td><td>76</td><td></td></tr> <tr><td>245</td><td>198</td><td>163</td><td>140</td><td>125</td><td>114</td><td>105</td><td>99</td><td>92</td><td>88</td><td>85</td><td>83</td><td>81</td><td>79</td><td>78</td><td>75</td><td></td></tr> <tr><td>250</td><td>194</td><td>160</td><td>138</td><td>122</td><td>111</td><td>103</td><td>97</td><td>90</td><td>86</td><td>83</td><td>81</td><td>80</td><td>78</td><td>76</td><td>73</td><td></td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d													0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	414	414	414	414	414	414	414	402	389	376	367	360	356	348	343	332	60	414	414	414	414	413	397	382	365	353	344	337	331	323	318	306		65	414	414	414	414	396	378	363	344	330	320	313	307	298	293	282		70	414	414	414	400	379	360	343	323	308	297	290	285	277	272	262		75	414	414	411	385	362	341	323	301	287	278	271	266	258	254	244		80	414	414	397	369	344	322	303	282	269	260	254	249	242	238	229		85	414	414	393	353	327	304	285	266	253	245	239	235	228	224	215		90	414	404	369	338	310	287	269	251	239	231	226	222	215	212	203		95	414	392	355	322	293	272	255	238	227	219	214	210	204	201	193		100	414	380	341	306	278	258	242	226	215	208	203	200	194	191	183		105	412	368	327	291	265	246	231	215	205	198	194	190	185	182	174		110	402	356	313	278	253	235	220	205	196	189	185	181	176	173	166		115	392	344	299	266	242	224	211	196	187	181	177	174	169	166	159		120	382	331	287	255	232	215	202	188	179	174	169	166	161	159	153		125	372	310	275	245	223	206	194	181	172	167	163	160	155	152	146		130	363	307	265	235	214	198	186	174	166	160	156	154	149	147	141		135	353	296	255	227	206	191	179	167	160	154	151	148	144	141	136		140	343	285	246	219	199	184	173	161	154	149	145	143	138	136	131		145	333	275	237	211	192	178	167	156	149	144	140	138	134	131	126		150	323	266	229	204	186	172	161	151	144	139	135	133	129	127	122		155	313	257	222	197	180	166	156	146	139	134	131	129	125	123	118		160	303	249	215	191	174	161	151	141	135	130	127	125	121	119	114		165	294	242	208	185	169	156	147	137	131	126	123	121	117	115	111		170	285	235	202	180	164	152	142	133	127	122	120	117	114	112	108		175	277	228	197	175	159	147	138	129	123	119	116	114	111	109	105		180	269	222	191	170	155	143	135	125	120	116	113	111	108	106	102		185	262	216	186	165	151	139	131	122	116	113	110	108	105	103	99		190	255	210	181	161	147	136	127	119	113	110	107	105	102	100	96		195	248	205	176	157	143	132	124	116	110	107	104	102	99	98	94		200	242	200	172	153	139	129	121	113	106	104	102	100	97	95	92		205	236	195	168	149	136	126	118	110	105	102	99	97	95	93	89		210	231	190	164	146	133	123	115	108	103	99	97	95	92	91	87		215	225	186	160	142	130	120	113	105	100	97	95	93	90	89	85		220	220	181	156	139	127	117	110	103	98	95	92	91	88	87	83		225	215	177	153	136	124	115	108	100	96	93	90	89	86	85	81		230	211	174	150	133	121	112	105	98	94	91	88	87	84	83	80		235	206	170	146	130	118	110	103	96	92	89	88	85	82	81	78		240	202	166	143	127	116	107	101	94	90	87	85	83	81	79	76		245	198	163	140	125	114	105	99	92	88	85	83	81	79	78	75		250	194	160	138	122	111	103	97	90	86	83	81	80	78	76	73	
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Table 8.5j ⁴³	<p style="text-align: center;">Table 8.5j - Shear buckling strength q_w (N/mm²) of a web (for 16mm $\leq t \leq 35$mm)</p> <p style="text-align: center;">10) Grade Q390 steel, web thickness >16mm ≤ 35mm – design strength $p_y = 335$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="14">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>201</td><td>201</td><td>201</td><td>201</td><td>201</td><td>201</td><td>201</td><td>201</td><td>201</td><td>201</td><td>201</td><td>201</td><td>201</td><td>201</td><td>201</td></tr> 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<tr><td>190</td><td>173</td><td>146</td><td>126</td><td>112</td><td>102</td><td>94</td><td>88</td><td>82</td><td>78</td><td>76</td><td>74</td><td>73</td><td>71</td><td>69</td><td>67</td></tr> <tr><td>195</td><td>170</td><td>142</td><td>122</td><td>109</td><td>99</td><td>92</td><td>86</td><td>80</td><td>76</td><td>74</td><td>72</td><td>71</td><td>69</td><td>68</td><td>65</td></tr> <tr><td>200</td><td>167</td><td>139</td><td>119</td><td>106</td><td>97</td><td>89</td><td>84</td><td>78</td><td>75</td><td>72</td><td>70</td><td>69</td><td>67</td><td>66</td><td>63</td></tr> <tr><td>205</td><td>163</td><td>135</td><td>116</td><td>103</td><td>94</td><td>87</td><td>82</td><td>76</td><td>73</td><td>70</td><td>69</td><td>67</td><td>65</td><td>64</td><td>62</td></tr> <tr><td>210</td><td>160</td><td>132</td><td>114</td><td>101</td><td>92</td><td>85</td><td>80</td><td>74</td><td>71</td><td>69</td><td>67</td><td>66</td><td>64</td><td>63</td><td>60</td></tr> 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<tr><td>240</td><td>140</td><td>115</td><td>99</td><td>88</td><td>80</td><td>74</td><td>70</td><td>65</td><td>62</td><td>60</td><td>58</td><td>57</td><td>55</td><td>54</td><td>53</td></tr> <tr><td>245</td><td>137</td><td>113</td><td>97</td><td>87</td><td>79</td><td>73</td><td>68</td><td>64</td><td>61</td><td>59</td><td>57</td><td>56</td><td>54</td><td>53</td><td>52</td></tr> <tr><td>250</td><td>135</td><td>111</td><td>95</td><td>85</td><td>77</td><td>71</td><td>67</td><td>62</td><td>60</td><td>58</td><td>56</td><td>55</td><td>53</td><td>52</td><td>51</td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d														0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	60	201	201	201	201	201	201	201	201	201	201	201	201	200	198	194	65	201	201	201	201	201	201	201	201	201	199	197	195	192	190	185	70	201	201	201	201	201	201	201	200	195	191	189	187	183	181	176	75	201	201	201	201	201	201	200	193	187	184	181	179	175	173	168	80	201	201	201	201	201	200	193	186	180	176	173	170	167	164	159	85	201	201	201	201	201	194	187	178	172	168	165	162	158	156	150	90	201	201	201	201	198	187	180	171	165	160	157	154	150	147	141	95	201	201	201	200	190	181	173	164	157	152	149	146	142	139	134	100	201	201	201	201	194	184	175	167	157	150	145	141	139	135	127	105	201	201	201	189	178	168	160	150	142	138	134	132	128	126	121	110	201	201	197	184	172	162	153	143	138	131	128	126	122	120	115	115	201	201	192	178	166	156	146	138	130	126	123	120	117	115	110	120	201	201	187	173	161	150	140	131	125	120	117	115	112	110	108	125	201	199	183	168	155	143	135	125	120	116	113	111	108	106	102	130	201	195	178	163	149	138	129	121	115	111	108	106	103	102	98	135	201	191	173	157	143	133	125	116	111	107	104	102	100	98	94	140	201	187	168	152	138	128	120	112	107	103	101	99	96	94	91	145	201	183	164	147	133	123	116	108	103	100	97	95	93	91	87	150	200	179	159	142	129	119	112	104	100	96	94	92	90	88	85	155	197	174	154	137	125	115	108	101	96	93	91	89	87	85	82	160	193	170	150	133	121	112	105	98	93	90	88	86	84	83	79	165	190	166	145	129	117	108	102	95	90	87	85	84	81	80	77	170	187	162	140	125	114	105	99	92	88	85	83	81	79	78	75	175	183	158	136	121	110	102	96	89	85	82	80	79	77	75	72	180	180	154	133	118	107	99	93	87	83	80	78	77	75	73	70	185	177	150	129	115	104	97	91	85	81	78	76	75	72	71	68	190	173	146	126	112	102	94	88	82	78	76	74	73	71	69	67	195	170	142	122	109	99	92	86	80	76	74	72	71	69	68	65	200	167	139	119	106	97	89	84	78	75	72	70	69	67	66	63	205	163	135	116	103	94	87	82	76	73	70	69	67	65	64	62	210	160	132	114	101	92	85	80	74	71	69	67	66	64	63	60	215	158	129	111	99	90	83	78	73	69	67	65	64	62	61	59	220	153	126	108	96	88	81	76	71	68	65	64	63	61	60	57	225	150	123	106	94	86	79	75	69	66	64	62	61	60	59	56	230	148	120	104	92	84	78	73	68	65	63	61	60	58	57	55	235	143	118	101	90	82	76	71	66	63	61	60	59	57	56	54	240	140	115	99	88	80	74	70	65	62	60	58	57	55	54	53	245	137	113	97	87	79	73	68	64	61	59	57	56	54	53	52	250	135	111	95	85	77	71	67	62	60	58	56	55	53	52	51	<p style="text-align: center;">Table 8.5j - Shear buckling strength q_w (N/mm²) of a web (for 50mm $< t \leq 100$mm)</p> <p style="text-align: center;">10) Grade S690 steel, web thickness >50mm ≤ 100mm – design strength $p_y = 650$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="14">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>390</td><td>390</td><td>390</td><td>390</td><td>390</td><td>390</td><td>390</td><td>390</td><td>390</td><td>390</td><td>390</td><td>390</td><td>385</td><td>370</td><td>362</td></tr> <tr><td>60</td><td>390</td><td>390</td><td>390</td><td>390</td><td>390</td><td>390</td><td>390</td><td>390</td><td>390</td><td>390</td><td>390</td><td>387</td><td>351</td><td>340</td><td>331</td></tr> <tr><td>65</td><td>390</td><td>390</td><td>390</td><td>390</td><td>390</td><td>379</td><td>383</td><td>384</td><td>346</td><td>331</td><td>312</td><td>299</td><td>289</td><td>282</td><td>277</td></tr> <tr><td>70</td><td>390</td><td>390</td><td>390</td><td>390</td><td>383</td><td>384</td><td>346</td><td>331</td><td>312</td><td>299</td><td>289</td><td>282</td><td>277</td><td>269</td><td>264</td></tr> <tr><td>75</td><td>390</td><td>390</td><td>390</td><td>390</td><td>348</td><td>329</td><td>312</td><td>293</td><td>279</td><td>269</td><td>263</td><td>258</td><td>251</td><td>247</td><td>237</td></tr> <tr><td>80</td><td>390</td><td>390</td><td>380</td><td>355</td><td>332</td><td>312</td><td>294</td><td>274</td><td>261</td><td>253</td><td>247</td><td>242</td><td>235</td><td>231</td><td>222</td></tr> <tr><td>85</td><td>390</td><td>390</td><td>367</td><td>340</td><td>316</td><td>295</td><td>277</td><td>258</td><td>246</td><td>238</td><td>232</td><td>228</td><td>221</td><td>218</td><td>209</td></tr> <tr><td>90</td><td>390</td><td>386</td><td>355</td><td>326</td><td>301</td><td>278</td><td>261</td><td>244</td><td>232</td><td>225</td><td>219</td><td>215</td><td>209</td><td>206</td><td>197</td></tr> <tr><td>95</td><td>390</td><td>375</td><td>342</td><td>312</td><td>285</td><td>264</td><td>247</td><td>231</td><td>220</td><td>213</td><td>208</td><td>204</td><td>198</td><td>195</td><td>187</td></tr> <tr><td>100</td><td>390</td><td>364</td><td>329</td><td>297</td><td>270</td><td>250</td><td>235</td><td>219</td><td>209</td><td>202</td><td>197</td><td>194</td><td>188</td><td>185</td><td>178</td></tr> <tr><td>105</td><td>390</td><td>353</td><td>316</td><td>283</td><td>257</td><td>238</td><td>224</td><td>209</td><td>199</td><td>192</td><td>188</td><td>184</td><td>179</td><td>178</td><td>169</td></tr> <tr><td>110</td><td>385</td><td>342</td><td>303</td><td>270</td><td>246</td><td>228</td><td>214</td><td>199</td><td>190</td><td>184</td><td>179</td><td>178</td><td>171</td><td>168</td><td>162</td></tr> <tr><td>115</td><td>378</td><td>331</td><td>291</td><td>258</td><td>235</td><td>218</td><td>204</td><td>191</td><td>182</td><td>176</td><td>172</td><td>168</td><td>164</td><td>161</td><td>155</td></tr> <tr><td>120</td><td>367</td><td>320</td><td>278</td><td>247</td><td>225</td><td>209</td><td>196</td><td>183</td><td>174</td><td>168</td><td>164</td><td>161</td><td>157</td><td>154</td><td>148</td></tr> <tr><td>125</td><td>358</td><td>309</td><td>267</td><td>238</td><td>216</td><td>200</td><td>188</td><td>175</td><td>167</td><td>162</td><td>158</td><td>155</td><td>150</td><td>148</td><td>142</td></tr> <tr><td>130</td><td>349</td><td>298</td><td>257</td><td>228</td><td>206</td><td>193</td><td>181</td><td>169</td><td>161</td><td>155</td><td>152</td><td>149</td><td>146</td><td>142</td><td>137</td></tr> <tr><td>135</td><td>340</td><td>287</td><td>247</td><td>220</td><td>200</td><td>185</td><td>174</td><td>162</td><td>155</td><td>150</td><td>146</td><td>143</td><td>139</td><td>137</td><td>132</td></tr> <tr><td>140</td><td>331</td><td>277</td><td>238</td><td>212</td><td>193</td><td>179</td><td>168</td><td>157</td><td>149</td><td>144</td><td>141</td><td>138</td><td>134</td><td>132</td><td>127</td></tr> <tr><td>145</td><td>321</td><td>267</td><td>230</td><td>205</td><td>186</td><td>173</td><td>162</td><td>151</td><td>144</td><td>139</td><td>136</td><td>134</td><td>130</td><td>128</td><td>123</td></tr> <tr><td>150</td><td>312</td><td>258</td><td>223</td><td>198</td><td>180</td><td>167</td><td>157</td><td>146</td><td>139</td><td>135</td><td>131</td><td>129</td><td>125</td><td>123</td><td>118</td></tr> <tr><td>155</td><td>303</td><td>250</td><td>215</td><td>192</td><td>174</td><td>162</td><td>152</td><td>141</td><td>135</td><td>130</td><td>127</td><td>125</td><td>121</td><td>119</td><td>115</td></tr> <tr><td>160</td><td>294</td><td>242</td><td>209</td><td>186</td><td>169</td><td>156</td><td>147</td><td>137</td><td>131</td><td>126</td><td>123</td><td>121</td><td>118</td><td>116</td><td>111</td></tr> <tr><td>165</td><td>285</td><td>235</td><td>202</td><td>180</td><td>164</td><td>152</td><td>142</td><td>133</td><td>127</td><td>122</td><td>120</td><td>117</td><td>114</td><td>112</td><td>108</td></tr> <tr><td>170</td><td>277</td><td>228</td><td>196</td><td>175</td><td>159</td><td>147</td><td>138</td><td>129</td><td>123</td><td>119</td><td>116</td><td>114</td><td>111</td><td>109</td><td>105</td></tr> <tr><td>175</td><td>269</td><td>221</td><td>191</td><td>170</td><td>154</td><td>143</td><td>134</td><td>125</td><td>119</td><td>115</td><td>113</td><td>111</td><td>107</td><td>106</td><td>102</td></tr> 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<tr><td>230</td><td>204</td><td>168</td><td>145</td><td>129</td><td>118</td><td>109</td><td>102</td><td>95</td><td>91</td><td>88</td><td>86</td><td>84</td><td>82</td><td>80</td><td>77</td></tr> <tr><td>235</td><td>200</td><td>165</td><td>142</td><td>126</td><td>115</td><td>107</td><td>100</td><td>93</td><td>89</td><td>86</td><td>84</td><td>82</td><td>80</td><td>79</td><td>76</td></tr> <tr><td>240</td><td>196</td><td>161</td><td>139</td><td>124</td><td>113</td><td>104</td><td>98</td><td>91</td><td>87</td><td>84</td><td>82</td><td>81</td><td>78</td><td>77</td><td>74</td></tr> <tr><td>245</td><td>192</td><td>158</td><td>136</td><td>121</td><td>110</td><td>102</td><td>96</td><td>89</td><td>85</td><td>82</td><td>81</td><td>79</td><td>77</td><td>76</td><td>73</td></tr> <tr><td>250</td><td>188</td><td>155</td><td>134</td><td>119</td><td>108</td><td>100</td><td>94</td><td>88</td><td>84</td><td>81</td><td>79</td><td>77</td><td>75</td><td>74</td><td>71</td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d														0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	390	390	390	390	390	390	390	390	390	390	390	390	385	370	362	60	390	390	390	390	390	390	390	390	390	390	390	387	351	340	331	65	390	390	390	390	390	379	383	384	346	331	312	299	289	282	277	70	390	390	390	390	383	384	346	331	312	299	289	282	277	269	264	75	390	390	390	390	348	329	312	293	279	269	263	258	251	247	237	80	390	390	380	355	332	312	294	274	261	253	247	242	235	231	222	85	390	390	367	340	316	295	277	258	246	238	232	228	221	218	209	90	390	386	355	326	301	278	261	244	232	225	219	215	209	206	197	95	390	375	342	312	285	264	247	231	220	213	208	204	198	195	187	100	390	364	329	297	270	250	235	219	209	202	197	194	188	185	178	105	390	353	316	283	257	238	224	209	199	192	188	184	179	178	169	110	385	342	303	270	246	228	214	199	190	184	179	178	171	168	162	115	378	331	291	258	235	218	204	191	182	176	172	168	164	161	155	120	367	320	278	247	225	209	196	183	174	168	164	161	157	154	148	125	358	309	267	238	216	200	188	175	167	162	158	155	150	148	142	130	349	298	257	228	206	193	181	169	161	155	152	149	146	142	137	135	340	287	247	220	200	185	174	162	155	150	146	143	139	137	132	140	331	277	238	212	193	179	168	157	149	144	141	138	134	132	127	145	321	267	230	205	186	173	162	151	144	139	136	134	130	128	123	150	312	258	223	198	180	167	157	146	139	135	131	129	125	123	118	155	303	250	215	192	174	162	152	141	135	130	127	125	121	119	115	160	294	242	209	186	169	156	147	137	131	126	123	121	118	116	111	165	285	235	202	180	164	152	142	133	127	122	120	117	114	112	108	170	277	228	196	175	159	147	138	129	123	119	116	114	111	109	105	175	269	221	191	170	154	143	134	125	119	115	113	111	107	106	102	180	261	215	185	165	150	139	131	122	116	112	110	108	104	103	99	185	254	209	180	160	146	135	127	118	113	109	107	105	102	100	96	190	247	204	176	156	142	132	124	115	110	106	104	102	99	97	94	195	241	199	171	152	139	128	121	112	107	104	101	99	96	95	91	200	235	194	167	148	135	125	118	110	104	101	99	97	94	92	89	205	229	189	163	145	132	122	115	107	102	99	96	94	92	90	87	210	224	184	159	141	129	119	112	104	100	96	94	92	90	88	85	215	219	180	155	138	128	118	109	102	97	94	92	90	87	86	83	220	214	176	152	135	123	114	107	100	95	92	90	88	85	84	81	225	209	172	148	132	120	111	104	97	93	90	88	86	84	82	79	230	204	168	145	129	118	109	102	95	91	88	86	84	82	80	77	235	200	165	142	126	115	107	100	93	89	86	84	82	80	79	76	240	196	161	139	124	113	104	98	91	87	84	82	81	78	77	74	245	192	158	136	121	110	102	96	89	85	82	81	79	77	76	73	250	188	155	134	119	108	100	94	88	84	81	79	77	75	74	71
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Table 8.5k ⁴⁴	<p style="text-align: center;">Table 8.5k - Shear buckling strength q_w (N/mm²) of a web (for $t \leq 16$mm)</p> <p style="text-align: center;">11) Grade Q420 steel, web thickness ≤ 16mm – design strength $p_y = 380$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="14">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>228</td><td>228</td><td>228</td><td>228</td><td>228</td><td>228</td><td>228</td><td>228</td><td>228</td><td>228</td><td>228</td><td>228</td><td>228</td><td>228</td><td>223</td></tr> 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<tr><td>220</td><td>163</td><td>134</td><td>116</td><td>103</td><td>93</td><td>87</td><td>81</td><td>76</td><td>72</td><td>70</td><td>68</td><td>67</td><td>65</td><td>64</td><td>61</td></tr> <tr><td>225</td><td>159</td><td>131</td><td>113</td><td>100</td><td>91</td><td>85</td><td>79</td><td>74</td><td>71</td><td>68</td><td>67</td><td>65</td><td>63</td><td>62</td><td>60</td></tr> <tr><td>230</td><td>156</td><td>128</td><td>110</td><td>98</td><td>89</td><td>83</td><td>78</td><td>72</td><td>69</td><td>67</td><td>65</td><td>64</td><td>62</td><td>61</td><td>59</td></tr> <tr><td>235</td><td>152</td><td>126</td><td>108</td><td>96</td><td>87</td><td>81</td><td>76</td><td>71</td><td>67</td><td>65</td><td>64</td><td>63</td><td>61</td><td>60</td><td>57</td></tr> <tr><td>240</td><td>149</td><td>123</td><td>106</td><td>94</td><td>86</td><td>79</td><td>74</td><td>69</td><td>66</td><td>64</td><td>62</td><td>61</td><td>59</td><td>58</td><td>56</td></tr> <tr><td>245</td><td>146</td><td>120</td><td>104</td><td>92</td><td>84</td><td>78</td><td>73</td><td>68</td><td>65</td><td>63</td><td>61</td><td>60</td><td>58</td><td>57</td><td>55</td></tr> <tr><td>250</td><td>143</td><td>118</td><td>102</td><td>90</td><td>82</td><td>76</td><td>71</td><td>67</td><td>63</td><td>61</td><td>60</td><td>59</td><td>57</td><td>56</td><td>54</td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d														0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	228	228	228	228	228	228	228	228	228	228	228	228	228	228	223	60	228	228	228	228	228	228	228	228	228	225	223	220	218	212		65	228	228	228	228	228	228	228	223	219	216	213	209	207	202		70	228	228	228	228	228	228	228	219	213	209	203	203	199	197	191	75	228	228	228	228	227	220	211	204	200	198	194	189	187	180		80	228	228	228	228	219	211	202	195	190	187	184	179	176	170		85	228	228	228	228	221	212	203	193	188	181	177	174	169	168	159	90	228	228	228	228	214	204	195	185	177	171	167	164	159	157	150	95	228	228	228	219	207	197	187	178	168	162	158	155	151	148	143	100	228	228	227	213	200	189	179	167	159	154	150	148	143	141	135	105	228	228	221	208	193	181	171	159	152	147	143	141	138	134	129	110	228	228	216	200	189	174	163	152	145	140	137	134	130	128	123	115	228	228	210	194	179	168	158	145	138	134	131	128	125	122	118	120	228	223	204	187	172	159	148	139	133	128	125	123	119	117	113	125	228	218	198	181	165	153	143	134	127	123	120	118	115	113	108	130	228	213	193	174	158	147	138	128	122	118	116	113	110	108	104	135	228	208	187	168	153	141	133	124	118	114	111	109	106	104	100	140	228	203	181	162	147	138	128	119	114	110	107	105	102	101	97	145	224	198	176	158	142	132	123	115	110	108	104	102	99	97	93	150	220	194	170	151	137	127	119	111	103	103	100	98	95	94	90	155	215	189	164	148	133	123	115	108	103	99	97	95	92	91	87	160	211	184	159	141	129	119	112	104	99	96	94	92	89	88	84	165	207	179	154	137	125	118	109	101	96	93	91	89	87	85	82	170	203	174	150	133	121	112	105	98	93	90	88	87	84	83	79	175	199	169	145	129	118	109	102	95	91	88	86	84	82	80	77	180	195	164	141	126	114	106	99	93	88	85	83	82	79	78	75	185	191	160	137	122	111	103	97	90	86	83	81	80	77	76	73	190	187	155	134	119	108	100	94	88	84	81	79	77	75	74	71	195	183	151	130	116	105	98	92	85	81	79	77	75	73	72	69	200	179	148	127	113	103	96	89	83	79	77	75	74	71	70	67	205	175	144	124	110	100	93	87	81	77	75	73	72	70	68	66	210	171	141	121	108	98	91	85	79	76	73	71	70	68	67	64	215	167	137	118	105	96	89	83	77	74	71	70	68	66	65	63	220	163	134	116	103	93	87	81	76	72	70	68	67	65	64	61	225	159	131	113	100	91	85	79	74	71	68	67	65	63	62	60	230	156	128	110	98	89	83	78	72	69	67	65	64	62	61	59	235	152	126	108	96	87	81	76	71	67	65	64	63	61	60	57	240	149	123	106	94	86	79	74	69	66	64	62	61	59	58	56	245	146	120	104	92	84	78	73	68	65	63	61	60	58	57	55	250	143	118	102	90	82	76	71	67	63	61	60	59	57	56	54	<p style="text-align: center;">Table 8.5k - Shear buckling strength q_w (N/mm²) of a web (for $t \leq 16$mm)</p> <p style="text-align: center;">11) Grade Q235 steel, web thickness ≤ 16mm – design strength $p_y = 215$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="14">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>60</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>65</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>70</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>75</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>124</td></tr> <tr><td>80</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>85</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>90</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>95</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>100</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>105</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>110</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>115</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>120</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>125</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>130</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>135</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>140</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>145</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>150</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>155</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>160</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>165</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>170</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>175</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>180</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>185</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>190</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>195</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>200</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>205</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>210</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>215</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>220</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>225</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>230</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>235</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>240</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>245</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> <tr><td>250</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td><td>129</td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d														0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	60	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	65	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	70	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	75	129	129	129	129	129	129	129	129	129	129	129	129	129	129	124	80	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	85	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	90	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	95	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	100	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	105	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	110	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	115	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	120	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	125	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	130	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	135	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	140	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	145	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	150	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	155	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	160	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	165	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	170	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	175	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	180	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	185	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	190	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	195	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	200	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	205	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	210	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	215	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	220	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	225	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	230	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	235	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	240	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	245	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	250	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129
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⁴⁴ Revision of Table 8.5k - Shear Buckling Strength for Q235 steel with web thickness ≤ 16 mm.

Item

Current version

Amendments

45. Table 8.51⁴⁵

Table 8.51 - Shear buckling strength q_w (N/mm²) of a web (for 16mm ≤ t ≤ 35mm)

12) Grade Q420 steel, web thickness >16mm ≤ 35mm – design strength $p_y = 360\text{N/mm}^2$													
d/t	Stiffener spacing ratio a/d												
	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	∞
55	216	216	216	216	216	216	216	216	216	216	216	216	214
60	216	216	216	216	216	216	216	216	216	216	214	211	209
65	216	216	216	216	216	216	216	214	210	207	205	202	200
70	216	216	216	216	216	216	211	205	201	198	198	192	190
75	216	216	216	216	216	216	211	203	197	193	190	187	181
80	216	216	216	216	216	211	204	195	189	184	181	178	174
85	216	216	216	216	213	204	198	187	180	175	172	169	164
90	216	216	216	216	208	197	189	179	172	167	163	160	155
95	216	216	216	211	200	190	181	171	163	158	154	151	147
100	216	216	216	205	193	183	174	163	155	150	148	144	139
105	216	216	213	199	187	178	168	155	148	143	139	137	133
110	216	216	207	193	180	169	159	148	141	138	133	131	127
115	216	216	202	187	174	162	152	141	135	130	127	125	121
120	216	214	197	181	167	155	145	135	129	125	122	120	118
125	216	210	192	175	161	149	139	130	124	120	117	115	110
130	216	205	188	169	154	143	134	125	119	115	112	110	107
135	216	201	181	163	148	138	129	120	115	111	108	107	101
140	216	198	176	157	143	133	124	116	111	107	104	102	99
145	215	192	171	152	138	128	120	112	107	103	101	99	94
150	211	187	165	147	134	124	116	108	103	100	97	96	91
155	207	183	160	142	129	120	112	105	100	97	94	92	88
160	204	178	155	138	125	116	109	101	97	94	91	90	87
165	200	173	150	133	121	112	105	98	94	91	88	87	84
170	198	169	146	129	118	109	102	95	91	88	84	82	80
175	192	164	141	126	114	106	99	93	88	85	83	82	78
180	189	160	138	122	111	103	97	90	86	83	81	80	77
185	185	155	134	119	108	100	94	88	84	81	79	77	74
190	181	151	130	116	105	98	92	86	81	79	77	75	72
195	177	147	127	113	103	96	90	83	79	77	75	73	70
200	174	144	124	110	100	93	87	81	77	75	73	71	67
205	170	140	121	107	98	90	85	79	75	73	71	70	68
210	168	137	118	105	95	88	83	77	74	71	69	68	65
215	163	134	115	102	93	86	81	76	72	69	68	67	64
220	159	131	112	100	91	84	79	74	70	68	66	65	62
225	155	128	110	98	89	82	77	72	69	66	65	64	61
230	152	125	108	96	87	81	76	70	67	65	63	62	59
235	148	122	105	94	85	79	74	69	66	64	62	61	58
240	145	120	103	92	83	77	72	67	64	62	61	60	57
245	142	117	101	90	82	76	71	66	63	61	59	58	55
250	139	115	99	88	80	74	69	65	62	60	58	57	55

Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.

Table 8.51 - Shear buckling strength q_w (N/mm²) of a web (for 16mm < t ≤ 40mm)

12) Grade Q235 steel, web thickness >16mm ≤ 40mm – design strength $p_y = 205\text{N/mm}^2$													
d/t	Stiffener spacing ratio a/d												
	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	∞
55	123	123	123	123	123	123	123	123	123	123	123	123	123
60	123	123	123	123	123	123	123	123	123	123	123	123	123
65	123	123	123	123	123	123	123	123	123	123	123	123	123
70	123	123	123	123	123	123	123	123	123	123	123	123	123
75	123	123	123	123	123	123	123	123	123	123	123	123	120
80	123	123	123	123	123	123	123	123	123	123	123	123	118
85	123	123	123	123	123	123	123	123	123	123	123	122	118
90	123	123	123	123	123	123	123	123	123	122	119	117	115
95	123	123	123	123	123	123	123	123	123	122	118	115	113
100	123	123	123	123	123	123	123	123	120	115	112	109	107
105	123	123	123	123	123	123	123	120	116	111	108	105	103
110	123	123	123	123	123	122	117	113	108	104	102	100	98
115	123	123	123	123	123	120	114	110	105	101	98	96	94
120	123	123	123	123	123	117	111	107	101	97	94	92	90
125	123	123	123	120	114	108	104	98	93	90	88	87	85
130	123	123	123	118	111	105	100	94	90	87	85	83	81
135	123	123	123	115	108	102	97	91	88	84	82	80	78
140	123	123	120	113	106	99	94	87	83	81	79	77	75
145	123	123	118	110	103	96	91	84	80	78	76	75	72
150	123	123	116	108	100	93	88	82	78	75	73	72	70
155	123	123	114	105	97	90	85	79	75	73	71	70	68
160	123	121	111	102	94	87	82	76	73	70	69	67	64
165	123	119	109	100	92	85	80	74	71	68	67	65	62
170	123	118	107	97	89	82	77	72	69	66	65	63	61
175	123	116	105	95	86	80	75	70	67	64	63	62	59
180	123	114	102	92	84	78	73	68	65	63	61	60	58
185	123	112	100	90	82	76	71	66	63	61	59	58	55
190	123	110	98	87	79	74	69	64	61	59	58	57	54
195	121	108	96	85	77	72	67	63	60	58	56	55	53
200	120	106	93	83	75	70	66	61	58	56	55	54	51
205	118	104	91	81	74	68	64	60	57	55	54	53	50
210	116	102	89	79	72	66	62	58	55	54	52	51	48
215	115	100	87	77	70	65	61	57	54	52	51	50	47
220	113	98	85	75	68	63	60	56	53	51	50	49	46
225	112	96	83	74	67	62	58	54	52	50	49	48	45
230	110	94	81	72	65	61	57	53	51	49	48	47	44
235	108	92	79	70	64	59	56	52	49	48	47	46	43
240	107	90	78	69	63	58	55	51	48	47	46	45	42
245	106	88	76	66	61	57	53	50	47	46	45	44	41
250	104	87	74	66	60	56	52	49	46	45	44	43	40

Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.

⁴⁵ Revision of Table 8.51 - Shear Buckling Strength for Q235 steel with web thickness >16mm ≤ 40mm.

Item	Current version	Amendments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
46. Table 8.5m ⁴⁶		<p style="text-align: center;">Table 8.5m - Shear buckling strength q_w (N/mm²) of a web (for $t \leq 16$mm)</p> <p style="text-align: center;">13J Grade Q345/Q355 steel, web thickness ≤ 16mm – design strength $p_y = 305$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="16">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>183</td><td>183</td><td>183</td><td>183</td><td>183</td><td>183</td><td>183</td><td>183</td><td>183</td><td>183</td><td>183</td><td>183</td><td>183</td><td>183</td><td>183</td></tr> 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<tr><td>100</td><td>183</td><td>183</td><td>183</td><td>182</td><td>173</td><td>165</td><td>158</td><td>149</td><td>143</td><td>139</td><td>135</td><td>133</td><td>129</td><td>127</td><td>122</td></tr> <tr><td>105</td><td>183</td><td>183</td><td>183</td><td>177</td><td>168</td><td>159</td><td>152</td><td>143</td><td>137</td><td>132</td><td>129</td><td>126</td><td>123</td><td>121</td><td>116</td></tr> <tr><td>110</td><td>183</td><td>183</td><td>183</td><td>173</td><td>163</td><td>154</td><td>146</td><td>137</td><td>130</td><td>126</td><td>123</td><td>121</td><td>117</td><td>115</td><td>111</td></tr> <tr><td>115</td><td>183</td><td>183</td><td>180</td><td>168</td><td>158</td><td>148</td><td>140</td><td>131</td><td>124</td><td>120</td><td>117</td><td>115</td><td>112</td><td>110</td><td>106</td></tr> <tr><td>120</td><td>183</td><td>183</td><td>178</td><td>163</td><td>153</td><td>143</td><td>134</td><td>125</td><td>119</td><td>115</td><td>113</td><td>111</td><td>107</td><td>105</td><td>101</td></tr> <tr><td>125</td><td>183</td><td>183</td><td>172</td><td>159</td><td>147</td><td>137</td><td>129</td><td>120</td><td>115</td><td>111</td><td>108</td><td>106</td><td>103</td><td>101</td><td>97</td></tr> <tr><td>130</td><td>183</td><td>182</td><td>167</td><td>154</td><td>142</td><td>132</td><td>124</td><td>115</td><td>110</td><td>106</td><td>104</td><td>102</td><td>99</td><td>97</td><td>94</td></tr> <tr><td>135</td><td>183</td><td>179</td><td>163</td><td>150</td><td>137</td><td>127</td><td>119</td><td>111</td><td>106</td><td>103</td><td>100</td><td>98</td><td>95</td><td>94</td><td>90</td></tr> <tr><td>140</td><td>183</td><td>175</td><td>159</td><td>145</td><td>132</td><td>123</td><td>115</td><td>107</td><td>102</td><td>99</td><td>97</td><td>95</td><td>92</td><td>91</td><td>87</td></tr> <tr><td>145</td><td>183</td><td>172</td><td>155</td><td>140</td><td>128</td><td>118</td><td>111</td><td>104</td><td>99</td><td>95</td><td>93</td><td>91</td><td>89</td><td>87</td><td>84</td></tr> <tr><td>150</td><td>183</td><td>168</td><td>151</td><td>136</td><td>123</td><td>114</td><td>107</td><td>100</td><td>95</td><td>92</td><td>90</td><td>88</td><td>85</td><td>84</td><td>81</td></tr> <tr><td>155</td><td>183</td><td>165</td><td>147</td><td>131</td><td>119</td><td>111</td><td>104</td><td>97</td><td>92</td><td>89</td><td>87</td><td>86</td><td>83</td><td>82</td><td>79</td></tr> <tr><td>160</td><td>181</td><td>161</td><td>143</td><td>127</td><td>116</td><td>107</td><td>101</td><td>94</td><td>89</td><td>87</td><td>84</td><td>83</td><td>81</td><td>79</td><td>76</td></tr> <tr><td>165</td><td>178</td><td>157</td><td>139</td><td>123</td><td>112</td><td>104</td><td>98</td><td>91</td><td>87</td><td>84</td><td>82</td><td>80</td><td>78</td><td>77</td><td>74</td></tr> <tr><td>170</td><td>175</td><td>154</td><td>135</td><td>120</td><td>109</td><td>101</td><td>95</td><td>88</td><td>84</td><td>81</td><td>79</td><td>78</td><td>76</td><td>75</td><td>72</td></tr> <tr><td>175</td><td>172</td><td>150</td><td>131</td><td>116</td><td>106</td><td>98</td><td>92</td><td>86</td><td>82</td><td>79</td><td>77</td><td>76</td><td>74</td><td>72</td><td>70</td></tr> <tr><td>180</td><td>169</td><td>147</td><td>127</td><td>113</td><td>103</td><td>95</td><td>89</td><td>83</td><td>80</td><td>77</td><td>75</td><td>74</td><td>72</td><td>70</td><td>68</td></tr> <tr><td>185</td><td>166</td><td>143</td><td>124</td><td>110</td><td>100</td><td>93</td><td>87</td><td>81</td><td>77</td><td>75</td><td>73</td><td>72</td><td>70</td><td>68</td><td>66</td></tr> <tr><td>190</td><td>163</td><td>140</td><td>120</td><td>107</td><td>97</td><td>90</td><td>85</td><td>79</td><td>75</td><td>73</td><td>71</td><td>70</td><td>68</td><td>67</td><td>64</td></tr> <tr><td>195</td><td>161</td><td>138</td><td>117</td><td>104</td><td>95</td><td>88</td><td>83</td><td>77</td><td>73</td><td>71</td><td>69</td><td>68</td><td>66</td><td>65</td><td>62</td></tr> <tr><td>200</td><td>158</td><td>133</td><td>114</td><td>102</td><td>93</td><td>86</td><td>81</td><td>75</td><td>72</td><td>69</td><td>68</td><td>66</td><td>64</td><td>63</td><td>61</td></tr> <tr><td>205</td><td>155</td><td>129</td><td>112</td><td>99</td><td>90</td><td>84</td><td>79</td><td>73</td><td>70</td><td>68</td><td>66</td><td>65</td><td>63</td><td>62</td><td>59</td></tr> <tr><td>210</td><td>152</td><td>126</td><td>109</td><td>97</td><td>88</td><td>82</td><td>77</td><td>71</td><td>68</td><td>66</td><td>64</td><td>63</td><td>61</td><td>60</td><td>58</td></tr> <tr><td>215</td><td>149</td><td>123</td><td>106</td><td>95</td><td>86</td><td>80</td><td>75</td><td>70</td><td>67</td><td>64</td><td>63</td><td>62</td><td>60</td><td>59</td><td>57</td></tr> <tr><td>220</td><td>146</td><td>121</td><td>104</td><td>92</td><td>84</td><td>78</td><td>73</td><td>68</td><td>65</td><td>63</td><td>61</td><td>60</td><td>59</td><td>58</td><td>55</td></tr> <tr><td>225</td><td>143</td><td>118</td><td>102</td><td>90</td><td>82</td><td>76</td><td>72</td><td>67</td><td>64</td><td>62</td><td>60</td><td>59</td><td>57</td><td>56</td><td>54</td></tr> <tr><td>230</td><td>140</td><td>115</td><td>99</td><td>88</td><td>80</td><td>75</td><td>70</td><td>65</td><td>62</td><td>60</td><td>59</td><td>58</td><td>56</td><td>55</td><td>53</td></tr> <tr><td>235</td><td>137</td><td>113</td><td>97</td><td>87</td><td>79</td><td>73</td><td>69</td><td>64</td><td>61</td><td>59</td><td>57</td><td>56</td><td>55</td><td>54</td><td>52</td></tr> <tr><td>240</td><td>134</td><td>111</td><td>95</td><td>85</td><td>77</td><td>71</td><td>67</td><td>63</td><td>60</td><td>58</td><td>56</td><td>55</td><td>54</td><td>53</td><td>51</td></tr> <tr><td>245</td><td>131</td><td>108</td><td>93</td><td>83</td><td>76</td><td>70</td><td>66</td><td>61</td><td>58</td><td>57</td><td>55</td><td>54</td><td>53</td><td>52</td><td>50</td></tr> <tr><td>250</td><td>129</td><td>106</td><td>91</td><td>81</td><td>74</td><td>69</td><td>64</td><td>60</td><td>57</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>49</td></tr> </tbody> </table> <p style="text-align: center;">Note - For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d																0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	60	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	65	183	183	183	183	183	183	183	183	183	183	183	183	182	179	178	70	183	183	183	183	183	183	183	183	183	182	179	177	175	172	170	75	183	183	183	183	183	183	183	183	180	176	172	170	168	165	163	80	183	183	183	183	183	183	181	174	169	166	163	161	158	156	151	85	183	183	183	183	183	181	175	168	163	159	156	154	150	148	143	90	183	183	183	183	183	176	169	162	156	152	149	147	143	141	135	95	183	183	183	183	178	170	163	155	150	145	142	140	136	134	128	100	183	183	183	182	173	165	158	149	143	139	135	133	129	127	122	105	183	183	183	177	168	159	152	143	137	132	129	126	123	121	116	110	183	183	183	173	163	154	146	137	130	126	123	121	117	115	111	115	183	183	180	168	158	148	140	131	124	120	117	115	112	110	106	120	183	183	178	163	153	143	134	125	119	115	113	111	107	105	101	125	183	183	172	159	147	137	129	120	115	111	108	106	103	101	97	130	183	182	167	154	142	132	124	115	110	106	104	102	99	97	94	135	183	179	163	150	137	127	119	111	106	103	100	98	95	94	90	140	183	175	159	145	132	123	115	107	102	99	97	95	92	91	87	145	183	172	155	140	128	118	111	104	99	95	93	91	89	87	84	150	183	168	151	136	123	114	107	100	95	92	90	88	85	84	81	155	183	165	147	131	119	111	104	97	92	89	87	86	83	82	79	160	181	161	143	127	116	107	101	94	89	87	84	83	81	79	76	165	178	157	139	123	112	104	98	91	87	84	82	80	78	77	74	170	175	154	135	120	109	101	95	88	84	81	79	78	76	75	72	175	172	150	131	116	106	98	92	86	82	79	77	76	74	72	70	180	169	147	127	113	103	95	89	83	80	77	75	74	72	70	68	185	166	143	124	110	100	93	87	81	77	75	73	72	70	68	66	190	163	140	120	107	97	90	85	79	75	73	71	70	68	67	64	195	161	138	117	104	95	88	83	77	73	71	69	68	66	65	62	200	158	133	114	102	93	86	81	75	72	69	68	66	64	63	61	205	155	129	112	99	90	84	79	73	70	68	66	65	63	62	59	210	152	126	109	97	88	82	77	71	68	66	64	63	61	60	58	215	149	123	106	95	86	80	75	70	67	64	63	62	60	59	57	220	146	121	104	92	84	78	73	68	65	63	61	60	59	58	55	225	143	118	102	90	82	76	72	67	64	62	60	59	57	56	54	230	140	115	99	88	80	75	70	65	62	60	59	58	56	55	53	235	137	113	97	87	79	73	69	64	61	59	57	56	55	54	52	240	134	111	95	85	77	71	67	63	60	58	56	55	54	53	51	245	131	108	93	83	76	70	66	61	58	57	55	54	53	52	50	250	129	106	91	81	74	69	64	60	57	55	54	53	52	51	49
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⁴⁶ Addition of Table 8.5m - Shear Buckling Strength for Q345/Q355 steel with web thickness ≤ 16 mm.

Item	Current version	- Amendments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
47. Table 8.5n ⁴⁷		<p style="text-align: center;">Table 8.5n - Shear buckling strength q_w (N/mm²) of a web (for 16mm < $t \leq 40$mm)</p> <p style="text-align: center;">14) Grade Q345/Q355 steel, web thickness >16mm ≤40mm – design strength $p_y = 295$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="16">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td></tr> <tr><td>60</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td></tr> <tr><td>65</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>175</td><td>174</td></tr> <tr><td>70</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>175</td><td>173</td><td>171</td><td>168</td><td>167</td></tr> <tr><td>75</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>178</td><td>172</td><td>168</td><td>166</td><td>164</td><td>161</td><td>160</td></tr> <tr><td>80</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>176</td><td>170</td><td>165</td><td>162</td><td>156</td><td>158</td><td>154</td><td>152</td></tr> <tr><td>85</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>171</td><td>164</td><td>159</td><td>156</td><td>153</td><td>151</td><td>147</td><td>145</td></tr> <tr><td>90</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>177</td><td>171</td><td>165</td><td>158</td><td>153</td><td>149</td><td>146</td><td>144</td><td>141</td></tr> <tr><td>95</td><td>177</td><td>177</td><td>177</td><td>177</td><td>174</td><td>166</td><td>160</td><td>152</td><td>147</td><td>143</td><td>140</td><td>137</td><td>134</td><td>131</td><td>128</td></tr> 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<tr><td>195</td><td>157</td><td>134</td><td>115</td><td>103</td><td>93</td><td>87</td><td>81</td><td>76</td><td>72</td><td>70</td><td>68</td><td>67</td><td>65</td><td>64</td><td>61</td></tr> <tr><td>200</td><td>154</td><td>131</td><td>112</td><td>100</td><td>91</td><td>84</td><td>79</td><td>74</td><td>70</td><td>68</td><td>66</td><td>65</td><td>63</td><td>62</td><td>60</td></tr> <tr><td>205</td><td>152</td><td>127</td><td>110</td><td>98</td><td>89</td><td>82</td><td>77</td><td>72</td><td>69</td><td>66</td><td>65</td><td>64</td><td>62</td><td>61</td><td>58</td></tr> <tr><td>210</td><td>149</td><td>124</td><td>107</td><td>95</td><td>87</td><td>80</td><td>75</td><td>70</td><td>67</td><td>65</td><td>63</td><td>62</td><td>60</td><td>59</td><td>57</td></tr> <tr><td>215</td><td>146</td><td>121</td><td>105</td><td>93</td><td>85</td><td>78</td><td>74</td><td>69</td><td>65</td><td>63</td><td>62</td><td>61</td><td>59</td><td>58</td><td>56</td></tr> <tr><td>220</td><td>143</td><td>119</td><td>102</td><td>91</td><td>83</td><td>77</td><td>72</td><td>67</td><td>64</td><td>62</td><td>60</td><td>59</td><td>58</td><td>57</td><td>54</td></tr> <tr><td>225</td><td>141</td><td>116</td><td>100</td><td>89</td><td>81</td><td>75</td><td>70</td><td>66</td><td>63</td><td>61</td><td>59</td><td>58</td><td>56</td><td>55</td><td>53</td></tr> <tr><td>230</td><td>138</td><td>113</td><td>98</td><td>87</td><td>79</td><td>73</td><td>69</td><td>64</td><td>61</td><td>59</td><td>58</td><td>57</td><td>55</td><td>54</td><td>52</td></tr> <tr><td>235</td><td>135</td><td>111</td><td>96</td><td>85</td><td>77</td><td>72</td><td>67</td><td>63</td><td>60</td><td>58</td><td>57</td><td>56</td><td>54</td><td>53</td><td>51</td></tr> <tr><td>240</td><td>132</td><td>109</td><td>94</td><td>83</td><td>76</td><td>70</td><td>66</td><td>62</td><td>59</td><td>57</td><td>56</td><td>54</td><td>53</td><td>52</td><td>50</td></tr> <tr><td>245</td><td>129</td><td>107</td><td>92</td><td>82</td><td>74</td><td>69</td><td>65</td><td>60</td><td>57</td><td>56</td><td>54</td><td>53</td><td>52</td><td>51</td><td>49</td></tr> <tr><td>250</td><td>127</td><td>104</td><td>90</td><td>80</td><td>73</td><td>67</td><td>63</td><td>59</td><td>56</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>48</td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d																0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	60	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	65	177	177	177	177	177	177	177	177	177	177	177	177	177	175	174	70	177	177	177	177	177	177	177	177	177	177	175	173	171	168	167	75	177	177	177	177	177	177	177	177	178	172	168	166	164	161	160	80	177	177	177	177	177	177	177	176	170	165	162	156	158	154	152	85	177	177	177	177	177	177	177	171	164	159	156	153	151	147	145	90	177	177	177	177	177	177	177	171	165	158	153	149	146	144	141	95	177	177	177	177	174	166	160	152	147	143	140	137	134	131	128	100	177	177	177	177	160	161	154	146	140	136	133	131	127	125	120	105	177	177	177	173	164	156	149	140	134	130	127	124	121	119	114	110	177	177	177	160	159	151	143	134	128	124	121	119	115	113	109	115	177	177	175	164	154	145	138	128	122	118	116	113	110	108	104	120	177	177	171	160	149	140	132	123	117	113	111	109	106	104	100	125	177	177	168	155	145	135	127	118	113	109	106	104	101	100	96	130	177	177	164	151	140	130	122	114	108	105	102	100	97	96	92	135	177	174	160	147	135	125	117	109	104	101	98	97	94	92	89	140	177	171	156	142	130	120	113	105	101	97	95	93	91	89	86	145	177	168	152	138	126	116	109	102	97	94	92	90	87	86	83	150	177	164	148	134	121	112	106	98	94	91	89	87	84	83	80	155	177	161	144	129	117	109	102	95	91	88	86	84	82	80	77	160	176	158	140	125	114	105	99	92	88	85	83	82	79	78	75	165	174	154	136	121	110	102	96	89	85	83	81	79	77	76	73	170	171	151	132	118	107	99	93	87	83	80	78	77	75	73	70	175	168	147	129	114	104	96	91	84	80	78	76	75	72	71	68	180	165	144	125	111	101	94	88	82	78	76	74	72	70	69	67	185	163	141	122	108	98	91	85	80	76	74	72	71	68	67	65	190	160	137	118	105	96	89	83	78	74	72	70	69	67	66	63	195	157	134	115	103	93	87	81	76	72	70	68	67	65	64	61	200	154	131	112	100	91	84	79	74	70	68	66	65	63	62	60	205	152	127	110	98	89	82	77	72	69	66	65	64	62	61	58	210	149	124	107	95	87	80	75	70	67	65	63	62	60	59	57	215	146	121	105	93	85	78	74	69	65	63	62	61	59	58	56	220	143	119	102	91	83	77	72	67	64	62	60	59	58	57	54	225	141	116	100	89	81	75	70	66	63	61	59	58	56	55	53	230	138	113	98	87	79	73	69	64	61	59	58	57	55	54	52	235	135	111	96	85	77	72	67	63	60	58	57	56	54	53	51	240	132	109	94	83	76	70	66	62	59	57	56	54	53	52	50	245	129	107	92	82	74	69	65	60	57	56	54	53	52	51	49	250	127	104	90	80	73	67	63	59	56	54	53	52	51	50	48
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Table 8.5o ⁴⁸		<p style="text-align: center;">Table 8.5o - Shear buckling strength q_w (N/mm²) of a web (for $t \leq 16\text{mm}$)</p> <p style="text-align: center;">15) Grade Q390 steel, web thickness $\leq 16\text{mm}$ – design strength $p_y = 345\text{N/mm}^2$</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="16">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>207</td><td>207</td><td>207</td><td>207</td><td>207</td><td>207</td><td>207</td><td>207</td><td>207</td><td>207</td><td>207</td><td>207</td><td>207</td><td>207</td><td>207</td></tr> 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<tr><td>215</td><td>159</td><td>131</td><td>113</td><td>101</td><td>92</td><td>85</td><td>80</td><td>74</td><td>71</td><td>68</td><td>67</td><td>66</td><td>64</td><td>63</td><td>60</td></tr> <tr><td>220</td><td>156</td><td>128</td><td>111</td><td>98</td><td>90</td><td>83</td><td>78</td><td>73</td><td>69</td><td>67</td><td>65</td><td>64</td><td>62</td><td>61</td><td>59</td></tr> <tr><td>225</td><td>152</td><td>125</td><td>108</td><td>96</td><td>88</td><td>81</td><td>76</td><td>71</td><td>68</td><td>65</td><td>64</td><td>63</td><td>61</td><td>60</td><td>58</td></tr> <tr><td>230</td><td>149</td><td>123</td><td>106</td><td>94</td><td>86</td><td>79</td><td>74</td><td>69</td><td>66</td><td>64</td><td>62</td><td>61</td><td>60</td><td>59</td><td>56</td></tr> <tr><td>235</td><td>146</td><td>120</td><td>103</td><td>92</td><td>84</td><td>78</td><td>73</td><td>68</td><td>65</td><td>63</td><td>61</td><td>60</td><td>58</td><td>57</td><td>55</td></tr> <tr><td>240</td><td>143</td><td>118</td><td>101</td><td>90</td><td>82</td><td>76</td><td>71</td><td>67</td><td>63</td><td>61</td><td>60</td><td>59</td><td>57</td><td>56</td><td>54</td></tr> <tr><td>245</td><td>140</td><td>115</td><td>99</td><td>88</td><td>80</td><td>74</td><td>70</td><td>65</td><td>62</td><td>60</td><td>59</td><td>58</td><td>56</td><td>55</td><td>53</td></tr> <tr><td>250</td><td>137</td><td>113</td><td>97</td><td>87</td><td>79</td><td>73</td><td>69</td><td>64</td><td>61</td><td>59</td><td>57</td><td>56</td><td>55</td><td>54</td><td>52</td></tr> </tbody> </table> <p style="text-align: center;">Note: For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d																0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	60	207	207	207	207	207	207	207	207	207	207	207	207	205	203	199	65	207	207	207	207	207	207	207	207	207	204	201	200	198	194	190	70	207	207	207	207	207	207	207	207	205	200	196	193	191	187	180	75	207	207	207	207	207	207	207	205	197	192	188	185	183	179	177	80	207	207	207	207	207	205	198	190	184	180	176	174	170	168	162	85	207	207	207	207	206	198	191	182	176	172	168	165	161	159	153	90	207	207	207	207	200	192	184	175	168	163	160	157	152	150	144	95	207	207	207	205	194	185	177	167	160	155	151	149	144	142	136	100	207	207	207	199	188	178	170	160	152	147	144	141	137	135	129	105	207	207	206	194	182	172	163	152	145	140	137	134	131	128	123	110	207	207	202	188	176	165	156	145	138	134	131	128	125	123	118	115	207	207	197	182	170	159	149	139	132	128	125	123	119	117	113	120	207	207	192	177	164	152	143	133	127	123	120	118	114	112	108	125	207	204	187	171	158	146	137	128	122	118	115	113	110	108	104	130	207	200	182	166	152	140	132	123	117	113	111	109	105	104	100	135	207	195	177	160	146	135	127	118	113	109	106	105	102	100	96	140	207	191	172	155	141	130	122	114	109	105	103	101	98	96	92	145	207	187	167	149	136	126	118	110	105	102	99	97	95	93	89	150	205	183	162	144	131	122	114	106	102	98	96	94	91	90	86	155	201	178	157	140	127	118	111	103	98	95	93	91	88	87	84	160	198	174	152	135	123	114	107	100	95	92	90	88	86	84	81	165	194	170	147	131	119	111	104	97	92	89	87	86	83	82	78	170	191	165	143	127	116	107	101	94	90	87	85	83	81	79	76	175	187	161	139	124	113	104	98	91	87	84	82	81	78	77	74	180	184	157	135	120	109	101	95	89	85	82	80	78	76	75	72	185	180	153	131	117	106	99	93	88	82	80	78	76	74	73	70	190	177	149	128	114	104	98	90	84	80	77	76	74	72	71	68	195	173	145	125	111	101	94	88	82	78	76	74	72	70	69	66	200	170	141	122	108	98	91	86	80	76	74	72	71	69	67	65	205	166	138	119	106	96	89	84	78	74	72	70	69	67	66	63	210	163	134	116	103	94	87	82	76	73	70	68	67	65	64	62	215	159	131	113	101	92	85	80	74	71	68	67	66	64	63	60	220	156	128	111	98	90	83	78	73	69	67	65	64	62	61	59	225	152	125	108	96	88	81	76	71	68	65	64	63	61	60	58	230	149	123	106	94	86	79	74	69	66	64	62	61	60	59	56	235	146	120	103	92	84	78	73	68	65	63	61	60	58	57	55	240	143	118	101	90	82	76	71	67	63	61	60	59	57	56	54	245	140	115	99	88	80	74	70	65	62	60	59	58	56	55	53	250	137	113	97	87	79	73	69	64	61	59	57	56	55	54	52
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⁴⁸ Addition of Table 8.5o - Shear Buckling Strength for Q390 steel with web thickness $\leq 16\text{mm}$.

Item	Current version	Amendments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
49. Table 8.5p ⁴⁹		<p style="text-align: center;">Table 8.5p - Shear buckling strength q_w (N/mm²) of a web (for 16mm < $t \leq 40$mm)</p> <p style="text-align: center;">16) Grade Q390 steel, web thickness >16mm ≤40mm – design strength $p_y = 330$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="14">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>m</th> </tr> </thead> <tbody> <tr><td>55</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td></tr> <tr><td>60</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>197</td><td>193</td></tr> <tr><td>65</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>197</td><td>195</td><td>193</td><td>190</td><td>184</td></tr> <tr><td>70</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>193</td><td>190</td><td>187</td><td>185</td><td>182</td><td>180</td><td>175</td></tr> <tr><td>75</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>191</td><td>186</td><td>182</td><td>179</td><td>177</td><td>174</td><td>167</td></tr> <tr><td>80</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>192</td><td>184</td><td>179</td><td>175</td><td>172</td><td>169</td><td>166</td><td>163</td><td>158</td></tr> <tr><td>85</td><td>198</td><td>198</td><td>198</td><td>198</td><td>198</td><td>192</td><td>185</td><td>177</td><td>171</td><td>167</td><td>164</td><td>161</td><td>157</td><td>155</td><td>149</td></tr> <tr><td>90</td><td>198</td><td>198</td><td>198</td><td>198</td><td>194</td><td>188</td><td>179</td><td>170</td><td>164</td><td>159</td><td>156</td><td>153</td><td>149</td><td>147</td><td>141</td></tr> <tr><td>95</td><td>198</td><td>198</td><td>198</td><td>198</td><td>188</td><td>180</td><td>172</td><td>163</td><td>157</td><td>152</td><td>148</td><td>145</td><td>141</td><td>139</td><td>133</td></tr> <tr><td>100</td><td>198</td><td>198</td><td>198</td><td>193</td><td>183</td><td>174</td><td>166</td><td>158</td><td>149</td><td>144</td><td>141</td><td>138</td><td>134</td><td>132</td><td>127</td></tr> <tr><td>105</td><td>198</td><td>198</td><td>198</td><td>188</td><td>177</td><td>167</td><td>159</td><td>149</td><td>142</td><td>137</td><td>134</td><td>131</td><td>128</td><td>126</td><td>121</td></tr> <tr><td>110</td><td>198</td><td>198</td><td>195</td><td>182</td><td>171</td><td>161</td><td>152</td><td>142</td><td>135</td><td>131</td><td>128</td><td>125</td><td>122</td><td>120</td><td>115</td></tr> <tr><td>115</td><td>198</td><td>198</td><td>190</td><td>177</td><td>165</td><td>155</td><td>146</td><td>138</td><td>129</td><td>125</td><td>122</td><td>120</td><td>117</td><td>115</td><td>110</td></tr> <tr><td>120</td><td>198</td><td>198</td><td>188</td><td>172</td><td>160</td><td>149</td><td>140</td><td>130</td><td>124</td><td>120</td><td>117</td><td>115</td><td>112</td><td>110</td><td>106</td></tr> <tr><td>125</td><td>198</td><td>197</td><td>181</td><td>167</td><td>154</td><td>143</td><td>134</td><td>125</td><td>119</td><td>115</td><td>112</td><td>110</td><td>107</td><td>105</td><td>101</td></tr> <tr><td>130</td><td>198</td><td>193</td><td>177</td><td>162</td><td>148</td><td>137</td><td>129</td><td>120</td><td>115</td><td>111</td><td>108</td><td>106</td><td>103</td><td>101</td><td>97</td></tr> <tr><td>135</td><td>198</td><td>189</td><td>172</td><td>156</td><td>143</td><td>132</td><td>124</td><td>116</td><td>110</td><td>107</td><td>104</td><td>102</td><td>99</td><td>98</td><td>94</td></tr> <tr><td>140</td><td>198</td><td>185</td><td>167</td><td>151</td><td>138</td><td>127</td><td>120</td><td>112</td><td>106</td><td>103</td><td>100</td><td>99</td><td>96</td><td>94</td><td>90</td></tr> <tr><td>145</td><td>198</td><td>181</td><td>163</td><td>146</td><td>133</td><td>123</td><td>116</td><td>108</td><td>103</td><td>99</td><td>97</td><td>95</td><td>92</td><td>91</td><td>87</td></tr> <tr><td>150</td><td>198</td><td>177</td><td>158</td><td>141</td><td>128</td><td>119</td><td>112</td><td>104</td><td>99</td><td>96</td><td>94</td><td>92</td><td>89</td><td>88</td><td>84</td></tr> <tr><td>155</td><td>195</td><td>173</td><td>153</td><td>136</td><td>124</td><td>115</td><td>108</td><td>101</td><td>96</td><td>93</td><td>91</td><td>89</td><td>86</td><td>85</td><td>82</td></tr> <tr><td>160</td><td>192</td><td>169</td><td>149</td><td>132</td><td>120</td><td>112</td><td>105</td><td>98</td><td>93</td><td>90</td><td>88</td><td>86</td><td>84</td><td>82</td><td>79</td></tr> <tr><td>165</td><td>188</td><td>165</td><td>144</td><td>128</td><td>117</td><td>108</td><td>102</td><td>95</td><td>90</td><td>87</td><td>85</td><td>84</td><td>81</td><td>80</td><td>77</td></tr> <tr><td>170</td><td>185</td><td>161</td><td>140</td><td>124</td><td>113</td><td>105</td><td>99</td><td>92</td><td>88</td><td>85</td><td>83</td><td>81</td><td>79</td><td>78</td><td>74</td></tr> <tr><td>175</td><td>182</td><td>157</td><td>136</td><td>121</td><td>110</td><td>102</td><td>96</td><td>89</td><td>85</td><td>82</td><td>80</td><td>79</td><td>77</td><td>75</td><td>72</td></tr> <tr><td>180</td><td>179</td><td>153</td><td>132</td><td>118</td><td>107</td><td>99</td><td>93</td><td>87</td><td>83</td><td>80</td><td>78</td><td>77</td><td>74</td><td>73</td><td>70</td></tr> <tr><td>185</td><td>175</td><td>149</td><td>129</td><td>114</td><td>104</td><td>96</td><td>91</td><td>84</td><td>80</td><td>78</td><td>76</td><td>75</td><td>72</td><td>71</td><td>68</td></tr> <tr><td>190</td><td>172</td><td>145</td><td>125</td><td>111</td><td>101</td><td>94</td><td>88</td><td>82</td><td>78</td><td>76</td><td>74</td><td>73</td><td>71</td><td>69</td><td>67</td></tr> <tr><td>195</td><td>169</td><td>142</td><td>122</td><td>108</td><td>99</td><td>91</td><td>86</td><td>80</td><td>76</td><td>74</td><td>72</td><td>71</td><td>69</td><td>68</td><td>65</td></tr> <tr><td>200</td><td>166</td><td>138</td><td>119</td><td>106</td><td>98</td><td>91</td><td>84</td><td>78</td><td>74</td><td>72</td><td>70</td><td>69</td><td>67</td><td>66</td><td>63</td></tr> <tr><td>205</td><td>162</td><td>135</td><td>116</td><td>103</td><td>94</td><td>87</td><td>82</td><td>76</td><td>73</td><td>70</td><td>69</td><td>67</td><td>65</td><td>64</td><td>62</td></tr> <tr><td>210</td><td>159</td><td>131</td><td>113</td><td>101</td><td>92</td><td>85</td><td>80</td><td>74</td><td>71</td><td>69</td><td>67</td><td>66</td><td>64</td><td>63</td><td>60</td></tr> <tr><td>215</td><td>156</td><td>128</td><td>111</td><td>98</td><td>90</td><td>83</td><td>78</td><td>73</td><td>69</td><td>67</td><td>65</td><td>64</td><td>62</td><td>61</td><td>59</td></tr> <tr><td>220</td><td>152</td><td>125</td><td>108</td><td>96</td><td>88</td><td>81</td><td>76</td><td>71</td><td>68</td><td>65</td><td>64</td><td>63</td><td>61</td><td>60</td><td>58</td></tr> <tr><td>225</td><td>149</td><td>123</td><td>106</td><td>94</td><td>86</td><td>79</td><td>74</td><td>69</td><td>66</td><td>64</td><td>62</td><td>61</td><td>60</td><td>59</td><td>56</td></tr> <tr><td>230</td><td>146</td><td>120</td><td>103</td><td>92</td><td>84</td><td>78</td><td>73</td><td>68</td><td>65</td><td>63</td><td>61</td><td>60</td><td>59</td><td>57</td><td>55</td></tr> <tr><td>235</td><td>143</td><td>117</td><td>101</td><td>90</td><td>82</td><td>76</td><td>71</td><td>66</td><td>63</td><td>61</td><td>60</td><td>59</td><td>57</td><td>56</td><td>54</td></tr> <tr><td>240</td><td>140</td><td>115</td><td>99</td><td>88</td><td>80</td><td>74</td><td>70</td><td>65</td><td>62</td><td>60</td><td>59</td><td>58</td><td>56</td><td>55</td><td>53</td></tr> <tr><td>245</td><td>137</td><td>113</td><td>97</td><td>86</td><td>79</td><td>73</td><td>68</td><td>64</td><td>61</td><td>59</td><td>57</td><td>56</td><td>55</td><td>54</td><td>52</td></tr> <tr><td>250</td><td>134</td><td>110</td><td>95</td><td>85</td><td>77</td><td>71</td><td>67</td><td>62</td><td>60</td><td>58</td><td>56</td><td>55</td><td>54</td><td>53</td><td>51</td></tr> </tbody> </table> <p style="text-align: center;">Note: For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d														0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	m	55	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	60	198	198	198	198	198	198	198	198	198	198	198	198	198	197	193	65	198	198	198	198	198	198	198	198	198	198	197	195	193	190	184	70	198	198	198	198	198	198	198	198	193	190	187	185	182	180	175	75	198	198	198	198	198	198	198	198	191	186	182	179	177	174	167	80	198	198	198	198	198	198	192	184	179	175	172	169	166	163	158	85	198	198	198	198	198	192	185	177	171	167	164	161	157	155	149	90	198	198	198	198	194	188	179	170	164	159	156	153	149	147	141	95	198	198	198	198	188	180	172	163	157	152	148	145	141	139	133	100	198	198	198	193	183	174	166	158	149	144	141	138	134	132	127	105	198	198	198	188	177	167	159	149	142	137	134	131	128	126	121	110	198	198	195	182	171	161	152	142	135	131	128	125	122	120	115	115	198	198	190	177	165	155	146	138	129	125	122	120	117	115	110	120	198	198	188	172	160	149	140	130	124	120	117	115	112	110	106	125	198	197	181	167	154	143	134	125	119	115	112	110	107	105	101	130	198	193	177	162	148	137	129	120	115	111	108	106	103	101	97	135	198	189	172	156	143	132	124	116	110	107	104	102	99	98	94	140	198	185	167	151	138	127	120	112	106	103	100	99	96	94	90	145	198	181	163	146	133	123	116	108	103	99	97	95	92	91	87	150	198	177	158	141	128	119	112	104	99	96	94	92	89	88	84	155	195	173	153	136	124	115	108	101	96	93	91	89	86	85	82	160	192	169	149	132	120	112	105	98	93	90	88	86	84	82	79	165	188	165	144	128	117	108	102	95	90	87	85	84	81	80	77	170	185	161	140	124	113	105	99	92	88	85	83	81	79	78	74	175	182	157	136	121	110	102	96	89	85	82	80	79	77	75	72	180	179	153	132	118	107	99	93	87	83	80	78	77	74	73	70	185	175	149	129	114	104	96	91	84	80	78	76	75	72	71	68	190	172	145	125	111	101	94	88	82	78	76	74	73	71	69	67	195	169	142	122	108	99	91	86	80	76	74	72	71	69	68	65	200	166	138	119	106	98	91	84	78	74	72	70	69	67	66	63	205	162	135	116	103	94	87	82	76	73	70	69	67	65	64	62	210	159	131	113	101	92	85	80	74	71	69	67	66	64	63	60	215	156	128	111	98	90	83	78	73	69	67	65	64	62	61	59	220	152	125	108	96	88	81	76	71	68	65	64	63	61	60	58	225	149	123	106	94	86	79	74	69	66	64	62	61	60	59	56	230	146	120	103	92	84	78	73	68	65	63	61	60	59	57	55	235	143	117	101	90	82	76	71	66	63	61	60	59	57	56	54	240	140	115	99	88	80	74	70	65	62	60	59	58	56	55	53	245	137	113	97	86	79	73	68	64	61	59	57	56	55	54	52	250	134	110	95	85	77	71	67	62	60	58	56	55	54	53	51
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⁴⁹ Addition of Table 8.5p - Shear Buckling Strength for Q390 steel with web thickness >16mm ≤ 40mm.

Item	Current version	Amendments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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Table 8.5q ⁵⁰		<p style="text-align: center;">Table 8.5q - Shear buckling strength q_w (N/mm²) of a web (for $t \leq 16$mm)</p> <p style="text-align: center;">17) Grade Q420 steel, web thickness ≤ 16mm – design strength $p_y = 375$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="16">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>225</td><td>225</td><td>225</td><td>225</td><td>225</td><td>225</td><td>225</td><td>225</td><td>225</td><td>225</td><td>225</td><td>225</td><td>225</td><td>225</td><td>222</td></tr> 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<tr><td>215</td><td>166</td><td>137</td><td>118</td><td>105</td><td>95</td><td>88</td><td>83</td><td>77</td><td>74</td><td>71</td><td>70</td><td>68</td><td>66</td><td>65</td><td>63</td></tr> <tr><td>220</td><td>162</td><td>134</td><td>115</td><td>103</td><td>93</td><td>86</td><td>81</td><td>76</td><td>72</td><td>70</td><td>68</td><td>67</td><td>65</td><td>64</td><td>61</td></tr> <tr><td>225</td><td>159</td><td>131</td><td>113</td><td>100</td><td>91</td><td>85</td><td>79</td><td>74</td><td>71</td><td>68</td><td>67</td><td>65</td><td>63</td><td>62</td><td>60</td></tr> <tr><td>230</td><td>155</td><td>128</td><td>110</td><td>98</td><td>89</td><td>83</td><td>78</td><td>72</td><td>69</td><td>67</td><td>65</td><td>64</td><td>62</td><td>61</td><td>59</td></tr> <tr><td>235</td><td>152</td><td>125</td><td>108</td><td>96</td><td>87</td><td>81</td><td>76</td><td>71</td><td>68</td><td>65</td><td>64</td><td>63</td><td>61</td><td>60</td><td>57</td></tr> <tr><td>240</td><td>149</td><td>123</td><td>106</td><td>94</td><td>86</td><td>79</td><td>74</td><td>69</td><td>66</td><td>64</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td></tr> <tr><td>245</td><td>146</td><td>120</td><td>103</td><td>92</td><td>84</td><td>78</td><td>73</td><td>68</td><td>65</td><td>63</td><td>61</td><td>60</td><td>58</td><td>57</td><td>55</td></tr> <tr><td>250</td><td>143</td><td>118</td><td>101</td><td>90</td><td>82</td><td>76</td><td>71</td><td>67</td><td>63</td><td>61</td><td>60</td><td>59</td><td>57</td><td>56</td><td>54</td></tr> </tbody> </table> <p style="text-align: center;">Note: For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d																0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	225	225	225	225	225	225	225	225	225	225	225	225	225	225	222	60	225	225	225	225	225	225	225	225	225	225	225	223	221	218	211	65	225	225	225	225	225	225	225	225	225	221	217	214	212	208	201	70	225	225	225	225	225	225	225	218	212	208	205	202	198	196	190	75	225	225	225	225	225	225	218	200	203	198	195	192	188	186	180	80	225	225	225	225	225	218	210	201	194	189	186	183	178	176	169	85	225	225	225	225	220	210	202	192	185	180	176	173	168	166	159	90	225	225	225	224	213	203	194	184	178	171	167	164	159	156	150	95	225	225	225	218	208	198	186	175	167	162	158	155	150	148	142	100	225	225	225	211	199	188	178	167	159	154	150	147	143	141	135	105	225	225	220	205	192	180	170	159	151	146	143	140	136	134	129	110	225	225	214	199	185	173	162	151	144	140	136	134	130	128	123	115	225	225	208	192	178	166	155	145	138	133	130	128	124	122	117	120	225	221	203	186	171	158	149	139	132	128	125	123	119	117	113	125	225	217	197	180	164	152	143	133	127	123	120	118	114	112	108	130	225	212	192	174	158	146	137	128	122	118	115	113	110	108	104	135	225	207	186	167	152	141	132	123	118	114	111	109	106	104	100	140	225	202	180	161	147	136	128	119	113	110	107	105	102	100	96	145	222	197	175	156	142	131	123	115	109	106	103	101	99	97	93	150	218	192	169	150	137	127	119	111	106	102	100	98	95	94	90	155	214	188	164	146	132	123	115	107	102	99	97	95	92	91	87	160	210	183	158	141	128	119	112	104	99	96	94	92	89	88	84	165	206	178	154	137	124	115	108	101	96	93	91	89	87	85	82	170	202	173	149	133	121	112	105	98	93	90	88	87	84	83	79	175	198	168	145	129	117	109	102	95	91	88	86	84	82	80	77	180	194	164	141	125	114	106	99	92	88	85	83	82	79	78	75	185	190	159	137	122	111	103	97	90	86	83	81	80	77	76	73	190	186	155	133	119	108	100	94	88	84	81	79	77	75	74	71	195	182	151	130	116	105	98	92	85	81	79	77	75	73	72	69	200	178	147	127	113	103	95	89	83	79	77	75	74	71	70	68	205	174	144	124	110	100	93	87	81	77	75	73	72	70	69	66	210	170	140	121	107	98	91	85	79	75	73	71	70	68	67	64	215	166	137	118	105	95	88	83	77	74	71	70	68	66	65	63	220	162	134	115	103	93	86	81	76	72	70	68	67	65	64	61	225	159	131	113	100	91	85	79	74	71	68	67	65	63	62	60	230	155	128	110	98	89	83	78	72	69	67	65	64	62	61	59	235	152	125	108	96	87	81	76	71	68	65	64	63	61	60	57	240	149	123	106	94	86	79	74	69	66	64	62	61	60	59	58	245	146	120	103	92	84	78	73	68	65	63	61	60	58	57	55	250	143	118	101	90	82	76	71	67	63	61	60	59	57	56	54
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⁵⁰ Addition of Table 8.5q - Shear Buckling Strength for Q420 steel with web thickness ≤ 16 mm.

Item	Current version	Amendments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
51. Table 8.5r ⁵¹		<p style="text-align: center;">Table 8.5r - Shear buckling strength q_w (N/mm²) of a web (for 16mm < t ≤ 40mm)</p> <p style="text-align: center;">18) Grade Q420 steel, web thickness >16mm ≤ 40mm – design strength $p_y = 355$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="16">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td></tr> <tr><td>60</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td></tr> <tr><td>65</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>212</td><td>208</td><td>206</td><td>204</td><td>200</td><td>198</td><td>193</td></tr> <tr><td>70</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>209</td><td>204</td><td>200</td><td>197</td><td>195</td><td>191</td><td>189</td><td>184</td></tr> <tr><td>75</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>209</td><td>201</td><td>193</td><td>191</td><td>188</td><td>188</td><td>182</td><td>180</td><td>174</td></tr> <tr><td>80</td><td>213</td><td>213</td><td>213</td><td>213</td><td>213</td><td>209</td><td>202</td><td>194</td><td>187</td><td>183</td><td>180</td><td>177</td><td>173</td><td>170</td><td>164</td></tr> <tr><td>85</td><td>213</td><td>213</td><td>213</td><td>213</td><td>211</td><td>202</td><td>195</td><td>186</td><td>179</td><td>174</td><td>171</td><td>168</td><td>164</td><td>161</td><td>155</td></tr> <tr><td>90</td><td>213</td><td>213</td><td>213</td><td>213</td><td>205</td><td>195</td><td>187</td><td>178</td><td>171</td><td>166</td><td>162</td><td>159</td><td>155</td><td>152</td><td>146</td></tr> <tr><td>95</td><td>213</td><td>213</td><td>213</td><td>209</td><td>198</td><td>189</td><td>180</td><td>170</td><td>163</td><td>157</td><td>153</td><td>151</td><td>146</td><td>144</td><td>138</td></tr> <tr><td>100</td><td>213</td><td>213</td><td>213</td><td>203</td><td>192</td><td>182</td><td>173</td><td>162</td><td>155</td><td>149</td><td>146</td><td>143</td><td>139</td><td>137</td><td>131</td></tr> <tr><td>105</td><td>213</td><td>213</td><td>211</td><td>197</td><td>185</td><td>175</td><td>165</td><td>154</td><td>147</td><td>142</td><td>139</td><td>136</td><td>132</td><td>130</td><td>125</td></tr> <tr><td>110</td><td>213</td><td>213</td><td>206</td><td>192</td><td>179</td><td>168</td><td>158</td><td>147</td><td>140</td><td>136</td><td>133</td><td>130</td><td>126</td><td>124</td><td>119</td></tr> <tr><td>115</td><td>213</td><td>213</td><td>201</td><td>186</td><td>173</td><td>161</td><td>151</td><td>141</td><td>134</td><td>130</td><td>127</td><td>124</td><td>121</td><td>119</td><td>114</td></tr> <tr><td>120</td><td>213</td><td>213</td><td>195</td><td>180</td><td>166</td><td>154</td><td>145</td><td>135</td><td>129</td><td>124</td><td>121</td><td>119</td><td>116</td><td>114</td><td>109</td></tr> <tr><td>125</td><td>213</td><td>208</td><td>190</td><td>174</td><td>160</td><td>148</td><td>139</td><td>130</td><td>124</td><td>119</td><td>117</td><td>115</td><td>111</td><td>109</td><td>105</td></tr> <tr><td>130</td><td>213</td><td>204</td><td>185</td><td>169</td><td>154</td><td>142</td><td>134</td><td>125</td><td>119</td><td>115</td><td>112</td><td>110</td><td>107</td><td>105</td><td>101</td></tr> <tr><td>135</td><td>213</td><td>199</td><td>180</td><td>163</td><td>148</td><td>137</td><td>129</td><td>120</td><td>114</td><td>111</td><td>108</td><td>106</td><td>103</td><td>101</td><td>97</td></tr> <tr><td>140</td><td>213</td><td>195</td><td>175</td><td>157</td><td>143</td><td>132</td><td>124</td><td>116</td><td>110</td><td>107</td><td>104</td><td>102</td><td>99</td><td>96</td><td>94</td></tr> <tr><td>145</td><td>213</td><td>190</td><td>170</td><td>151</td><td>138</td><td>128</td><td>120</td><td>112</td><td>107</td><td>103</td><td>101</td><td>99</td><td>96</td><td>94</td><td>91</td></tr> <tr><td>150</td><td>209</td><td>186</td><td>165</td><td>146</td><td>133</td><td>123</td><td>116</td><td>108</td><td>103</td><td>100</td><td>97</td><td>95</td><td>93</td><td>91</td><td>88</td></tr> <tr><td>155</td><td>206</td><td>181</td><td>159</td><td>142</td><td>126</td><td>119</td><td>112</td><td>105</td><td>100</td><td>96</td><td>94</td><td>92</td><td>90</td><td>88</td><td>85</td></tr> <tr><td>160</td><td>202</td><td>177</td><td>154</td><td>137</td><td>125</td><td>116</td><td>109</td><td>101</td><td>97</td><td>93</td><td>91</td><td>89</td><td>87</td><td>85</td><td>82</td></tr> 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<tr><td>190</td><td>180</td><td>151</td><td>130</td><td>115</td><td>105</td><td>97</td><td>91</td><td>85</td><td>81</td><td>79</td><td>77</td><td>75</td><td>73</td><td>72</td><td>69</td></tr> <tr><td>195</td><td>178</td><td>147</td><td>127</td><td>113</td><td>102</td><td>95</td><td>89</td><td>83</td><td>79</td><td>77</td><td>75</td><td>73</td><td>71</td><td>70</td><td>67</td></tr> <tr><td>200</td><td>173</td><td>143</td><td>123</td><td>110</td><td>100</td><td>93</td><td>87</td><td>81</td><td>77</td><td>75</td><td>73</td><td>72</td><td>70</td><td>68</td><td>66</td></tr> <tr><td>205</td><td>169</td><td>140</td><td>120</td><td>107</td><td>97</td><td>90</td><td>85</td><td>79</td><td>75</td><td>73</td><td>71</td><td>70</td><td>68</td><td>67</td><td>64</td></tr> <tr><td>210</td><td>165</td><td>136</td><td>117</td><td>104</td><td>95</td><td>88</td><td>83</td><td>77</td><td>74</td><td>71</td><td>69</td><td>68</td><td>66</td><td>65</td><td>63</td></tr> <tr><td>215</td><td>162</td><td>133</td><td>115</td><td>102</td><td>93</td><td>86</td><td>81</td><td>75</td><td>72</td><td>69</td><td>68</td><td>67</td><td>65</td><td>64</td><td>61</td></tr> <tr><td>220</td><td>158</td><td>130</td><td>112</td><td>100</td><td>91</td><td>84</td><td>79</td><td>74</td><td>70</td><td>68</td><td>66</td><td>65</td><td>63</td><td>62</td><td>60</td></tr> <tr><td>225</td><td>155</td><td>127</td><td>110</td><td>98</td><td>89</td><td>82</td><td>77</td><td>72</td><td>69</td><td>66</td><td>65</td><td>64</td><td>62</td><td>61</td><td>58</td></tr> <tr><td>230</td><td>151</td><td>124</td><td>107</td><td>95</td><td>87</td><td>80</td><td>76</td><td>70</td><td>67</td><td>65</td><td>63</td><td>62</td><td>60</td><td>59</td><td>57</td></tr> <tr><td>235</td><td>148</td><td>122</td><td>105</td><td>93</td><td>85</td><td>79</td><td>74</td><td>69</td><td>66</td><td>64</td><td>62</td><td>61</td><td>59</td><td>58</td><td>56</td></tr> <tr><td>240</td><td>145</td><td>119</td><td>103</td><td>91</td><td>83</td><td>77</td><td>72</td><td>67</td><td>64</td><td>62</td><td>61</td><td>60</td><td>58</td><td>57</td><td>55</td></tr> <tr><td>245</td><td>142</td><td>117</td><td>101</td><td>90</td><td>82</td><td>76</td><td>71</td><td>66</td><td>63</td><td>61</td><td>59</td><td>58</td><td>57</td><td>56</td><td>54</td></tr> <tr><td>250</td><td>139</td><td>115</td><td>99</td><td>88</td><td>80</td><td>74</td><td>70</td><td>65</td><td>62</td><td>60</td><td>58</td><td>57</td><td>56</td><td>55</td><td>53</td></tr> </tbody> </table> <p style="text-align: center;">Note: For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d																0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	213	213	213	213	213	213	213	213	213	213	213	213	213	213	213	60	213	213	213	213	213	213	213	213	213	213	213	213	213	213	213	65	213	213	213	213	213	213	213	213	212	208	206	204	200	198	193	70	213	213	213	213	213	213	213	209	204	200	197	195	191	189	184	75	213	213	213	213	213	213	209	201	193	191	188	188	182	180	174	80	213	213	213	213	213	209	202	194	187	183	180	177	173	170	164	85	213	213	213	213	211	202	195	186	179	174	171	168	164	161	155	90	213	213	213	213	205	195	187	178	171	166	162	159	155	152	146	95	213	213	213	209	198	189	180	170	163	157	153	151	146	144	138	100	213	213	213	203	192	182	173	162	155	149	146	143	139	137	131	105	213	213	211	197	185	175	165	154	147	142	139	136	132	130	125	110	213	213	206	192	179	168	158	147	140	136	133	130	126	124	119	115	213	213	201	186	173	161	151	141	134	130	127	124	121	119	114	120	213	213	195	180	166	154	145	135	129	124	121	119	116	114	109	125	213	208	190	174	160	148	139	130	124	119	117	115	111	109	105	130	213	204	185	169	154	142	134	125	119	115	112	110	107	105	101	135	213	199	180	163	148	137	129	120	114	111	108	106	103	101	97	140	213	195	175	157	143	132	124	116	110	107	104	102	99	96	94	145	213	190	170	151	138	128	120	112	107	103	101	99	96	94	91	150	209	186	165	146	133	123	116	108	103	100	97	95	93	91	88	155	206	181	159	142	126	119	112	105	100	96	94	92	90	88	85	160	202	177	154	137	125	116	109	101	97	93	91	89	87	85	82	165	198	173	150	133	121	112	105	98	94	91	88	87	84	83	80	170	195	168	145	129	117	109	102	95	91	88	86	84	82	80	77	175	191	164	141	125	114	106	99	93	88	85	83	82	79	78	75	180	187	159	137	122	111	103	97	90	86	83	81	80	77	76	73	185	184	155	133	119	108	100	94	89	83	81	79	77	75	74	71	190	180	151	130	115	105	97	91	85	81	79	77	75	73	72	69	195	178	147	127	113	102	95	89	83	79	77	75	73	71	70	67	200	173	143	123	110	100	93	87	81	77	75	73	72	70	68	66	205	169	140	120	107	97	90	85	79	75	73	71	70	68	67	64	210	165	136	117	104	95	88	83	77	74	71	69	68	66	65	63	215	162	133	115	102	93	86	81	75	72	69	68	67	65	64	61	220	158	130	112	100	91	84	79	74	70	68	66	65	63	62	60	225	155	127	110	98	89	82	77	72	69	66	65	64	62	61	58	230	151	124	107	95	87	80	76	70	67	65	63	62	60	59	57	235	148	122	105	93	85	79	74	69	66	64	62	61	59	58	56	240	145	119	103	91	83	77	72	67	64	62	61	60	58	57	55	245	142	117	101	90	82	76	71	66	63	61	59	58	57	56	54	250	139	115	99	88	80	74	70	65	62	60	58	57	56	55	53
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⁵¹ Addition of Table 8.5r f- Shear Buckling Strength for Q420 steel with web thickness >16mm ≤ 40mm.

Item	Current version	Amendments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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Table 8.5s ⁵²		<p style="text-align: center;">Table 8.5s - Shear buckling strength q_w (N/mm²) of a web (for $t \leq 16$mm)</p> <p style="text-align: center;">19) Grade Q460 steel, web thickness ≤ 16mm – design strength $p_y = 410$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="16">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>246</td><td>246</td><td>246</td><td>246</td><td>246</td><td>246</td><td>246</td><td>246</td><td>246</td><td>246</td><td>246</td><td>246</td><td>244</td><td>242</td><td>236</td></tr> 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<tr><td>215</td><td>174</td><td>143</td><td>123</td><td>110</td><td>100</td><td>92</td><td>87</td><td>81</td><td>77</td><td>75</td><td>73</td><td>72</td><td>69</td><td>68</td><td>66</td></tr> <tr><td>220</td><td>170</td><td>140</td><td>121</td><td>107</td><td>98</td><td>90</td><td>85</td><td>79</td><td>75</td><td>73</td><td>71</td><td>70</td><td>68</td><td>67</td><td>64</td></tr> <tr><td>225</td><td>166</td><td>137</td><td>118</td><td>105</td><td>95</td><td>88</td><td>83</td><td>77</td><td>74</td><td>71</td><td>70</td><td>68</td><td>66</td><td>65</td><td>63</td></tr> <tr><td>230</td><td>162</td><td>134</td><td>115</td><td>103</td><td>93</td><td>86</td><td>81</td><td>76</td><td>72</td><td>70</td><td>68</td><td>67</td><td>65</td><td>64</td><td>61</td></tr> <tr><td>235</td><td>159</td><td>131</td><td>113</td><td>100</td><td>91</td><td>85</td><td>79</td><td>74</td><td>71</td><td>68</td><td>67</td><td>65</td><td>64</td><td>63</td><td>60</td></tr> <tr><td>240</td><td>156</td><td>128</td><td>110</td><td>98</td><td>89</td><td>83</td><td>78</td><td>73</td><td>69</td><td>67</td><td>65</td><td>64</td><td>62</td><td>61</td><td>59</td></tr> <tr><td>245</td><td>152</td><td>126</td><td>108</td><td>96</td><td>88</td><td>81</td><td>76</td><td>71</td><td>68</td><td>66</td><td>64</td><td>63</td><td>61</td><td>60</td><td>58</td></tr> <tr><td>250</td><td>149</td><td>123</td><td>106</td><td>94</td><td>86</td><td>80</td><td>75</td><td>70</td><td>66</td><td>64</td><td>63</td><td>62</td><td>60</td><td>59</td><td>56</td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d																0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	246	246	246	246	246	246	246	246	246	246	246	246	244	242	236	60	246	246	246	246	246	246	246	246	246	242	239	236	232	230	224	65	246	246	246	246	246	246	246	242	236	231	228	225	221	219	212	70	246	246	246	246	246	246	241	232	226	221	217	214	210	207	200	75	246	246	246	246	246	241	232	222	215	210	206	203	198	195	188	80	246	246	246	246	242	232	223	213	205	200	195	192	187	184	178	85	246	246	246	246	234	224	214	203	195	189	185	181	176	173	166	90	246	246	246	239	228	215	205	193	185	178	174	171	166	163	157	95	246	246	246	232	218	207	196	184	175	169	165	162	157	155	149	100	246	246	241	225	211	198	187	174	166	161	157	154	149	147	141	105	246	246	234	218	203	190	178	166	158	153	149	146	142	140	134	110	246	246	228	210	195	181	170	158	151	146	142	140	136	134	128	115	246	242	221	203	187	173	162	151	144	140	136	134	130	128	123	120	246	236	215	198	179	166	156	145	138	134	131	128	124	122	118	125	246	231	209	189	172	159	149	139	133	128	125	123	120	118	113	130	246	225	202	182	165	153	144	134	128	123	120	118	115	113	109	135	246	220	198	175	159	147	138	129	123	119	116	114	111	109	105	140	241	214	190	168	153	142	133	124	119	115	112	110	107	105	101	145	237	209	183	163	148	137	129	120	114	111	108	106	103	101	97	150	232	203	177	157	143	133	124	118	111	107	104	103	100	98	94	155	228	198	171	152	138	128	120	112	107	104	101	99	96	95	91	160	223	192	166	147	134	124	117	109	104	100	98	96	93	92	88	165	219	187	161	143	130	121	113	106	101	97	95	93	91	89	86	170	214	181	156	138	126	117	110	102	98	94	92	90	88	86	83	175	210	176	152	135	123	114	107	99	95	92	90	88	85	84	81	180	205	171	147	131	119	110	104	97	92	89	87	85	83	82	79	185	201	166	143	127	116	107	101	94	90	87	85	83	81	79	76	190	196	162	140	124	113	105	98	92	87	84	82	81	79	77	74	195	192	158	136	121	110	102	96	89	85	82	80	79	77	75	72	200	187	154	133	118	107	99	93	87	83	80	78	77	75	73	71	205	182	150	129	115	105	97	91	85	81	78	76	75	73	72	69	210	178	146	128	112	102	95	89	83	79	76	75	73	71	70	67	215	174	143	123	110	100	92	87	81	77	75	73	72	69	68	66	220	170	140	121	107	98	90	85	79	75	73	71	70	68	67	64	225	166	137	118	105	95	88	83	77	74	71	70	68	66	65	63	230	162	134	115	103	93	86	81	76	72	70	68	67	65	64	61	235	159	131	113	100	91	85	79	74	71	68	67	65	64	63	60	240	156	128	110	98	89	83	78	73	69	67	65	64	62	61	59	245	152	126	108	96	88	81	76	71	68	66	64	63	61	60	58	250	149	123	106	94	86	80	75	70	66	64	63	62	60	59	56
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230	162	134	115	103	93	86	81	76	72	70	68	67	65	64	61																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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⁵² Addition of Table 8.5s - Shear Buckling Strength for Q460 steel with web thickness ≤ 16 mm.

Item	Current version	Amendments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
53. Table 8.5t ⁵³		<p style="text-align: center;">Table 8.5t - Shear buckling strength q_w (N/mm²) of a web (for 16mm < $t \leq 40$mm)</p> <p style="text-align: center;">20) Grade Q460 steel, web thickness >16mm \leq 40mm – design strength $p_y = 390$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="13">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>234</td><td>234</td><td>234</td><td>234</td><td>234</td><td>234</td><td>234</td><td>234</td><td>234</td><td>234</td><td>234</td><td>234</td><td>234</td><td>233</td><td>228</td></tr> 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<tr><td>80</td><td>234</td><td>234</td><td>234</td><td>234</td><td>233</td><td>224</td><td>216</td><td>206</td><td>199</td><td>194</td><td>190</td><td>187</td><td>182</td><td>179</td><td>172</td></tr> <tr><td>85</td><td>234</td><td>234</td><td>234</td><td>234</td><td>228</td><td>218</td><td>207</td><td>197</td><td>189</td><td>184</td><td>180</td><td>177</td><td>172</td><td>169</td><td>162</td></tr> <tr><td>90</td><td>234</td><td>234</td><td>234</td><td>230</td><td>219</td><td>208</td><td>199</td><td>188</td><td>180</td><td>174</td><td>170</td><td>167</td><td>162</td><td>159</td><td>153</td></tr> <tr><td>95</td><td>234</td><td>234</td><td>234</td><td>224</td><td>211</td><td>200</td><td>191</td><td>179</td><td>171</td><td>165</td><td>161</td><td>158</td><td>153</td><td>151</td><td>145</td></tr> <tr><td>100</td><td>234</td><td>234</td><td>232</td><td>217</td><td>204</td><td>192</td><td>182</td><td>170</td><td>162</td><td>157</td><td>153</td><td>150</td><td>148</td><td>143</td><td>138</td></tr> <tr><td>105</td><td>234</td><td>234</td><td>226</td><td>210</td><td>197</td><td>184</td><td>174</td><td>162</td><td>154</td><td>149</td><td>146</td><td>143</td><td>139</td><td>136</td><td>131</td></tr> <tr><td>110</td><td>234</td><td>234</td><td>220</td><td>204</td><td>189</td><td>177</td><td>166</td><td>154</td><td>147</td><td>142</td><td>139</td><td>136</td><td>132</td><td>130</td><td>125</td></tr> <tr><td>115</td><td>234</td><td>233</td><td>214</td><td>197</td><td>182</td><td>169</td><td>158</td><td>148</td><td>141</td><td>136</td><td>133</td><td>130</td><td>127</td><td>125</td><td>120</td></tr> <tr><td>120</td><td>234</td><td>228</td><td>208</td><td>190</td><td>175</td><td>162</td><td>152</td><td>141</td><td>135</td><td>130</td><td>127</td><td>125</td><td>121</td><td>119</td><td>115</td></tr> <tr><td>125</td><td>234</td><td>223</td><td>202</td><td>184</td><td>167</td><td>155</td><td>146</td><td>136</td><td>130</td><td>125</td><td>122</td><td>120</td><td>117</td><td>115</td><td>110</td></tr> <tr><td>130</td><td>234</td><td>218</td><td>196</td><td>177</td><td>161</td><td>149</td><td>140</td><td>131</td><td>125</td><td>120</td><td>118</td><td>115</td><td>112</td><td>110</td><td>106</td></tr> <tr><td>135</td><td>234</td><td>213</td><td>190</td><td>170</td><td>155</td><td>144</td><td>135</td><td>126</td><td>120</td><td>116</td><td>113</td><td>111</td><td>108</td><td>106</td><td>102</td></tr> <tr><td>140</td><td>233</td><td>207</td><td>184</td><td>164</td><td>150</td><td>139</td><td>130</td><td>121</td><td>116</td><td>112</td><td>109</td><td>107</td><td>104</td><td>102</td><td>98</td></tr> <tr><td>145</td><td>228</td><td>202</td><td>179</td><td>159</td><td>144</td><td>134</td><td>126</td><td>117</td><td>112</td><td>108</td><td>105</td><td>103</td><td>100</td><td>99</td><td>95</td></tr> <tr><td>150</td><td>224</td><td>197</td><td>173</td><td>153</td><td>140</td><td>129</td><td>121</td><td>113</td><td>106</td><td>104</td><td>102</td><td>100</td><td>97</td><td>96</td><td>92</td></tr> <tr><td>155</td><td>220</td><td>192</td><td>167</td><td>148</td><td>135</td><td>125</td><td>117</td><td>110</td><td>104</td><td>101</td><td>99</td><td>97</td><td>94</td><td>92</td><td>89</td></tr> <tr><td>160</td><td>216</td><td>187</td><td>162</td><td>144</td><td>131</td><td>121</td><td>114</td><td>106</td><td>101</td><td>98</td><td>95</td><td>94</td><td>91</td><td>90</td><td>86</td></tr> <tr><td>165</td><td>212</td><td>182</td><td>157</td><td>139</td><td>127</td><td>118</td><td>110</td><td>103</td><td>98</td><td>95</td><td>93</td><td>91</td><td>88</td><td>87</td><td>83</td></tr> <tr><td>170</td><td>207</td><td>177</td><td>152</td><td>135</td><td>123</td><td>114</td><td>107</td><td>100</td><td>95</td><td>92</td><td>90</td><td>88</td><td>86</td><td>84</td><td>81</td></tr> <tr><td>175</td><td>203</td><td>172</td><td>148</td><td>131</td><td>120</td><td>111</td><td>104</td><td>97</td><td>93</td><td>89</td><td>87</td><td>86</td><td>83</td><td>82</td><td>79</td></tr> <tr><td>180</td><td>199</td><td>167</td><td>144</td><td>128</td><td>118</td><td>108</td><td>101</td><td>94</td><td>90</td><td>87</td><td>85</td><td>83</td><td>81</td><td>80</td><td>76</td></tr> <tr><td>185</td><td>195</td><td>162</td><td>140</td><td>124</td><td>113</td><td>105</td><td>98</td><td>92</td><td>88</td><td>85</td><td>83</td><td>81</td><td>79</td><td>77</td><td>74</td></tr> <tr><td>190</td><td>191</td><td>158</td><td>136</td><td>121</td><td>110</td><td>102</td><td>96</td><td>89</td><td>85</td><td>82</td><td>80</td><td>79</td><td>77</td><td>75</td><td>72</td></tr> <tr><td>195</td><td>188</td><td>154</td><td>133</td><td>118</td><td>107</td><td>99</td><td>93</td><td>87</td><td>83</td><td>80</td><td>78</td><td>77</td><td>75</td><td>73</td><td>71</td></tr> <tr><td>200</td><td>182</td><td>150</td><td>129</td><td>115</td><td>105</td><td>97</td><td>91</td><td>85</td><td>81</td><td>78</td><td>76</td><td>75</td><td>73</td><td>72</td><td>69</td></tr> <tr><td>205</td><td>178</td><td>146</td><td>126</td><td>112</td><td>102</td><td>95</td><td>89</td><td>83</td><td>79</td><td>76</td><td>75</td><td>73</td><td>71</td><td>70</td><td>67</td></tr> <tr><td>210</td><td>174</td><td>143</td><td>123</td><td>110</td><td>100</td><td>92</td><td>87</td><td>81</td><td>77</td><td>75</td><td>73</td><td>71</td><td>69</td><td>68</td><td>66</td></tr> <tr><td>215</td><td>169</td><td>140</td><td>120</td><td>107</td><td>97</td><td>90</td><td>85</td><td>79</td><td>75</td><td>73</td><td>71</td><td>70</td><td>68</td><td>67</td><td>64</td></tr> <tr><td>220</td><td>166</td><td>136</td><td>118</td><td>105</td><td>95</td><td>88</td><td>83</td><td>77</td><td>74</td><td>71</td><td>69</td><td>68</td><td>66</td><td>65</td><td>63</td></tr> <tr><td>225</td><td>162</td><td>133</td><td>115</td><td>102</td><td>93</td><td>86</td><td>81</td><td>75</td><td>72</td><td>70</td><td>68</td><td>67</td><td>65</td><td>64</td><td>61</td></tr> <tr><td>230</td><td>158</td><td>130</td><td>112</td><td>100</td><td>91</td><td>84</td><td>79</td><td>74</td><td>70</td><td>68</td><td>66</td><td>65</td><td>63</td><td>62</td><td>60</td></tr> <tr><td>235</td><td>155</td><td>128</td><td>110</td><td>98</td><td>89</td><td>83</td><td>77</td><td>72</td><td>69</td><td>67</td><td>65</td><td>64</td><td>62</td><td>61</td><td>59</td></tr> <tr><td>240</td><td>152</td><td>125</td><td>108</td><td>96</td><td>87</td><td>81</td><td>76</td><td>71</td><td>67</td><td>65</td><td>64</td><td>63</td><td>61</td><td>60</td><td>57</td></tr> <tr><td>245</td><td>149</td><td>122</td><td>106</td><td>94</td><td>85</td><td>79</td><td>74</td><td>69</td><td>66</td><td>64</td><td>62</td><td>61</td><td>59</td><td>58</td><td>56</td></tr> <tr><td>250</td><td>146</td><td>120</td><td>103</td><td>92</td><td>84</td><td>78</td><td>73</td><td>68</td><td>65</td><td>63</td><td>61</td><td>60</td><td>58</td><td>57</td><td>55</td></tr> </tbody> </table> <p style="text-align: center;">Note: For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d													0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	234	234	234	234	234	234	234	234	234	234	234	234	234	233	228	60	234	234	234	234	234	234	234	234	234	233	230	228	224	222	217	65	234	234	234	234	234	234	234	233	227	223	220	218	214	211	206	70	234	234	234	234	234	234	233	224	218	213	210	207	203	201	195	75	234	234	234	234	234	232	224	215	208	204	200	197	193	190	183	80	234	234	234	234	233	224	216	206	199	194	190	187	182	179	172	85	234	234	234	234	228	218	207	197	189	184	180	177	172	169	162	90	234	234	234	230	219	208	199	188	180	174	170	167	162	159	153	95	234	234	234	224	211	200	191	179	171	165	161	158	153	151	145	100	234	234	232	217	204	192	182	170	162	157	153	150	148	143	138	105	234	234	226	210	197	184	174	162	154	149	146	143	139	136	131	110	234	234	220	204	189	177	166	154	147	142	139	136	132	130	125	115	234	233	214	197	182	169	158	148	141	136	133	130	127	125	120	120	234	228	208	190	175	162	152	141	135	130	127	125	121	119	115	125	234	223	202	184	167	155	146	136	130	125	122	120	117	115	110	130	234	218	196	177	161	149	140	131	125	120	118	115	112	110	106	135	234	213	190	170	155	144	135	126	120	116	113	111	108	106	102	140	233	207	184	164	150	139	130	121	116	112	109	107	104	102	98	145	228	202	179	159	144	134	126	117	112	108	105	103	100	99	95	150	224	197	173	153	140	129	121	113	106	104	102	100	97	96	92	155	220	192	167	148	135	125	117	110	104	101	99	97	94	92	89	160	216	187	162	144	131	121	114	106	101	98	95	94	91	90	86	165	212	182	157	139	127	118	110	103	98	95	93	91	88	87	83	170	207	177	152	135	123	114	107	100	95	92	90	88	86	84	81	175	203	172	148	131	120	111	104	97	93	89	87	86	83	82	79	180	199	167	144	128	118	108	101	94	90	87	85	83	81	80	76	185	195	162	140	124	113	105	98	92	88	85	83	81	79	77	74	190	191	158	136	121	110	102	96	89	85	82	80	79	77	75	72	195	188	154	133	118	107	99	93	87	83	80	78	77	75	73	71	200	182	150	129	115	105	97	91	85	81	78	76	75	73	72	69	205	178	146	126	112	102	95	89	83	79	76	75	73	71	70	67	210	174	143	123	110	100	92	87	81	77	75	73	71	69	68	66	215	169	140	120	107	97	90	85	79	75	73	71	70	68	67	64	220	166	136	118	105	95	88	83	77	74	71	69	68	66	65	63	225	162	133	115	102	93	86	81	75	72	70	68	67	65	64	61	230	158	130	112	100	91	84	79	74	70	68	66	65	63	62	60	235	155	128	110	98	89	83	77	72	69	67	65	64	62	61	59	240	152	125	108	96	87	81	76	71	67	65	64	63	61	60	57	245	149	122	106	94	85	79	74	69	66	64	62	61	59	58	56	250	146	120	103	92	84	78	73	68	65	63	61	60	58	57	55
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⁵³ Addition of Table 8.5t - Shear Buckling Strength for Q460 steel with web thickness >16mm \leq 40mm.

Item	Current version	Amendments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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Table 8.5u ⁵⁴		<p style="text-align: center;">Table 8.5u - Shear buckling strength q_w (N/mm²) of a web (for $t \leq 16$mm)</p> <p style="text-align: center;">2) Grade Q550 steel, web thickness ≤ 16mm – design strength $p_y = 520$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="16">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>312</td><td>312</td><td>312</td><td>312</td><td>312</td><td>312</td><td>312</td><td>307</td><td>301</td><td>297</td><td>294</td><td>289</td><td>286</td><td>279</td><td>270</td></tr> <tr><td>60</td><td>312</td><td>312</td><td>312</td><td>312</td><td>312</td><td>312</td><td>312</td><td>300</td><td>292</td><td>286</td><td>282</td><td>279</td><td>273</td><td>270</td><td>262</td></tr> <tr><td>65</td><td>312</td><td>312</td><td>312</td><td>312</td><td>312</td><td>309</td><td>299</td><td>287</td><td>278</td><td>271</td><td>268</td><td>263</td><td>257</td><td>253</td><td>244</td></tr> <tr><td>70</td><td>312</td><td>312</td><td>312</td><td>312</td><td>306</td><td>297</td><td>286</td><td>273</td><td>263</td><td>256</td><td>251</td><td>247</td><td>240</td><td>237</td><td>227</td></tr> <tr><td>75</td><td>312</td><td>312</td><td>312</td><td>312</td><td>298</td><td>285</td><td>273</td><td>259</td><td>249</td><td>241</td><td>236</td><td>231</td><td>224</td><td>221</td><td>212</td></tr> 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<tr><td>210</td><td>200</td><td>165</td><td>142</td><td>126</td><td>115</td><td>107</td><td>100</td><td>93</td><td>89</td><td>86</td><td>84</td><td>82</td><td>80</td><td>79</td><td>76</td></tr> <tr><td>215</td><td>196</td><td>161</td><td>139</td><td>124</td><td>112</td><td>104</td><td>98</td><td>91</td><td>87</td><td>84</td><td>82</td><td>81</td><td>78</td><td>77</td><td>74</td></tr> <tr><td>220</td><td>191</td><td>157</td><td>136</td><td>121</td><td>110</td><td>102</td><td>96</td><td>89</td><td>85</td><td>82</td><td>80</td><td>79</td><td>76</td><td>75</td><td>72</td></tr> <tr><td>225</td><td>187</td><td>154</td><td>133</td><td>118</td><td>107</td><td>100</td><td>93</td><td>87</td><td>83</td><td>80</td><td>78</td><td>77</td><td>75</td><td>74</td><td>71</td></tr> <tr><td>230</td><td>183</td><td>151</td><td>130</td><td>115</td><td>105</td><td>97</td><td>91</td><td>85</td><td>81</td><td>79</td><td>77</td><td>75</td><td>73</td><td>72</td><td>69</td></tr> <tr><td>235</td><td>179</td><td>147</td><td>127</td><td>113</td><td>103</td><td>95</td><td>89</td><td>83</td><td>80</td><td>77</td><td>75</td><td>74</td><td>72</td><td>70</td><td>68</td></tr> <tr><td>240</td><td>175</td><td>144</td><td>124</td><td>111</td><td>101</td><td>93</td><td>88</td><td>82</td><td>78</td><td>75</td><td>74</td><td>72</td><td>70</td><td>69</td><td>66</td></tr> <tr><td>245</td><td>172</td><td>141</td><td>122</td><td>108</td><td>99</td><td>91</td><td>86</td><td>80</td><td>76</td><td>74</td><td>72</td><td>71</td><td>69</td><td>68</td><td>65</td></tr> <tr><td>250</td><td>168</td><td>139</td><td>119</td><td>106</td><td>97</td><td>90</td><td>84</td><td>78</td><td>75</td><td>72</td><td>71</td><td>69</td><td>67</td><td>66</td><td>64</td></tr> </tbody> </table> <p>Note: For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d																0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	312	312	312	312	312	312	312	307	301	297	294	289	286	279	270	60	312	312	312	312	312	312	312	300	292	286	282	279	273	270	262	65	312	312	312	312	312	309	299	287	278	271	268	263	257	253	244	70	312	312	312	312	306	297	286	273	263	256	251	247	240	237	227	75	312	312	312	312	298	285	273	259	249	241	236	231	224	221	212	80	312	312	312	303	287	273	260	245	234	226	221	217	210	207	199	85	312	312	312	293	276	260	247	231	220	213	208	204	198	195	187	90	312	312	303	283	264	248	234	218	208	201	196	192	187	184	177	95	312	312	294	272	253	236	221	206	197	190	186	182	177	174	167	100	312	310	285	262	242	224	210	196	187	181	176	173	168	165	159	105	312	302	278	252	231	213	200	187	178	172	168	165	160	158	151	110	312	294	266	242	220	204	191	178	170	164	160	157	153	150	145	115	312	286	257	231	210	195	183	170	163	157	153	151	148	144	138	120	312	279	248	221	201	187	175	163	156	151	147	144	140	138	132	125	305	271	239	212	193	179	168	157	150	145	141	139	135	132	127	130	299	263	230	204	185	172	162	151	144	139	136	133	129	127	122	135	292	255	221	197	179	166	156	145	138	134	131	128	125	123	118	140	286	247	213	190	173	160	150	140	134	129	126	124	120	118	114	145	279	239	206	183	167	154	145	135	129	125	122	119	116	114	110	150	273	231	199	177	161	149	140	131	125	121	118	115	112	110	106	155	266	224	193	171	156	144	136	128	121	117	114	112	109	107	103	160	260	217	187	166	151	140	131	123	117	113	110	108	105	103	99	165	253	210	181	161	147	136	127	119	113	110	107	105	102	100	96	170	247	204	176	156	142	132	124	115	110	106	104	102	99	97	94	175	240	198	171	152	138	128	120	112	107	103	101	99	96	95	91	180	234	192	166	148	134	124	117	109	104	100	98	96	93	92	88	185	228	187	161	144	131	121	114	106	101	98	95	94	91	89	86	190	221	182	157	140	127	118	111	103	98	95	93	91	89	87	84	195	216	178	153	136	124	115	108	101	96	93	90	89	86	85	82	200	210	173	149	133	121	112	105	98	93	90	88	87	84	83	79	205	205	169	146	130	118	109	103	96	91	88	86	85	82	81	78	210	200	165	142	126	115	107	100	93	89	86	84	82	80	79	76	215	196	161	139	124	112	104	98	91	87	84	82	81	78	77	74	220	191	157	136	121	110	102	96	89	85	82	80	79	76	75	72	225	187	154	133	118	107	100	93	87	83	80	78	77	75	74	71	230	183	151	130	115	105	97	91	85	81	79	77	75	73	72	69	235	179	147	127	113	103	95	89	83	80	77	75	74	72	70	68	240	175	144	124	111	101	93	88	82	78	75	74	72	70	69	66	245	172	141	122	108	99	91	86	80	76	74	72	71	69	68	65	250	168	139	119	106	97	90	84	78	75	72	71	69	67	66	64
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⁵⁴ Addition of Table 8.5u - Shear Buckling Strength for Q550 steel with web thickness ≤ 16 mm.

Item	Current version	Amendments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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Table 8.5v ⁵⁵		<p style="text-align: center;">Table 8.5v - Shear buckling strength q_w (N/mm²) of a web (for 16mm < $t \leq 40$mm)</p> <p style="text-align: center;">22) Grade Q550 steel, web thickness >16mm ≤40mm – design strength $p_w = 500$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="16">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>300</td><td>300</td><td>300</td><td>300</td><td>300</td><td>300</td><td>300</td><td>298</td><td>293</td><td>289</td><td>286</td><td>281</td><td>278</td><td>272</td><td></td></tr> <tr><td>60</td><td>300</td><td>300</td><td>300</td><td>300</td><td>300</td><td>300</td><td>300</td><td>292</td><td>284</td><td>279</td><td>275</td><td>271</td><td>266</td><td>263</td><td>255</td></tr> <tr><td>65</td><td>300</td><td>300</td><td>300</td><td>300</td><td>300</td><td>300</td><td>300</td><td>290</td><td>279</td><td>271</td><td>265</td><td>260</td><td>256</td><td>251</td><td>247</td></tr> <tr><td>70</td><td>300</td><td>300</td><td>300</td><td>300</td><td>300</td><td>289</td><td>278</td><td>266</td><td>257</td><td>250</td><td>245</td><td>242</td><td>235</td><td>232</td><td>223</td></tr> <tr><td>75</td><td>300</td><td>300</td><td>300</td><td>300</td><td>290</td><td>277</td><td>268</td><td>253</td><td>243</td><td>236</td><td>231</td><td>227</td><td>220</td><td>216</td><td>208</td></tr> <tr><td>80</td><td>300</td><td>300</td><td>300</td><td>295</td><td>279</td><td>266</td><td>254</td><td>240</td><td>229</td><td>222</td><td>216</td><td>212</td><td>206</td><td>203</td><td>195</td></tr> <tr><td>85</td><td>300</td><td>300</td><td>300</td><td>285</td><td>269</td><td>254</td><td>242</td><td>226</td><td>216</td><td>209</td><td>204</td><td>200</td><td>194</td><td>191</td><td>183</td></tr> <tr><td>90</td><td>300</td><td>300</td><td>294</td><td>275</td><td>258</td><td>243</td><td>229</td><td>214</td><td>204</td><td>197</td><td>192</td><td>189</td><td>183</td><td>180</td><td>173</td></tr> <tr><td>95</td><td>300</td><td>300</td><td>288</td><td>268</td><td>247</td><td>231</td><td>217</td><td>202</td><td>193</td><td>187</td><td>182</td><td>179</td><td>174</td><td>171</td><td>164</td></tr> <tr><td>100</td><td>300</td><td>300</td><td>277</td><td>256</td><td>237</td><td>220</td><td>206</td><td>192</td><td>183</td><td>177</td><td>173</td><td>170</td><td>165</td><td>162</td><td>156</td></tr> <tr><td>105</td><td>300</td><td>294</td><td>269</td><td>246</td><td>228</td><td>209</td><td>196</td><td>183</td><td>175</td><td>169</td><td>165</td><td>162</td><td>157</td><td>155</td><td>148</td></tr> <tr><td>110</td><td>300</td><td>286</td><td>260</td><td>236</td><td>218</td><td>200</td><td>187</td><td>175</td><td>167</td><td>161</td><td>157</td><td>154</td><td>150</td><td>147</td><td>142</td></tr> <tr><td>115</td><td>300</td><td>279</td><td>251</td><td>227</td><td>209</td><td>191</td><td>179</td><td>167</td><td>159</td><td>154</td><td>150</td><td>148</td><td>143</td><td>141</td><td>136</td></tr> <tr><td>120</td><td>300</td><td>271</td><td>243</td><td>217</td><td>198</td><td>183</td><td>172</td><td>160</td><td>153</td><td>148</td><td>144</td><td>142</td><td>137</td><td>135</td><td>130</td></tr> <tr><td>125</td><td>297</td><td>264</td><td>234</td><td>208</td><td>190</td><td>176</td><td>165</td><td>154</td><td>147</td><td>142</td><td>138</td><td>136</td><td>132</td><td>130</td><td>125</td></tr> <tr><td>130</td><td>290</td><td>256</td><td>226</td><td>200</td><td>182</td><td>169</td><td>159</td><td>148</td><td>141</td><td>136</td><td>133</td><td>131</td><td>127</td><td>125</td><td>120</td></tr> <tr><td>135</td><td>284</td><td>249</td><td>217</td><td>193</td><td>176</td><td>163</td><td>153</td><td>142</td><td>136</td><td>131</td><td>128</td><td>126</td><td>122</td><td>120</td><td>115</td></tr> <tr><td>140</td><td>278</td><td>242</td><td>209</td><td>186</td><td>169</td><td>157</td><td>147</td><td>137</td><td>131</td><td>127</td><td>124</td><td>121</td><td>118</td><td>116</td><td>111</td></tr> <tr><td>145</td><td>272</td><td>234</td><td>202</td><td>180</td><td>163</td><td>151</td><td>142</td><td>133</td><td>126</td><td>122</td><td>119</td><td>117</td><td>114</td><td>112</td><td>108</td></tr> <tr><td>150</td><td>266</td><td>227</td><td>195</td><td>174</td><td>158</td><td>146</td><td>137</td><td>128</td><td>122</td><td>118</td><td>115</td><td>113</td><td>110</td><td>108</td><td>104</td></tr> <tr><td>155</td><td>260</td><td>219</td><td>189</td><td>168</td><td>153</td><td>142</td><td>133</td><td>124</td><td>118</td><td>114</td><td>112</td><td>110</td><td>106</td><td>105</td><td>101</td></tr> 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<tr><td>185</td><td>223</td><td>184</td><td>158</td><td>141</td><td>128</td><td>119</td><td>111</td><td>104</td><td>99</td><td>95</td><td>94</td><td>92</td><td>89</td><td>88</td><td>84</td></tr> <tr><td>190</td><td>217</td><td>179</td><td>154</td><td>137</td><td>125</td><td>116</td><td>109</td><td>101</td><td>96</td><td>93</td><td>91</td><td>89</td><td>87</td><td>85</td><td>82</td></tr> <tr><td>195</td><td>212</td><td>174</td><td>150</td><td>134</td><td>122</td><td>113</td><td>106</td><td>99</td><td>94</td><td>91</td><td>89</td><td>87</td><td>85</td><td>83</td><td>80</td></tr> <tr><td>200</td><td>206</td><td>170</td><td>146</td><td>130</td><td>119</td><td>110</td><td>103</td><td>96</td><td>92</td><td>89</td><td>88</td><td>86</td><td>84</td><td>81</td><td>78</td></tr> <tr><td>205</td><td>201</td><td>166</td><td>143</td><td>127</td><td>116</td><td>107</td><td>101</td><td>94</td><td>89</td><td>86</td><td>84</td><td>83</td><td>80</td><td>79</td><td>76</td></tr> <tr><td>210</td><td>196</td><td>162</td><td>139</td><td>124</td><td>113</td><td>105</td><td>98</td><td>92</td><td>87</td><td>84</td><td>82</td><td>81</td><td>79</td><td>77</td><td>74</td></tr> <tr><td>215</td><td>192</td><td>158</td><td>136</td><td>121</td><td>110</td><td>102</td><td>96</td><td>89</td><td>85</td><td>82</td><td>80</td><td>79</td><td>77</td><td>75</td><td>73</td></tr> <tr><td>220</td><td>187</td><td>154</td><td>133</td><td>118</td><td>108</td><td>100</td><td>94</td><td>87</td><td>83</td><td>81</td><td>79</td><td>77</td><td>75</td><td>74</td><td>71</td></tr> <tr><td>225</td><td>183</td><td>151</td><td>130</td><td>116</td><td>105</td><td>98</td><td>92</td><td>85</td><td>81</td><td>79</td><td>77</td><td>75</td><td>73</td><td>72</td><td>69</td></tr> <tr><td>230</td><td>179</td><td>148</td><td>127</td><td>113</td><td>103</td><td>95</td><td>90</td><td>84</td><td>80</td><td>77</td><td>75</td><td>74</td><td>72</td><td>71</td><td>68</td></tr> <tr><td>235</td><td>176</td><td>145</td><td>125</td><td>111</td><td>101</td><td>93</td><td>88</td><td>82</td><td>78</td><td>75</td><td>74</td><td>72</td><td>70</td><td>69</td><td>66</td></tr> <tr><td>240</td><td>172</td><td>142</td><td>122</td><td>109</td><td>99</td><td>92</td><td>86</td><td>80</td><td>76</td><td>74</td><td>72</td><td>71</td><td>69</td><td>68</td><td>65</td></tr> <tr><td>245</td><td>168</td><td>139</td><td>120</td><td>106</td><td>97</td><td>90</td><td>84</td><td>78</td><td>75</td><td>72</td><td>71</td><td>69</td><td>67</td><td>66</td><td>64</td></tr> <tr><td>250</td><td>165</td><td>136</td><td>117</td><td>104</td><td>95</td><td>88</td><td>82</td><td>77</td><td>73</td><td>71</td><td>69</td><td>68</td><td>66</td><td>65</td><td>62</td></tr> </tbody> </table> <p style="text-align: center;">Note: For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d																0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	300	300	300	300	300	300	300	298	293	289	286	281	278	272		60	300	300	300	300	300	300	300	292	284	279	275	271	266	263	255	65	300	300	300	300	300	300	300	290	279	271	265	260	256	251	247	70	300	300	300	300	300	289	278	266	257	250	245	242	235	232	223	75	300	300	300	300	290	277	268	253	243	236	231	227	220	216	208	80	300	300	300	295	279	266	254	240	229	222	216	212	206	203	195	85	300	300	300	285	269	254	242	226	216	209	204	200	194	191	183	90	300	300	294	275	258	243	229	214	204	197	192	189	183	180	173	95	300	300	288	268	247	231	217	202	193	187	182	179	174	171	164	100	300	300	277	256	237	220	206	192	183	177	173	170	165	162	156	105	300	294	269	246	228	209	196	183	175	169	165	162	157	155	148	110	300	286	260	236	218	200	187	175	167	161	157	154	150	147	142	115	300	279	251	227	209	191	179	167	159	154	150	148	143	141	136	120	300	271	243	217	198	183	172	160	153	148	144	142	137	135	130	125	297	264	234	208	190	176	165	154	147	142	138	136	132	130	125	130	290	256	226	200	182	169	159	148	141	136	133	131	127	125	120	135	284	249	217	193	176	163	153	142	136	131	128	126	122	120	115	140	278	242	209	186	169	157	147	137	131	127	124	121	118	116	111	145	272	234	202	180	163	151	142	133	126	122	119	117	114	112	108	150	266	227	195	174	158	146	137	128	122	118	115	113	110	108	104	155	260	219	189	168	153	142	133	124	118	114	112	110	106	105	101	160	254	212	183	163	148	137	129	120	115	111	108	106	103	101	97	165	248	206	177	158	144	133	125	117	111	107	105	103	100	98	94	170	242	200	172	153	139	129	121	113	108	104	102	100	97	95	92	175	235	194	167	149	135	125	118	110	105	101	99	97	94	93	89	180	229	189	163	145	132	122	115	107	102	98	96	94	92	90	87	185	223	184	158	141	128	119	111	104	99	95	94	92	89	88	84	190	217	179	154	137	125	116	109	101	96	93	91	89	87	85	82	195	212	174	150	134	122	113	106	99	94	91	89	87	85	83	80	200	206	170	146	130	119	110	103	96	92	89	88	86	84	81	78	205	201	166	143	127	116	107	101	94	89	86	84	83	80	79	76	210	196	162	139	124	113	105	98	92	87	84	82	81	79	77	74	215	192	158	136	121	110	102	96	89	85	82	80	79	77	75	73	220	187	154	133	118	108	100	94	87	83	81	79	77	75	74	71	225	183	151	130	116	105	98	92	85	81	79	77	75	73	72	69	230	179	148	127	113	103	95	90	84	80	77	75	74	72	71	68	235	176	145	125	111	101	93	88	82	78	75	74	72	70	69	66	240	172	142	122	109	99	92	86	80	76	74	72	71	69	68	65	245	168	139	120	106	97	90	84	78	75	72	71	69	67	66	64	250	165	136	117	104	95	88	82	77	73	71	69	68	66	65	62
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⁵⁵ Addition of Table 8.5v - Shear Buckling Strength for Q550 steel with web thickness >16mm ≤ 40mm.

Item	Current version	Amendments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
56. Table 8.5w ⁵⁶		<p style="text-align: center;">Table 8.5w - Shear buckling strength q_w (N/mm²) of a web (for $t \leq 16$mm)</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="16" style="background-color: #ffff00;">23) Grade Q690 steel, web thickness ≤ 16mm – design strength $p_w = 630$N/mm²</th> </tr> <tr> <th rowspan="2" style="background-color: #ffff00;">d/t</th> <th colspan="15" style="background-color: #ffff00;">Stiffener spacing ratio a/d</th> </tr> <tr> <th style="background-color: #ffff00;">0.4</th> <th style="background-color: #ffff00;">0.5</th> <th style="background-color: #ffff00;">0.6</th> <th style="background-color: #ffff00;">0.7</th> <th style="background-color: #ffff00;">0.8</th> <th style="background-color: #ffff00;">0.9</th> <th style="background-color: #ffff00;">1.0</th> <th style="background-color: #ffff00;">1.2</th> <th style="background-color: #ffff00;">1.4</th> <th style="background-color: #ffff00;">1.6</th> <th style="background-color: #ffff00;">1.8</th> <th style="background-color: #ffff00;">2.0</th> <th style="background-color: #ffff00;">2.5</th> <th style="background-color: #ffff00;">3.0</th> <th style="background-color: #ffff00;">∞</th> </tr> </thead> <tbody> <tr><td style="background-color: #ffff00;">55</td><td style="background-color: #ffff00;">378</td><td style="background-color: #ffff00;">378</td><td style="background-color: #ffff00;">378</td><td style="background-color: #ffff00;">378</td><td style="background-color: #ffff00;">378</td><td style="background-color: #ffff00;">378</td><td style="background-color: #ffff00;">378</td><td style="background-color: #ffff00;">362</td><td style="background-color: #ffff00;">352</td><td style="background-color: #ffff00;">345</td><td style="background-color: #ffff00;">340</td><td style="background-color: #ffff00;">335</td><td style="background-color: #ffff00;">329</td><td style="background-color: #ffff00;">325</td><td 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bold;">Note : For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	23) Grade Q690 steel, web thickness ≤ 16 mm – design strength $p_w = 630$ N/mm ²																d/t	Stiffener spacing ratio a/d															0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	378	378	378	378	378	378	378	362	352	345	340	335	329	325	315	60	378	378	378	378	378	371	359	344	333	325	319	314	307	303	292	65	378	378	378	378	371	355	341	325	313	305	298	293	285	281	269	70	378	378	378	375	358	339	324	307	294	285	278	272	265	260	250	75	378	378	378	381	341	323	307	288	274	265	259	254	247	243	233	80	378	378	371	347	326	306	290	270	257	249	243	238	231	228	219	85	378	378	359	333	311	290	272	254	242	234	228	224	218	214	206	90	378	377	347	320	296	274	257	240	229	221	216	212	206	202	194	95	378	367	335	308	280	259	244	227	217	209	204	201	195	192	184	100	378	356	323	292	266	247	231	216	206	199	194	191	185	182	175	105	378	346	311	279	253	235	220	206	196	189	185	182	176	173	167	110	376	335	298	266	242	224	210	196	187	181	177	173	168	166	159	115	367	325	286	254	231	214	201	188	179	173	169	166	161	158	152	120	359	314	274	244	222	205	193	180	171	166	162	158	154	152	146	125	350	304	263	234	213	197	185	173	165	159	155	153	148	146	140	130	341	293	253	225	205	190	178	166	158	153	149	147	142	140	135	135	333	283	243	217	197	183	171	160	152	147	144	141	137	135	130	140	324	272	235	209	190	178	165	154	147	142	139	136	132	130	125	145	316	263	227	202	184	170	160	149	142	137	134	132	128	126	121	150	307	254	219	195	177	164	154	144	137	133	129	127	123	121	117	155	298	246	212	188	172	159	149	139	133	128	125	123	119	117	113	160	290	238	205	183	166	154	145	135	129	124	121	119	116	114	109	165	281	231	199	177	161	149	140	131	125	121	118	116	112	110	106	170	272	224	193	172	157	145	136	127	121	117	114	112	109	107	103	175	265	218	188	167	152	141	132	123	118	114	111	109	106	104	100	180	257	212	183	162	148	137	129	120	114	111	108	106	103	101	97	185	250	206	178	158	144	133	125	117	111	108	105	103	100	98	95	190	244	201	173	154	140	130	122	114	108	105	102	100	97	96	92	195	237	196	169	150	138	128	119	111	106	102	100	98	95	93	90	200	231	191	164	146	133	123	116	108	103	99	97	95	93	91	87	205	228	188	160	143	130	120	113	105	100	97	95	93	90	89	85	210	220	182	157	139	127	117	110	103	98	95	92	91	88	87	83	215	215	177	153	136	124	115	108	100	96	93	90	89	86	85	81	220	210	173	149	133	121	112	105	98	94	90	88	87	84	83	80	225	206	169	146	130	118	110	103	96	91	88	86	85	82	81	78	230	201	166	143	127	116	107	101	94	89	87	84	83	81	79	76	235	197	162	140	124	113	105	99	92	88	85	83	81	79	77	74	240	193	159	137	122	111	103	96	90	86	83	81	79	77	76	73	245	189	156	134	119	109	101	94	88	84	81	79	78	76	74	71	250	185	153	131	117	106	99	93	88	82	80	78	76	74	73	70
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235	197	162	140	124	113	105	99	92	88	85	83	81	79	77	74																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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245	189	156	134	119	109	101	94	88	84	81	79	78	76	74	71																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
250	185	153	131	117	106	99	93	88	82	80	78	76	74	73	70																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		

⁵⁶ Addition of Table 8.5w - Shear Buckling Strength for Q690 steel with web thickness ≤ 16 mm.

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57. Table 8.5x ⁵⁷		<p style="text-align: center;">Table 8.5x - Shear buckling strength q_w (N/mm²) of a web (for 16mm < t ≤ 40mm)</p> <p style="text-align: center;">24) Grade Q690 steel, web thickness >16mm ≤40mm – design strength $p_y = 615$N/mm²</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">d/t</th> <th colspan="16">Stiffener spacing ratio a/d</th> </tr> <tr> <th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1.0</th><th>1.2</th><th>1.4</th><th>1.6</th><th>1.8</th><th>2.0</th><th>2.5</th><th>3.0</th><th>∞</th> </tr> </thead> <tbody> <tr><td>55</td><td>300</td><td>300</td><td>300</td><td>300</td><td>300</td><td>300</td><td>300</td><td>350</td><td>340</td><td>330</td><td>334</td><td>330</td><td>323</td><td>320</td><td>310</td></tr> 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<tr><td>160</td><td>286</td><td>235</td><td>203</td><td>181</td><td>164</td><td>152</td><td>143</td><td>133</td><td>127</td><td>123</td><td>120</td><td>118</td><td>114</td><td>112</td><td>108</td></tr> <tr><td>165</td><td>278</td><td>228</td><td>197</td><td>175</td><td>159</td><td>148</td><td>139</td><td>129</td><td>123</td><td>119</td><td>116</td><td>114</td><td>111</td><td>109</td><td>105</td></tr> <tr><td>170</td><td>269</td><td>222</td><td>191</td><td>170</td><td>155</td><td>143</td><td>135</td><td>125</td><td>120</td><td>116</td><td>113</td><td>111</td><td>108</td><td>106</td><td>102</td></tr> <tr><td>175</td><td>261</td><td>215</td><td>188</td><td>165</td><td>150</td><td>139</td><td>131</td><td>122</td><td>116</td><td>112</td><td>110</td><td>108</td><td>105</td><td>103</td><td>99</td></tr> 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<tr><td>205</td><td>223</td><td>184</td><td>158</td><td>141</td><td>128</td><td>119</td><td>112</td><td>104</td><td>99</td><td>96</td><td>94</td><td>92</td><td>89</td><td>88</td><td>84</td></tr> <tr><td>210</td><td>218</td><td>179</td><td>155</td><td>138</td><td>125</td><td>116</td><td>109</td><td>102</td><td>97</td><td>94</td><td>91</td><td>90</td><td>87</td><td>86</td><td>82</td></tr> <tr><td>215</td><td>213</td><td>175</td><td>151</td><td>134</td><td>122</td><td>113</td><td>106</td><td>99</td><td>95</td><td>91</td><td>89</td><td>88</td><td>85</td><td>84</td><td>80</td></tr> <tr><td>220</td><td>208</td><td>171</td><td>148</td><td>131</td><td>120</td><td>111</td><td>104</td><td>97</td><td>92</td><td>89</td><td>87</td><td>86</td><td>83</td><td>82</td><td>79</td></tr> <tr><td>225</td><td>203</td><td>167</td><td>144</td><td>128</td><td>117</td><td>108</td><td>102</td><td>95</td><td>90</td><td>87</td><td>85</td><td>84</td><td>81</td><td>80</td><td>77</td></tr> <tr><td>230</td><td>199</td><td>164</td><td>141</td><td>126</td><td>114</td><td>106</td><td>99</td><td>93</td><td>88</td><td>85</td><td>83</td><td>82</td><td>80</td><td>78</td><td>75</td></tr> <tr><td>235</td><td>195</td><td>160</td><td>138</td><td>123</td><td>112</td><td>104</td><td>97</td><td>91</td><td>87</td><td>84</td><td>82</td><td>80</td><td>78</td><td>77</td><td>74</td></tr> <tr><td>240</td><td>191</td><td>157</td><td>135</td><td>120</td><td>110</td><td>101</td><td>95</td><td>89</td><td>85</td><td>82</td><td>80</td><td>78</td><td>76</td><td>75</td><td>72</td></tr> <tr><td>245</td><td>187</td><td>154</td><td>133</td><td>118</td><td>107</td><td>99</td><td>93</td><td>87</td><td>83</td><td>80</td><td>78</td><td>77</td><td>75</td><td>73</td><td>71</td></tr> <tr><td>250</td><td>183</td><td>151</td><td>130</td><td>114</td><td>105</td><td>97</td><td>91</td><td>85</td><td>81</td><td>79</td><td>77</td><td>75</td><td>73</td><td>72</td><td>69</td></tr> </tbody> </table> <p style="text-align: center;">Note: For other steel grades not covered in Table 8.5, refer to Appendix 8.3.</p>	d/t	Stiffener spacing ratio a/d																0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0	∞	55	300	300	300	300	300	300	300	350	340	330	334	330	323	320	310	60	300	300	300	300	300	305	353	338	328	320	314	310	303	298	288	65	300	300	300	300	304	340	338	320	300	301	294	290	282	277	268	70	300	300	300	308	350	334	318	302	290	281	274	269	261	257	247	75	300	300	300	355	335	318	303	284	271	262	250	251	244	240	231	80	300	300	305	341	321	302	288	267	254	248	240	236	229	225	216	85	300	300	303	328	306	287	280	251	239	231	228	222	215	212	203	90	300	300	341	315	292	271	254	237	220	218	213	209	203	200	192	95	300	300	330	302	277	256	241	224	214	207	202	198	193	189	182	100	300	350	318	299	293	244	229	213	203	197	192	188	183	180	173	105	300	340	306	275	250	232	218	203	194	187	183	179	174	171	165	110	300	330	294	263	239	221	208	194	185	179	174	171	168	164	157	115	301	320	283	251	229	212	199	185	177	171	167	164	160	158	150	120	303	310	271	241	219	203	191	178	169	164	160	157	152	150	144	125	344	300	290	231	210	195	183	171	163	157	153	151	148	144	138	130	338	290	250	222	202	187	178	164	156	151	148	145	141	138	133	135	328	270	241	214	195	180	169	158	151	146	142	140	138	133	128	140	310	260	232	206	188	174	163	152	145	140	137	135	131	129	123	145	311	200	224	199	181	168	158	147	140	136	132	130	128	124	119	150	303	251	216	193	175	162	152	142	136	131	128	126	122	120	115	155	294	243	209	186	170	157	148	138	131	127	124	122	118	116	112	160	286	235	203	181	164	152	143	133	127	123	120	118	114	112	108	165	278	228	197	175	159	148	139	129	123	119	116	114	111	109	105	170	269	222	191	170	155	143	135	125	120	116	113	111	108	106	102	175	261	215	188	165	150	139	131	122	116	112	110	108	105	103	99	180	254	209	180	160	148	135	127	118	113	109	107	105	102	100	96	185	247	204	178	156	142	132	124	115	110	106	104	102	99	97	93	190	241	198	171	152	138	128	120	112	107	103	101	99	96	95	91	195	235	193	167	148	135	125	117	109	104	101	98	97	94	92	89	200	229	188	162	144	131	122	114	107	102	98	96	94	91	90	86	205	223	184	158	141	128	119	112	104	99	96	94	92	89	88	84	210	218	179	155	138	125	116	109	102	97	94	91	90	87	86	82	215	213	175	151	134	122	113	106	99	95	91	89	88	85	84	80	220	208	171	148	131	120	111	104	97	92	89	87	86	83	82	79	225	203	167	144	128	117	108	102	95	90	87	85	84	81	80	77	230	199	164	141	126	114	106	99	93	88	85	83	82	80	78	75	235	195	160	138	123	112	104	97	91	87	84	82	80	78	77	74	240	191	157	135	120	110	101	95	89	85	82	80	78	76	75	72	245	187	154	133	118	107	99	93	87	83	80	78	77	75	73	71	250	183	151	130	114	105	97	91	85	81	79	77	75	73	72	69
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240	191	157	135	120	110	101	95	89	85	82	80	78	76	75	72																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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250	183	151	130	114	105	97	91	85	81	79	77	75	73	72	69																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

⁵⁷ Addition of Table 8.5x - Shear Buckling Strength for Q690 steel with web thickness >16mm ≤40mm.

Item	Current version	Amendments																																																																																																																				
58. Table 8.7 ⁵⁸	<p>Table 8.7 - Designation of buckling curves for different section types</p> <table border="1"> <thead> <tr> <th rowspan="2">Type of section</th> <th rowspan="2">Maximum thickness (see note1)</th> <th colspan="2">Axis of buckling</th> </tr> <tr> <th>x-x</th> <th>y-y</th> </tr> </thead> <tbody> <tr> <td>Hot-finished structural hollow sections with steel grade \geq S460 or hot-finished seamless structural hollow sections</td> <td></td> <td>a₀)</td> <td>a₀)</td> </tr> <tr> <td>Hot-finished structural hollow section \leq grade S460</td> <td></td> <td>a)</td> <td>a)</td> </tr> <tr> <td>Cold-formed structural hollow section of longitudinal seam weld or spiral weld</td> <td></td> <td>c)</td> <td>c)</td> </tr> <tr> <td>Rolled I-section</td> <td>≤ 40 mm > 40 mm</td> <td>a) b)</td> <td>b) c)</td> </tr> <tr> <td>Rolled H-section</td> <td>≤ 40 mm > 40 mm</td> <td>b) c)</td> <td>c) d)</td> </tr> <tr> <td>Welded I- or H-section (see note 2)</td> <td>≤ 40 mm > 40 mm</td> <td>b) b)</td> <td>c) d)</td> </tr> <tr> <td>Rolled I-section with welded flange cover plates with $0.25 < U/B < 0.80$ as shown in Figure 8.4)</td> <td>≤ 40 mm > 40 mm</td> <td>a) b)</td> <td>b) c)</td> </tr> <tr> <td>Rolled H-section with welded flange cover plates with $0.25 < U/B < 0.80$ as shown in Figure 8.4)</td> <td>≤ 40 mm > 40 mm</td> <td>b) c)</td> <td>c) d)</td> </tr> <tr> <td>Rolled I or H-section with welded flange cover plates with $U/B \geq 0.80$ as shown in Figure 8.4)</td> <td>≤ 40 mm > 40 mm</td> <td>b) c)</td> <td>a) b)</td> </tr> <tr> <td>Rolled I or H-section with welded flange cover plates with $U/B \leq 0.25$ as shown in Figure 8.4)</td> <td>≤ 40 mm > 40 mm</td> <td>b) b)</td> <td>c) d)</td> </tr> <tr> <td>Welded box section (see note 3)</td> <td>≤ 40 mm > 40 mm</td> <td>b) c)</td> <td>b) c)</td> </tr> <tr> <td>Round, square or flat bar</td> <td>≤ 40 mm > 40 mm</td> <td>b) c)</td> <td>b) c)</td> </tr> <tr> <td>Rolled angle, channel or T-section Two rolled sections laced, battened or back-to-back Compound rolled sections</td> <td></td> <td colspan="2">Any axis: c)</td> </tr> </tbody> </table> <p>NOTE:</p> <ol style="list-style-type: none"> For thickness between 40mm and 50mm the value of p_r may be taken as the average of the values for thicknesses up to 40mm and over 40mm for the relevant value of p_r. For welded I or H-sections with their flanges thermally out by machine without subsequent edge grinding or machining, for buckling about the y-y axis, strut curve b) may be used for flanges up to 40mm thick and strut curve c) for flanges over 40mm thick. The category "welded box section" includes any box section fabricated from plates or rolled sections, provided that all of the longitudinal welds are near the corners of the cross-section. Box sections with longitudinal stiffeners are NOT included in this category. Use of buckling curves based on other recognized design codes allowing for variation between load and material factors and calibrated against Tables 8.8(a.), (a) to (h) is acceptable. See also footnote under Table 8.8. 	Type of section	Maximum thickness (see note1)	Axis of buckling		x-x	y-y	Hot-finished structural hollow sections with steel grade \geq S460 or hot-finished seamless structural hollow sections		a ₀)	a ₀)	Hot-finished structural hollow section \leq grade S460		a)	a)	Cold-formed structural hollow section of longitudinal seam weld or spiral weld		c)	c)	Rolled I-section	≤ 40 mm > 40 mm	a) b)	b) c)	Rolled H-section	≤ 40 mm > 40 mm	b) c)	c) d)	Welded I- or H-section (see note 2)	≤ 40 mm > 40 mm	b) b)	c) d)	Rolled I-section with welded flange cover plates with $0.25 < U/B < 0.80$ as shown in Figure 8.4)	≤ 40 mm > 40 mm	a) b)	b) c)	Rolled H-section with welded flange cover plates with $0.25 < U/B < 0.80$ as shown in Figure 8.4)	≤ 40 mm > 40 mm	b) c)	c) d)	Rolled I or H-section with welded flange cover plates with $U/B \geq 0.80$ as shown in Figure 8.4)	≤ 40 mm > 40 mm	b) c)	a) b)	Rolled I or H-section with welded flange cover plates with $U/B \leq 0.25$ as shown in Figure 8.4)	≤ 40 mm > 40 mm	b) b)	c) d)	Welded box section (see note 3)	≤ 40 mm > 40 mm	b) c)	b) c)	Round, square or flat bar	≤ 40 mm > 40 mm	b) c)	b) c)	Rolled angle, channel or T-section Two rolled sections laced, battened or back-to-back Compound rolled sections		Any axis: c)		<p>Table 8.7 - Designation of buckling curves for different section types</p> <table border="1"> <thead> <tr> <th rowspan="2">Type of section</th> <th rowspan="2">Maximum thickness (see note1)</th> <th colspan="2">Axis of buckling</th> </tr> <tr> <th>x-x</th> <th>y-y</th> </tr> </thead> <tbody> <tr> <td>Hot-finished structural hollow sections with steel grade \geq S460 or hot-finished seamless structural hollow sections</td> <td></td> <td>a₀)</td> <td>a₀)</td> </tr> <tr> <td>Hot-finished structural hollow section \leq grade S460</td> <td></td> <td>a)</td> <td>a)</td> </tr> <tr> <td>Cold-formed structural hollow section of longitudinal seam weld or spiral weld</td> <td></td> <td>c)</td> <td>c)</td> </tr> <tr> <td>Rolled I-section</td> <td>≤ 40 mm > 40 mm</td> <td>a) b)</td> <td>b) c)</td> </tr> <tr> <td>Rolled H-section</td> <td>≤ 40 mm > 40 mm</td> <td>b) c)</td> <td>c) d)</td> </tr> <tr> <td>Welded I- or H-section (see note 2)</td> <td>≤ 40 mm > 40 mm</td> <td>b) b)</td> <td>c) d)</td> </tr> <tr> <td>Rolled I-section with welded flange cover plates with $0.25 < U/B < 0.80$ as shown in Figure 8.4)</td> <td>≤ 40 mm > 40 mm</td> <td>a) b)</td> <td>b) c)</td> </tr> <tr> <td>Rolled H-section with welded flange cover plates with $0.25 < U/B < 0.80$ as shown in Figure 8.4)</td> <td>≤ 40 mm > 40 mm</td> <td>b) c)</td> <td>c) d)</td> </tr> <tr> <td>Rolled I or H-section with welded flange cover plates with $U/B \geq 0.80$ as shown in Figure 8.4)</td> <td>≤ 40 mm > 40 mm</td> <td>b) c)</td> <td>a) b)</td> </tr> <tr> <td>Rolled I or H-section with welded flange cover plates with $U/B \leq 0.25$ as shown in Figure 8.4)</td> <td>≤ 40 mm > 40 mm</td> <td>b) b)</td> <td>c) d)</td> </tr> <tr> <td>Welded box section (see note 3)</td> <td>≤ 40 mm > 40 mm</td> <td>b) c)</td> <td>b) c)</td> </tr> <tr> <td>Round, square or flat bar</td> <td>≤ 40 mm > 40 mm</td> <td>b) c)</td> <td>b) c)</td> </tr> <tr> <td>Rolled angle, channel or T-section Two rolled sections laced, battened or back-to-back Compound rolled sections</td> <td></td> <td colspan="2">Any axis: c)</td> </tr> </tbody> </table> <p>NOTE:</p> <ol style="list-style-type: none"> For thickness between 40mm and 50mm the value of p_r may be taken as the average of the values for thicknesses up to 40mm and over 40mm for the relevant value of p_r. 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Type of section	Maximum thickness (see note1)	Axis of buckling		x-x	y-y	Hot-finished structural hollow sections with steel grade \geq S460 or hot-finished seamless structural hollow sections		a ₀)	a ₀)	Hot-finished structural hollow section \leq grade S460		a)	a)	Cold-formed structural hollow section of longitudinal seam weld or spiral weld		c)	c)	Rolled I-section	≤ 40 mm > 40 mm	a) b)	b) c)	Rolled H-section	≤ 40 mm > 40 mm	b) c)	c) d)	Welded I- or H-section (see note 2)	≤ 40 mm > 40 mm	b) b)	c) d)	Rolled I-section with welded flange cover plates with $0.25 < U/B < 0.80$ as shown in Figure 8.4)	≤ 40 mm > 40 mm	a) b)	b) c)	Rolled H-section with welded flange cover plates with $0.25 < U/B < 0.80$ as shown in Figure 8.4)	≤ 40 mm > 40 mm	b) c)	c) d)	Rolled I or H-section with welded flange cover plates with $U/B \geq 0.80$ as shown in Figure 8.4)	≤ 40 mm > 40 mm	b) c)	a) b)	Rolled I or H-section with welded flange cover plates with $U/B \leq 0.25$ as shown in Figure 8.4)	≤ 40 mm > 40 mm	b) b)	c) d)	Welded box section (see note 3)	≤ 40 mm > 40 mm	b) c)	b) c)	Round, square or flat bar	≤ 40 mm > 40 mm	b) c)	b) c)	Rolled angle, channel or T-section Two rolled sections laced, battened or back-to-back Compound rolled sections		Any axis: c)	
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Hot-finished structural hollow section \leq grade S460		a)	a)																																																																																																																			
Cold-formed structural hollow section of longitudinal seam weld or spiral weld		c)	c)																																																																																																																			
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⁵⁸ Revision of size of steel plate thickness in Table 8.7 for designation of buckling curve.

Item

Current version

Amendments

59. Table 8.8(b)⁵⁹

Table 8.8(b) - Design strength p_c of compression members

3) Values of p_c in N/mm² with $\lambda < 110$ for strut curve b

Steel grade and design strength p_y (N/mm²)

λ	S275				S355				S460						
	235	245	265	275	315	325	335	345	355	400	410	430	440	460	
15	235	245	265	275	315	325	335	345	355	399	409	428	438	457	
20	234	243	263	263	272	310	320	330	339	349	391	401	420	429	448
25	229	239	248	258	267	304	314	323	332	342	384	393	411	421	439
30	225	234	243	253	262	298	307	316	325	335	375	384	402	411	429
35	220	229	238	247	256	291	300	309	318	327	365	374	392	400	417
40	216	224	233	241	250	284	293	301	310	318	355	364	380	388	404
42	213	222	231	239	248	281	289	298	306	314	351	359	375	383	399
44	211	220	228	237	245	278	286	294	302	310	346	354	369	377	392
46	209	218	226	234	242	275	283	291	298	306	341	349	364	371	385
48	207	215	223	231	239	271	279	287	294	302	336	343	358	365	379
50	205	213	221	229	237	267	275	283	290	298	330	337	351	358	372
52	203	210	218	226	234	264	271	278	286	293	324	331	344	351	364
54	200	208	215	223	230	260	267	274	281	288	318	325	337	344	356
56	198	205	213	220	227	256	263	269	276	283	312	318	330	336	347
58	195	202	210	217	224	252	258	265	271	278	305	311	322	328	339
60	193	200	207	214	221	247	254	260	266	272	298	304	314	320	330
62	190	197	204	210	217	243	249	255	261	266	291	296	306	311	320
64	187	194	200	207	213	238	244	249	255	261	284	289	298	302	311
66	184	191	197	203	210	233	239	244	249	255	276	281	289	294	301
68	181	188	194	200	206	228	233	239	244	249	269	273	281	285	292
70	178	185	190	196	202	223	228	233	238	242	261	265	272	276	282
72	175	181	187	193	198	218	223	227	232	236	254	257	264	267	273
74	172	178	183	189	194	213	217	222	226	230	246	249	255	258	264
76	169	175	180	185	190	208	212	216	220	223	238	241	247	250	255
78	166	171	176	181	186	203	206	210	214	217	231	234	239	241	246
80	163	168	172	177	181	197	201	204	208	211	224	226	231	233	237
82	160	164	169	173	177	192	196	199	202	205	217	219	223	225	229
84	156	161	165	169	173	187	190	193	196	199	210	212	216	218	221
86	153	157	161	165	169	182	185	188	190	193	203	205	208	210	213
88	150	154	158	161	165	177	180	182	185	187	196	198	201	203	206
90	146	150	154	157	161	172	175	177	179	181	190	192	195	198	199
92	143	147	150	153	156	167	170	172	174	176	184	185	188	189	192
94	140	143	147	150	152	162	165	167	169	171	178	179	182	183	185
96	137	140	143	146	148	158	160	162	164	165	172	173	176	177	179
98	134	137	139	142	145	153	155	157	159	160	167	168	170	171	173
100	130	133	136	138	141	149	151	152	154	155	161	162	164	165	167
102	127	130	132	135	137	145	146	148	149	151	156	157	159	160	162
104	124	127	129	131	133	141	142	144	145	146	151	152	154	155	156
106	121	124	126	128	130	137	138	139	141	142	147	148	149	150	151
108	118	121	123	125	128	133	134	135	137	138	142	143	144	145	147

Note : For other steel grades, refer to Appendix 8.4.

Table 8.8(b) - Design strength p_c of compression members

ii) S275 ~ S460 steel

3) Values of p_c in N/mm² with $\lambda < 110$ for strut curve b

Steel grade and design strength p_y (N/mm²)

λ	S275				S355				S460						
	235	245	265	275	315	325	335	345	355	400	410	430	440	460	
15	235	245	265	275	315	325	335	345	355	399	409	428	438	457	
20	234	243	263	263	272	310	320	330	339	349	391	401	420	429	448
25	229	239	248	258	267	304	314	323	332	342	384	393	411	421	439
30	225	234	243	253	262	298	307	316	325	335	375	384	402	411	429
35	220	229	238	247	256	291	300	309	318	327	365	374	392	400	417
40	216	224	233	241	250	284	293	301	310	318	355	364	380	388	404
42	213	222	231	239	248	281	289	298	306	314	351	359	375	383	399
44	211	220	228	237	245	278	286	294	302	310	346	354	369	377	392
46	209	218	226	234	242	275	283	291	298	306	341	349	364	371	385
48	207	215	223	231	239	271	279	287	294	302	336	343	358	365	379
50	205	213	221	229	237	267	275	283	290	298	330	337	351	358	372
52	203	210	218	226	234	264	271	278	286	293	324	331	344	351	364
54	200	208	215	223	230	260	267	274	281	288	318	325	337	344	356
56	198	205	213	220	227	256	263	269	276	283	312	318	330	336	347
58	195	202	210	217	224	252	258	265	271	278	305	311	322	328	339
60	193	200	207	214	221	247	254	260	266	272	298	304	314	320	330
62	190	197	204	210	217	243	249	255	261	266	291	296	306	311	320
64	187	194	200	207	213	238	244	249	255	261	284	289	298	302	311
66	184	191	197	203	210	233	239	244	249	255	276	281	289	294	301
68	181	188	194	200	206	228	233	239	244	249	269	273	281	285	292
70	178	185	190	196	202	223	228	233	238	242	261	265	272	276	282
72	175	181	187	193	198	218	223	227	232	236	254	257	264	267	273
74	172	178	183	189	194	213	217	222	226	230	246	249	255	258	264
76	169	175	180	185	190	208	212	216	220	223	238	241	247	250	255
78	166	171	176	181	186	203	206	210	214	217	231	234	239	241	246
80	163	168	172	177	181	197	201	204	208	211	224	226	231	233	237
82	160	164	169	173	177	192	196	199	202	205	217	219	223	225	229
84	156	161	165	169	173	187	190	193	196	199	210	212	216	218	221
86	153	157	161	165	169	182	185	188	190	193	203	205	208	210	213
88	150	154	158	161	165	177	180	182	185	187	196	198	201	203	206
90	146	150	154	157	161	172	175	177	179	181	190	192	195	198	199
92	143	147	150	153	156	167	170	172	174	176	184	185	188	189	192
94	140	143	147	150	152	162	165	167	169	171	178	179	182	183	185
96	137	140	143	146	148	158	160	162	164	165	172	173	176	177	179
98	134	137	139	142	145	153	155	157	159	160	167	168	170	171	173
100	130	133	136	138	141	149	151	152	154	155	161	162	164	165	167
102	127	130	132	135	137	145	146	148	149	151	156	157	159	160	162
104	124	127	129	131	133	141	142	144	145	146	151	152	154	155	156
106	121	124	126	128	130	137	138	139	141	142	147	148	149	150	151
108	118	121	123	125	128	133	134	135	137	138	142	143	144	145	147

Note : For other steel grades, refer to Appendix 8.4.

⁵⁹ Addition of relevant steel grade S275 ~ S460 as subtitle of Table 8.8(b) for buckling curve b.

Item

Current version

Amendments

60. Table 8.8(b)
(cont'd)⁶⁰

Table 8.8(b) - Design strength p_c of compression members (cont'd)

4) Values of p_c in N/mm ² with $\lambda \geq 110$ for strut curve b															
Steel grade and design strength p_r (N/mm ²)															
λ	S275					S355					S460				
	235	245	255	265	275	315	325	335	345	355	400	410	430	440	460
110	115	118	120	121	123	129	130	131	133	134	138	139	140	141	142
112	113	115	117	118	120	125	127	128	129	130	134	134	136	136	138
114	110	112	114	115	117	122	123	124	125	126	130	130	132	132	133
116	107	109	111	112	114	119	120	121	122	122	126	126	128	128	129
118	105	106	108	109	111	115	116	117	118	119	122	123	124	124	125
120	102	104	105	107	108	112	113	114	115	116	119	119	120	121	122
122	100	101	103	104	105	109	110	111	112	112	115	116	117	117	118
124	97	99	100	101	102	106	107	108	109	109	112	112	113	114	115
126	95	96	98	99	100	103	104	105	106	106	109	109	110	111	111
128	93	94	95	96	97	101	101	102	103	103	106	106	107	107	108
130	90	92	93	94	95	98	99	99	100	101	103	103	104	105	105
135	85	88	87	88	89	92	93	93	94	94	96	97	97	98	98
140	80	81	82	83	84	88	87	87	88	88	90	90	91	91	92
145	78	77	78	78	79	81	82	82	83	83	84	85	85	86	86
150	72	72	73	74	74	78	77	77	78	78	79	80	80	80	81
165	68	69	69	70	70	72	72	73	73	73	75	75	75	76	76
160	64	65	65	66	66	68	68	69	69	69	70	71	71	71	72
165	61	62	62	62	63	64	65	65	65	66	67	67	67	68	68
170	58	58	59	59	60	61	61	61	62	62	63	63	63	64	64
175	55	55	56	56	57	58	58	58	59	59	60	60	60	60	60
180	52	53	53	53	54	55	55	55	56	56	56	57	57	57	57
185	50	50	51	51	51	52	52	53	53	53	54	54	54	54	54
190	48	48	48	48	49	50	50	50	50	51	51	51	51	51	52
195	45	46	46	46	46	47	47	48	48	48	49	49	49	49	49
200	43	44	44	44	44	45	45	45	46	46	46	46	47	47	47
210	40	40	40	40	41	41	41	41	42	42	42	42	42	43	43
220	36	37	37	37	37	38	38	38	38	38	39	39	39	39	39
230	34	34	34	34	34	35	35	35	35	35	36	36	36	36	36
240	31	31	31	31	31	32	32	32	32	32	33	33	33	33	33
250	29	29	29	29	29	30	30	30	30	30	30	30	30	30	30
260	27	27	27	27	27	27	27	28	28	28	28	28	28	28	28
270	25	25	25	25	25	26	26	26	26	26	26	26	26	26	26
280	23	23	23	23	24	24	24	24	24	24	24	24	24	24	24
290	22	22	22	22	22	22	22	22	22	22	23	23	23	23	23
300	20	20	21	21	21	21	21	21	21	21	21	21	21	21	21
310	19	19	19	19	19	20	20	20	20	20	20	20	20	20	20
320	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
330	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
340	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
350	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15

Note : For other steel grades, refer to Appendix 8.4.

Table 8.8(b) - Design strength p_c of compression members (cont'd)

i) S275 ~ S460 steel

4) Values of p_c in N/mm ² with $\lambda \geq 110$ for strut curve b															
Steel grade and design strength p_r (N/mm ²)															
λ	S275					S355					S460				
	235	245	255	265	275	315	325	335	345	355	400	410	430	440	460
110	115	118	120	121	123	129	130	131	133	134	138	139	140	141	142
112	113	115	117	118	120	125	127	128	129	130	134	134	136	136	138
114	110	112	114	115	117	122	123	124	125	126	130	130	132	132	133
116	107	109	111	112	114	119	120	121	122	122	126	126	128	128	129
118	105	106	108	109	111	115	116	117	118	119	122	123	124	124	125
120	102	104	105	107	108	112	113	114	115	116	119	119	120	121	122
122	100	101	103	104	105	109	110	111	112	112	115	116	117	117	118
124	97	99	100	101	102	106	107	108	109	109	112	112	113	114	115
126	95	96	98	99	100	103	104	105	106	106	109	109	110	111	111
128	93	94	95	96	97	101	101	102	103	103	106	106	107	107	108
130	90	92	93	94	95	98	99	99	100	101	103	103	104	105	105
135	85	88	87	88	89	92	93	93	94	94	96	97	97	98	98
140	80	81	82	83	84	88	87	87	88	88	90	90	91	91	92
145	78	77	78	78	79	81	82	82	83	83	84	85	85	86	86
150	72	72	73	74	74	78	77	77	78	78	79	80	80	80	81
165	68	69	69	70	70	72	72	73	73	73	75	75	75	76	76
160	64	65	65	66	66	68	68	69	69	69	70	71	71	71	72
165	61	62	62	62	63	64	65	65	65	66	67	67	67	68	68
170	58	58	59	59	60	61	61	61	62	62	63	63	63	64	64
175	55	55	56	56	57	58	58	58	59	59	60	60	60	60	60
180	52	53	53	53	54	55	55	55	56	56	56	57	57	57	57
185	50	50	51	51	51	52	52	53	53	53	54	54	54	54	54
190	48	48	48	48	49	50	50	50	50	51	51	51	51	51	52
195	45	46	46	46	46	47	47	48	48	48	49	49	49	49	49
200	43	44	44	44	44	45	45	45	46	46	46	46	47	47	47
210	40	40	40	40	41	41	41	41	42	42	42	42	42	43	43
220	36	37	37	37	37	38	38	38	38	38	39	39	39	39	39
230	34	34	34	34	34	35	35	35	35	35	36	36	36	36	36
240	31	31	31	31	31	32	32	32	32	32	33	33	33	33	33
250	29	29	29	29	29	30	30	30	30	30	30	30	30	30	30
260	27	27	27	27	27	27	27	28	28	28	28	28	28	28	28
270	25	25	25	25	25	26	26	26	26	26	26	26	26	26	26
280	23	23	23	23	24	24	24	24	24	24	24	24	24	24	24
290	22	22	22	22	22	22	22	22	22	22	23	23	23	23	23
300	20	20	21	21	21	21	21	21	21	21	21	21	21	21	21
310	19	19	19	19	19	20	20	20	20	20	20	20	20	20	20
320	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
330	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
340	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
350	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15

Note : For other steel grades, refer to Appendix 8.4.

⁶⁰ Addition of relevant steel grade S275 ~ S460 as subtitle of Table 8.8(b) (Cont'd) for buckling curve b.

Item	Current version	Amendments																																																																																																																																																																																																																																																																																																											
61. Table 8.8(b) (cont'd) ⁶¹		<p style="text-align: center;">Table 8.8(b) - Design strength p_c of compression members</p> <p style="text-align: center;">ii) S550 – S690 steel</p> <p style="text-align: center;">b) Values of p_c in N/mm² with $\lambda < 110$ for strut curve b</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="3">λ</th> <th colspan="6">Steel grade and design strength p_c (N/mm²)</th> </tr> <tr> <th colspan="3">S550</th> <th colspan="3">S690</th> </tr> <tr> <th>490</th> <th>530</th> <th>590</th> <th>630</th> <th>690</th> <th>690</th> </tr> </thead> <tbody> <tr><td>16</td><td>488</td><td>525</td><td>544</td><td>621</td><td>641</td><td>670</td></tr> <tr><td>20</td><td>477</td><td>515</td><td>534</td><td>609</td><td>628</td><td>655</td></tr> <tr><td>25</td><td>467</td><td>504</td><td>522</td><td>595</td><td>613</td><td>650</td></tr> <tr><td>30</td><td>456</td><td>491</td><td>509</td><td>579</td><td>598</td><td>631</td></tr> <tr><td>35</td><td>443</td><td>477</td><td>494</td><td>560</td><td>576</td><td>608</td></tr> <tr><td>40</td><td>428</td><td>460</td><td>476</td><td>537</td><td>551</td><td>580</td></tr> <tr><td>42</td><td>422</td><td>452</td><td>467</td><td>528</td><td>540</td><td>567</td></tr> <tr><td>44</td><td>415</td><td>444</td><td>459</td><td>514</td><td>526</td><td>553</td></tr> <tr><td>46</td><td>408</td><td>436</td><td>449</td><td>502</td><td>514</td><td>538</td></tr> <tr><td>48</td><td>400</td><td>427</td><td>440</td><td>489</td><td>500</td><td>522</td></tr> <tr><td>50</td><td>391</td><td>417</td><td>429</td><td>475</td><td>486</td><td>505</td></tr> <tr><td>52</td><td>383</td><td>407</td><td>418</td><td>460</td><td>470</td><td>488</td></tr> <tr><td>54</td><td>373</td><td>398</td><td>408</td><td>445</td><td>454</td><td>470</td></tr> <tr><td>55</td><td>364</td><td>389</td><td>394</td><td>429</td><td>437</td><td>452</td></tr> <tr><td>58</td><td>354</td><td>373</td><td>382</td><td>414</td><td>421</td><td>434</td></tr> <tr><td>60</td><td>344</td><td>361</td><td>369</td><td>398</td><td>404</td><td>418</td></tr> <tr><td>62</td><td>333</td><td>349</td><td>357</td><td>382</td><td>388</td><td>398</td></tr> <tr><td>64</td><td>323</td><td>337</td><td>344</td><td>367</td><td>372</td><td>381</td></tr> <tr><td>66</td><td>312</td><td>326</td><td>332</td><td>352</td><td>356</td><td>364</td></tr> <tr><td>68</td><td>302</td><td>314</td><td>319</td><td>337</td><td>341</td><td>348</td></tr> <tr><td>70</td><td>292</td><td>302</td><td>307</td><td>323</td><td>327</td><td>333</td></tr> <tr><td>72</td><td>281</td><td>291</td><td>295</td><td>310</td><td>313</td><td>319</td></tr> <tr><td>74</td><td>271</td><td>280</td><td>284</td><td>297</td><td>300</td><td>305</td></tr> <tr><td>76</td><td>262</td><td>270</td><td>273</td><td>285</td><td>287</td><td>292</td></tr> <tr><td>78</td><td>252</td><td>259</td><td>263</td><td>273</td><td>275</td><td>279</td></tr> <tr><td>80</td><td>243</td><td>250</td><td>252</td><td>262</td><td>264</td><td>268</td></tr> <tr><td>82</td><td>234</td><td>240</td><td>243</td><td>251</td><td>253</td><td>257</td></tr> <tr><td>84</td><td>226</td><td>231</td><td>234</td><td>241</td><td>243</td><td>246</td></tr> <tr><td>86</td><td>218</td><td>223</td><td>225</td><td>232</td><td>233</td><td>236</td></tr> <tr><td>88</td><td>210</td><td>214</td><td>216</td><td>223</td><td>224</td><td>227</td></tr> <tr><td>90</td><td>202</td><td>206</td><td>208</td><td>214</td><td>216</td><td>218</td></tr> <tr><td>92</td><td>195</td><td>199</td><td>201</td><td>206</td><td>207</td><td>209</td></tr> <tr><td>94</td><td>188</td><td>192</td><td>193</td><td>199</td><td>200</td><td>201</td></tr> <tr><td>96</td><td>182</td><td>185</td><td>186</td><td>191</td><td>192</td><td>194</td></tr> <tr><td>98</td><td>176</td><td>179</td><td>180</td><td>184</td><td>185</td><td>187</td></tr> <tr><td>100</td><td>170</td><td>172</td><td>174</td><td>178</td><td>179</td><td>180</td></tr> <tr><td>102</td><td>164</td><td>167</td><td>168</td><td>171</td><td>172</td><td>174</td></tr> <tr><td>104</td><td>159</td><td>161</td><td>162</td><td>165</td><td>166</td><td>166</td></tr> <tr><td>106</td><td>153</td><td>156</td><td>157</td><td>160</td><td>160</td><td>162</td></tr> <tr><td>108</td><td>148</td><td>150</td><td>151</td><td>154</td><td>155</td><td>156</td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades, refer to Appendix 8.4.</p>	λ	Steel grade and design strength p_c (N/mm ²)						S550			S690			490	530	590	630	690	690	16	488	525	544	621	641	670	20	477	515	534	609	628	655	25	467	504	522	595	613	650	30	456	491	509	579	598	631	35	443	477	494	560	576	608	40	428	460	476	537	551	580	42	422	452	467	528	540	567	44	415	444	459	514	526	553	46	408	436	449	502	514	538	48	400	427	440	489	500	522	50	391	417	429	475	486	505	52	383	407	418	460	470	488	54	373	398	408	445	454	470	55	364	389	394	429	437	452	58	354	373	382	414	421	434	60	344	361	369	398	404	418	62	333	349	357	382	388	398	64	323	337	344	367	372	381	66	312	326	332	352	356	364	68	302	314	319	337	341	348	70	292	302	307	323	327	333	72	281	291	295	310	313	319	74	271	280	284	297	300	305	76	262	270	273	285	287	292	78	252	259	263	273	275	279	80	243	250	252	262	264	268	82	234	240	243	251	253	257	84	226	231	234	241	243	246	86	218	223	225	232	233	236	88	210	214	216	223	224	227	90	202	206	208	214	216	218	92	195	199	201	206	207	209	94	188	192	193	199	200	201	96	182	185	186	191	192	194	98	176	179	180	184	185	187	100	170	172	174	178	179	180	102	164	167	168	171	172	174	104	159	161	162	165	166	166	106	153	156	157	160	160	162	108	148	150	151	154	155	156
λ	Steel grade and design strength p_c (N/mm ²)																																																																																																																																																																																																																																																																																																												
	S550			S690																																																																																																																																																																																																																																																																																																									
	490	530	590	630	690	690																																																																																																																																																																																																																																																																																																							
16	488	525	544	621	641	670																																																																																																																																																																																																																																																																																																							
20	477	515	534	609	628	655																																																																																																																																																																																																																																																																																																							
25	467	504	522	595	613	650																																																																																																																																																																																																																																																																																																							
30	456	491	509	579	598	631																																																																																																																																																																																																																																																																																																							
35	443	477	494	560	576	608																																																																																																																																																																																																																																																																																																							
40	428	460	476	537	551	580																																																																																																																																																																																																																																																																																																							
42	422	452	467	528	540	567																																																																																																																																																																																																																																																																																																							
44	415	444	459	514	526	553																																																																																																																																																																																																																																																																																																							
46	408	436	449	502	514	538																																																																																																																																																																																																																																																																																																							
48	400	427	440	489	500	522																																																																																																																																																																																																																																																																																																							
50	391	417	429	475	486	505																																																																																																																																																																																																																																																																																																							
52	383	407	418	460	470	488																																																																																																																																																																																																																																																																																																							
54	373	398	408	445	454	470																																																																																																																																																																																																																																																																																																							
55	364	389	394	429	437	452																																																																																																																																																																																																																																																																																																							
58	354	373	382	414	421	434																																																																																																																																																																																																																																																																																																							
60	344	361	369	398	404	418																																																																																																																																																																																																																																																																																																							
62	333	349	357	382	388	398																																																																																																																																																																																																																																																																																																							
64	323	337	344	367	372	381																																																																																																																																																																																																																																																																																																							
66	312	326	332	352	356	364																																																																																																																																																																																																																																																																																																							
68	302	314	319	337	341	348																																																																																																																																																																																																																																																																																																							
70	292	302	307	323	327	333																																																																																																																																																																																																																																																																																																							
72	281	291	295	310	313	319																																																																																																																																																																																																																																																																																																							
74	271	280	284	297	300	305																																																																																																																																																																																																																																																																																																							
76	262	270	273	285	287	292																																																																																																																																																																																																																																																																																																							
78	252	259	263	273	275	279																																																																																																																																																																																																																																																																																																							
80	243	250	252	262	264	268																																																																																																																																																																																																																																																																																																							
82	234	240	243	251	253	257																																																																																																																																																																																																																																																																																																							
84	226	231	234	241	243	246																																																																																																																																																																																																																																																																																																							
86	218	223	225	232	233	236																																																																																																																																																																																																																																																																																																							
88	210	214	216	223	224	227																																																																																																																																																																																																																																																																																																							
90	202	206	208	214	216	218																																																																																																																																																																																																																																																																																																							
92	195	199	201	206	207	209																																																																																																																																																																																																																																																																																																							
94	188	192	193	199	200	201																																																																																																																																																																																																																																																																																																							
96	182	185	186	191	192	194																																																																																																																																																																																																																																																																																																							
98	176	179	180	184	185	187																																																																																																																																																																																																																																																																																																							
100	170	172	174	178	179	180																																																																																																																																																																																																																																																																																																							
102	164	167	168	171	172	174																																																																																																																																																																																																																																																																																																							
104	159	161	162	165	166	166																																																																																																																																																																																																																																																																																																							
106	153	156	157	160	160	162																																																																																																																																																																																																																																																																																																							
108	148	150	151	154	155	156																																																																																																																																																																																																																																																																																																							

⁶¹ Addition of design strength for S550 and S690 steel for buckling curve b.

Item	Current version	Amendments																																																																																																																																																																																																																																																																																																											
62. Table 8.8(b) (cont'd) ⁶²		<p style="text-align: center;">Table 8.8(b) - Design strength p_c of compression members (cont'd) ii) S550 ~ S690 steel (cont'd)</p> <p style="text-align: center;">5) Values of p_c in N/mm² with $\lambda \geq 110$ for strut curve b</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="3">λ</th> <th colspan="6">Steel grade and design strength p_c (N/mm²)</th> </tr> <tr> <th colspan="3">S550</th> <th colspan="3">S690</th> </tr> <tr> <th>490</th> <th>530</th> <th>550</th> <th>630</th> <th>650</th> <th>690</th> </tr> </thead> <tbody> <tr><td>110</td><td>144</td><td>146</td><td>148</td><td>149</td><td>150</td><td>151</td></tr> <tr><td>112</td><td>139</td><td>141</td><td>142</td><td>144</td><td>145</td><td>146</td></tr> <tr><td>114</td><td>135</td><td>136</td><td>137</td><td>140</td><td>140</td><td>141</td></tr> <tr><td>116</td><td>131</td><td>132</td><td>133</td><td>135</td><td>136</td><td>137</td></tr> <tr><td>118</td><td>127</td><td>128</td><td>129</td><td>131</td><td>132</td><td>132</td></tr> <tr><td>120</td><td>123</td><td>124</td><td>125</td><td>127</td><td>127</td><td>128</td></tr> <tr><td>122</td><td>119</td><td>121</td><td>121</td><td>123</td><td>124</td><td>124</td></tr> <tr><td>124</td><td>116</td><td>117</td><td>118</td><td>119</td><td>120</td><td>121</td></tr> <tr><td>126</td><td>112</td><td>114</td><td>114</td><td>116</td><td>116</td><td>117</td></tr> <tr><td>128</td><td>109</td><td>110</td><td>111</td><td>113</td><td>113</td><td>114</td></tr> <tr><td>130</td><td>106</td><td>107</td><td>108</td><td>109</td><td>110</td><td>110</td></tr> <tr><td>135</td><td>99</td><td>100</td><td>100</td><td>102</td><td>102</td><td>103</td></tr> <tr><td>140</td><td>93</td><td>93</td><td>94</td><td>95</td><td>95</td><td>96</td></tr> <tr><td>145</td><td>87</td><td>87</td><td>88</td><td>89</td><td>89</td><td>89</td></tr> <tr><td>150</td><td>81</td><td>82</td><td>82</td><td>83</td><td>83</td><td>84</td></tr> <tr><td>155</td><td>78</td><td>77</td><td>77</td><td>78</td><td>78</td><td>79</td></tr> <tr><td>160</td><td>72</td><td>73</td><td>73</td><td>74</td><td>74</td><td>74</td></tr> <tr><td>165</td><td>68</td><td>68</td><td>69</td><td>69</td><td>70</td><td>70</td></tr> <tr><td>170</td><td>64</td><td>65</td><td>65</td><td>65</td><td>66</td><td>66</td></tr> <tr><td>175</td><td>61</td><td>61</td><td>61</td><td>62</td><td>62</td><td>62</td></tr> <tr><td>180</td><td>58</td><td>58</td><td>58</td><td>59</td><td>59</td><td>59</td></tr> <tr><td>185</td><td>55</td><td>55</td><td>55</td><td>56</td><td>56</td><td>56</td></tr> <tr><td>190</td><td>52</td><td>52</td><td>52</td><td>53</td><td>53</td><td>53</td></tr> <tr><td>195</td><td>49</td><td>50</td><td>50</td><td>50</td><td>50</td><td>51</td></tr> <tr><td>200</td><td>47</td><td>47</td><td>47</td><td>48</td><td>48</td><td>48</td></tr> <tr><td>210</td><td>43</td><td>43</td><td>43</td><td>44</td><td>44</td><td>44</td></tr> <tr><td>220</td><td>39</td><td>39</td><td>39</td><td>40</td><td>40</td><td>40</td></tr> <tr><td>230</td><td>36</td><td>36</td><td>36</td><td>36</td><td>37</td><td>37</td></tr> <tr><td>240</td><td>33</td><td>33</td><td>33</td><td>34</td><td>34</td><td>34</td></tr> <tr><td>250</td><td>31</td><td>31</td><td>31</td><td>31</td><td>31</td><td>31</td></tr> <tr><td>260</td><td>28</td><td>28</td><td>29</td><td>29</td><td>29</td><td>29</td></tr> <tr><td>270</td><td>26</td><td>26</td><td>26</td><td>27</td><td>27</td><td>27</td></tr> <tr><td>280</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td></tr> <tr><td>290</td><td>23</td><td>23</td><td>23</td><td>23</td><td>23</td><td>23</td></tr> <tr><td>300</td><td>21</td><td>22</td><td>22</td><td>22</td><td>22</td><td>22</td></tr> <tr><td>310</td><td>20</td><td>20</td><td>20</td><td>20</td><td>20</td><td>20</td></tr> <tr><td>320</td><td>19</td><td>19</td><td>19</td><td>19</td><td>19</td><td>19</td></tr> <tr><td>330</td><td>18</td><td>18</td><td>18</td><td>18</td><td>18</td><td>18</td></tr> <tr><td>340</td><td>17</td><td>17</td><td>17</td><td>17</td><td>17</td><td>17</td></tr> <tr><td>350</td><td>16</td><td>16</td><td>16</td><td>16</td><td>16</td><td>16</td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades, refer to Appendix 8.4.</p>	λ	Steel grade and design strength p_c (N/mm ²)						S550			S690			490	530	550	630	650	690	110	144	146	148	149	150	151	112	139	141	142	144	145	146	114	135	136	137	140	140	141	116	131	132	133	135	136	137	118	127	128	129	131	132	132	120	123	124	125	127	127	128	122	119	121	121	123	124	124	124	116	117	118	119	120	121	126	112	114	114	116	116	117	128	109	110	111	113	113	114	130	106	107	108	109	110	110	135	99	100	100	102	102	103	140	93	93	94	95	95	96	145	87	87	88	89	89	89	150	81	82	82	83	83	84	155	78	77	77	78	78	79	160	72	73	73	74	74	74	165	68	68	69	69	70	70	170	64	65	65	65	66	66	175	61	61	61	62	62	62	180	58	58	58	59	59	59	185	55	55	55	56	56	56	190	52	52	52	53	53	53	195	49	50	50	50	50	51	200	47	47	47	48	48	48	210	43	43	43	44	44	44	220	39	39	39	40	40	40	230	36	36	36	36	37	37	240	33	33	33	34	34	34	250	31	31	31	31	31	31	260	28	28	29	29	29	29	270	26	26	26	27	27	27	280	25	25	25	25	25	25	290	23	23	23	23	23	23	300	21	22	22	22	22	22	310	20	20	20	20	20	20	320	19	19	19	19	19	19	330	18	18	18	18	18	18	340	17	17	17	17	17	17	350	16	16	16	16	16	16
λ	Steel grade and design strength p_c (N/mm ²)																																																																																																																																																																																																																																																																																																												
	S550			S690																																																																																																																																																																																																																																																																																																									
	490	530	550	630	650	690																																																																																																																																																																																																																																																																																																							
110	144	146	148	149	150	151																																																																																																																																																																																																																																																																																																							
112	139	141	142	144	145	146																																																																																																																																																																																																																																																																																																							
114	135	136	137	140	140	141																																																																																																																																																																																																																																																																																																							
116	131	132	133	135	136	137																																																																																																																																																																																																																																																																																																							
118	127	128	129	131	132	132																																																																																																																																																																																																																																																																																																							
120	123	124	125	127	127	128																																																																																																																																																																																																																																																																																																							
122	119	121	121	123	124	124																																																																																																																																																																																																																																																																																																							
124	116	117	118	119	120	121																																																																																																																																																																																																																																																																																																							
126	112	114	114	116	116	117																																																																																																																																																																																																																																																																																																							
128	109	110	111	113	113	114																																																																																																																																																																																																																																																																																																							
130	106	107	108	109	110	110																																																																																																																																																																																																																																																																																																							
135	99	100	100	102	102	103																																																																																																																																																																																																																																																																																																							
140	93	93	94	95	95	96																																																																																																																																																																																																																																																																																																							
145	87	87	88	89	89	89																																																																																																																																																																																																																																																																																																							
150	81	82	82	83	83	84																																																																																																																																																																																																																																																																																																							
155	78	77	77	78	78	79																																																																																																																																																																																																																																																																																																							
160	72	73	73	74	74	74																																																																																																																																																																																																																																																																																																							
165	68	68	69	69	70	70																																																																																																																																																																																																																																																																																																							
170	64	65	65	65	66	66																																																																																																																																																																																																																																																																																																							
175	61	61	61	62	62	62																																																																																																																																																																																																																																																																																																							
180	58	58	58	59	59	59																																																																																																																																																																																																																																																																																																							
185	55	55	55	56	56	56																																																																																																																																																																																																																																																																																																							
190	52	52	52	53	53	53																																																																																																																																																																																																																																																																																																							
195	49	50	50	50	50	51																																																																																																																																																																																																																																																																																																							
200	47	47	47	48	48	48																																																																																																																																																																																																																																																																																																							
210	43	43	43	44	44	44																																																																																																																																																																																																																																																																																																							
220	39	39	39	40	40	40																																																																																																																																																																																																																																																																																																							
230	36	36	36	36	37	37																																																																																																																																																																																																																																																																																																							
240	33	33	33	34	34	34																																																																																																																																																																																																																																																																																																							
250	31	31	31	31	31	31																																																																																																																																																																																																																																																																																																							
260	28	28	29	29	29	29																																																																																																																																																																																																																																																																																																							
270	26	26	26	27	27	27																																																																																																																																																																																																																																																																																																							
280	25	25	25	25	25	25																																																																																																																																																																																																																																																																																																							
290	23	23	23	23	23	23																																																																																																																																																																																																																																																																																																							
300	21	22	22	22	22	22																																																																																																																																																																																																																																																																																																							
310	20	20	20	20	20	20																																																																																																																																																																																																																																																																																																							
320	19	19	19	19	19	19																																																																																																																																																																																																																																																																																																							
330	18	18	18	18	18	18																																																																																																																																																																																																																																																																																																							
340	17	17	17	17	17	17																																																																																																																																																																																																																																																																																																							
350	16	16	16	16	16	16																																																																																																																																																																																																																																																																																																							

⁶² Addition of design strength for S550 and S690 steel for buckling curve b.

Item

Current version

Amendments

63. Table 8.8(c)⁶³

Table 8.8(c) - Design strength p_c of compression members

λ	5) Values of p_c in N/mm ² with $\lambda < 110$ for strut curve c																			
	Steel grade and design strength p_y (N/mm ²)																			
	S275				S355				S460											
	235	245	265	285	275	315	325	335	345	355	400	410	430	440	460					
15	235	245	265	285	275	315	325	335	345	355	368	408	427	436	455					
20	233	242	262	281	271	308	317	326	336	345	387	386	414	424	442					
25	226	235	245	264	263	299	308	317	326	335	375	384	402	410	428					
30	220	228	237	246	255	289	298	307	316	324	363	371	388	396	413					
35	213	221	230	238	247	280	288	296	305	313	349	357	374	382	397					
40	206	214	222	230	238	270	278	285	293	301	335	343	358	365	380					
42	203	211	219	227	235	266	273	281	288	296	329	337	351	358	373					
44	200	208	216	224	231	261	269	276	284	291	323	330	344	351	365					
46	197	205	213	220	228	257	264	271	279	286	317	324	337	344	357					
48	195	202	209	217	224	253	260	267	274	280	311	317	330	337	349					
50	192	199	206	213	220	248	255	262	269	275	304	310	323	329	341					
52	189	196	203	210	217	244	250	257	263	270	297	303	315	321	333					
54	185	193	199	206	213	239	245	252	258	264	291	296	308	313	324					
56	183	189	196	202	209	234	240	246	252	258	284	289	300	305	315					
58	179	186	192	199	205	229	235	241	247	252	277	282	292	297	306					
60	176	183	189	195	201	225	230	236	241	247	270	274	284	289	298					
62	173	179	185	191	197	220	225	230	236	241	262	267	276	280	289					
64	170	176	182	188	193	215	220	225	230	235	265	269	278	282	290					
66	167	173	178	184	189	210	215	220	224	229	248	252	260	264	271					
68	164	169	175	180	185	205	210	214	219	223	241	245	252	256	262					
70	161	166	171	176	181	200	204	209	213	217	234	238	244	248	254					
72	157	163	168	172	177	195	199	203	207	211	227	231	237	240	246					
74	154	159	164	169	173	190	194	198	202	205	220	223	229	232	238					
76	151	156	160	165	169	185	189	193	196	200	214	217	222	225	230					
78	148	152	157	161	165	180	184	187	191	194	207	210	215	217	222					
80	145	149	153	157	161	176	179	182	185	188	201	203	208	210	215					
82	142	146	150	154	157	171	174	177	180	183	195	197	201	203	207					
84	139	142	146	150	154	167	169	172	175	178	189	191	195	197	201					
86	135	139	143	146	150	162	165	168	170	173	183	185	189	190	194					
88	132	136	139	143	146	158	160	163	165	168	177	179	183	184	187					
90	129	133	136	139	142	153	156	158	161	163	172	173	177	178	181					
92	126	130	133	136	139	149	152	154	156	158	166	168	171	173	175					
94	124	127	130	133	135	145	147	149	151	153	161	163	166	167	170					
96	121	124	127	129	132	141	143	145	147	149	156	158	160	162	164					
98	118	121	123	126	129	137	139	141	143	145	151	153	155	157	159					
100	115	118	120	123	125	134	135	137	139	140	147	148	151	152	154					
102	113	115	118	120	122	130	132	133	135	136	143	144	146	147	149					
104	110	112	115	117	119	126	128	130	131	133	138	139	142	142	144					
106	107	110	112	114	116	123	125	126	127	129	134	135	137	138	140					
108	105	107	109	111	113	120	121	123	124	125	130	131	133	134	136					

Note : For other steel grades, refer to Appendix 8.4.

Table 8.8(c) - Design strength p_c of compression members

i) S275 - S460 steel

λ	5) Values of p_c in N/mm ² with $\lambda < 110$ for strut curve c																			
	Steel grade and design strength p_y (N/mm ²)																			
	S275				S355				S460											
	235	245	265	285	275	315	325	335	345	355	400	410	430	440	460					
15	235	245	265	285	275	315	325	335	345	355	368	408	427	436	455					
20	233	242	262	281	271	308	317	326	336	345	387	386	414	424	442					
25	226	235	245	264	263	299	308	317	326	335	375	384	402	410	428					
30	220	228	237	246	255	289	298	307	316	324	363	371	388	396	413					
35	213	221	230	238	247	280	288	296	305	313	349	357	374	382	397					
40	206	214	222	230	238	270	278	285	293	301	335	343	358	365	380					
42	203	211	219	227	235	266	273	281	288	296	329	337	351	358	373					
44	200	208	216	224	231	261	269	276	284	291	323	330	344	351	365					
46	197	205	213	220	228	257	264	271	279	286	317	324	337	344	357					
48	195	202	209	217	224	253	260	267	274	280	311	317	330	337	349					
50	192	199	206	213	220	248	255	262	269	275	304	310	323	329	341					
52	189	196	203	210	217	244	250	257	263	270	297	303	315	321	333					
54	185	193	199	206	213	239	245	252	258	264	291	296	308	313	324					
56	183	189	196	202	209	234	240	246	252	258	284	289	300	305	315					
58	179	186	192	199	205	229	235	241	247	252	277	282	292	297	306					
60	176	183	189	195	201	225	230	236	241	247	270	274	284	289	298					
62	173	179	185	191	197	220	225	230	236	241	262	267	276	280	289					
64	170	176	182	188	193	215	220	225	230	235	265	269	278	282	290					
66	167	173	178	184	189	210	215	220	224	229	248	252	260	264	271					
68	164	169	175	180	185	205	210	214	219	223	241	245	252	256	262					
70	161	166	171	176	181	200	204	209	213	217	234	238	244	248	254					
72	157	163	168	172	177	195	199	203	207	211	227	231	237	240	246					
74	154	159	164	169	173	190	194	198	202	205	220	223	229	232	238					
76	151	156	160	165	169	185	189	193	196	200	214	217	222	225	230					
78	148	152	157	161	165	180	184	187	191	194	207	210	215	217	222					
80	145	149	153	157	161	176	179	182	185	188	201	203	208	210	215					
82	142	146	150	154	157	171	174	177	180	183	195	197	201	203	207					
84	139	142	146	150	154	167	169	172	175	178	189	191	195	197	201					
86	135	139	143	146	150	162	165	168	170	173	183	185	189	190	194					
88	132	136	139	143	146	158	160	163	165	168	177	179	183	184	187					
90	129	133	136	139	142	153	156	158	161	163	172	173	177	178	181					
92	126	130	133	136	139	149	152	154	156	158	166	168	171	173	175					
94	124	127	130	133	135	145	147	149	151	153	161	163	166	167	170					
96	121	124	127	129	132	141	143	145	147	149	156	158	160	162	164					

Item

Current version

Amendments

64. Table 8.8(c)
(cont'd)⁶⁴

Table 8.8(c) - Design strength p_c of compression members

5) Values of p_c in N/mm² with $\lambda < 110$ for strut curve c

λ	Steel grade and design strength p_c (N/mm ²)														
	S275					S355					S460				
	235	245	255	265	275	315	325	335	345	355	400	410	420	440	460
16	235	245	255	265	275	315	325	335	345	355	368	408	427	436	465
20	233	242	252	261	271	308	317	328	336	345	387	396	414	424	442
25	226	235	245	254	263	299	308	317	326	335	375	384	402	410	428
30	220	228	237	246	255	289	298	307	315	324	363	371	388	396	413
35	213	221	230	238	247	280	288	296	305	313	349	357	374	382	397
40	206	214	222	230	238	270	278	285	293	301	335	343	358	365	380
42	203	211	219	227	235	266	273	281	288	296	329	337	351	358	373
44	200	208	216	224	231	261	269	276	284	291	323	330	344	351	365
46	197	205	213	220	228	257	264	271	279	286	317	324	337	344	357
48	195	202	209	217	224	253	260	267	274	280	311	317	330	337	349
50	192	199	206	213	220	248	255	262	268	275	304	310	323	329	341
52	189	196	203	210	217	244	250	257	263	270	297	303	315	321	333
54	186	193	199	206	213	239	245	252	258	264	291	296	308	313	324
56	183	189	196	202	209	234	240	246	252	258	284	289	300	305	315
58	179	186	192	199	205	229	235	241	247	252	277	282	292	297	306
60	176	183	189	195	201	225	230	236	241	247	270	274	284	289	298
62	173	179	185	191	197	220	225	230	236	241	262	267	276	280	289
64	170	176	182	188	193	215	220	225	230	235	255	260	268	272	280
66	167	173	178	184	189	210	215	220	224	229	248	252	260	264	271
68	164	169	175	180	185	205	210	214	219	223	241	245	252	256	262
70	161	166	171	176	181	200	204	209	213	217	234	238	244	248	254
72	157	163	168	172	177	195	199	203	207	211	227	231	237	240	246
74	154	159	164	169	173	190	194	198	202	205	220	223	229	232	238
76	151	156	160	165	169	185	189	193	196	200	214	217	222	225	230
78	148	152	157	161	165	180	184	187	191	194	207	210	215	217	222
80	145	149	153	157	161	176	179	182	185	188	201	203	208	210	215
82	142	146	150	154	157	171	174	177	180	183	195	197	201	203	207
84	139	142	146	150	154	167	169	172	175	178	189	191	195	197	201
86	135	139	143	146	150	162	165	168	170	173	183	185	189	190	194
88	132	136	139	143	146	158	160	163	165	168	177	179	183	184	187
90	129	133	136	139	142	153	156	158	161	163	172	173	177	178	181
92	126	130	133	136	139	149	152	154	156	158	166	168	171	173	175
94	124	127	130	133	135	145	147	149	151	153	161	163	166	167	170
96	121	124	127	129	132	141	143	145	147	149	156	158	160	162	164
98	118	121	123	125	129	137	139	141	143	145	151	153	155	157	159
100	115	118	120	123	125	134	135	137	139	140	147	148	151	152	154
102	113	115	118	120	122	130	132	133	135	136	143	144	146	147	149
104	110	112	115	117	119	126	128	130	131	133	138	139	142	142	144
106	107	110	112	114	116	123	125	126	127	129	134	135	137	138	140
108	105	107	109	111	113	120	121	123	124	125	130	131	133	134	136

Note : For other steel grades, refer to Appendix 8.4.

Table 8.8(c) - Design strength p_c of compression members (cont'd)

ii) S275 ~ S460 steel (cont'd)

6) Values of p_c in N/mm² with $\lambda \geq 110$ for strut curve c

λ	Steel grade and design strength p_c (N/mm ²)														
	S275					S355					S460				
	235	245	255	265	275	315	325	335	345	355	400	410	420	440	460
110	102	104	106	108	110	115	116	119	120	122	126	127	129	130	132
112	100	102	104	106	107	113	115	118	117	118	123	124	125	126	128
114	98	100	101	103	105	110	112	113	114	115	119	120	122	123	124
116	95	97	99	101	102	108	109	110	111	112	116	117	118	119	120
118	93	95	97	98	100	105	106	107	108	109	113	114	115	116	117
120	91	93	94	96	97	102	103	104	105	106	110	110	112	112	113
122	89	90	92	93	95	99	100	101	102	103	107	107	109	109	110
124	87	88	90	91	92	97	98	99	100	100	104	104	106	106	107
126	85	86	88	89	90	94	95	96	97	98	101	102	103	103	104
128	83	84	86	87	88	92	93	94	95	95	98	99	100	100	101
130	81	82	84	85	86	90	91	91	92	93	96	96	97	98	99
135	77	78	79	80	81	84	85	86	87	87	90	90	91	92	92
140	72	74	75	76	78	79	80	81	81	82	84	85	85	86	87
145	69	70	71	71	72	75	76	76	77	77	79	80	80	81	81
150	65	66	67	68	68	71	71	72	72	73	75	75	76	76	76
155	62	63	63	64	65	67	67	68	68	69	70	71	71	72	72
160	59	59	60	61	61	63	64	64	65	65	66	67	67	67	68
165	56	56	57	58	58	60	60	61	61	61	63	63	64	64	64
170	53	54	54	55	55	57	57	58	58	58	60	60	60	60	61
175	51	51	52	52	53	54	54	55	55	55	56	57	57	57	58
180	48	49	49	50	50	51	52	52	52	53	54	54	54	54	55
185	46	46	47	47	48	49	49	49	50	50	51	51	52	52	52
190	44	44	45	45	45	47	47	47	47	48	49	49	49	49	49
195	42	42	43	43	43	44	44	44	44	45	46	46	46	46	46
200	40	41	41	41	42	43	43	43	43	43	44	44	44	45	45
210	37	37	38	38	38	39	39	39	39	40	40	40	41	41	41
220	34	34	35	35	35	36	36	36	36	36	37	37	37	37	38
230	31	32	32	32	32	33	33	33	33	33	34	34	34	34	35
240	29	29	30	30	30	30	30	31	31	31	31	31	31	32	32
250	27	27	27	28	28	28	28	28	28	28	29	29	29	29	29
260	25	25	26	26	26	26	26	26	26	26	27	27	27	27	27
270	23	24	24	24	24	24	24	24	24	24	25	25	25	25	25
280	22	22	22	22	22	22	23	23	23	23	23	23	23	24	24
290	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
300	19	19	20	20	20	20	20	20	20	20	20	20	20	20	20
310	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
320	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
330	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
340	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
350	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15

Note : For other steel grades, refer to Appendix 8.4.

⁶⁴ Addition of relevant steel grade S275 ~ S460 as subtitle of Table 8.8(c) (Cont'd) for buckling curve c.

Item	Current version	Amendments																																																																																																																																																																																																																																																																																																											
65. Table 8.8(c) (cont'd) ⁶⁵		<p style="text-align: center;">Table 8.8(c) - Design strength p_c of compression members</p> <p style="text-align: center;">ii) S550 ~ S690 steel</p> <p style="text-align: center;">5) Values of p_c in N/mm² with $\lambda < 110$ for strut curve c</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="3">λ</th> <th colspan="6">Steel grade and design strength p_c (N/mm²)</th> </tr> <tr> <th colspan="3">S550</th> <th colspan="3">S690</th> </tr> <tr> <th>490</th> <th>530</th> <th>550</th> <th>630</th> <th>650</th> <th>690</th> </tr> </thead> <tbody> <tr><td>15</td><td>484</td><td>522</td><td>541</td><td>617</td><td>636</td><td>673</td></tr> <tr><td>20</td><td>470</td><td>506</td><td>525</td><td>608</td><td>616</td><td>652</td></tr> <tr><td>25</td><td>455</td><td>490</td><td>507</td><td>577</td><td>595</td><td>629</td></tr> <tr><td>30</td><td>439</td><td>472</td><td>489</td><td>554</td><td>571</td><td>603</td></tr> <tr><td>35</td><td>421</td><td>452</td><td>468</td><td>529</td><td>544</td><td>573</td></tr> <tr><td>40</td><td>402</td><td>431</td><td>445</td><td>500</td><td>513</td><td>539</td></tr> <tr><td>42</td><td>394</td><td>421</td><td>435</td><td>487</td><td>500</td><td>524</td></tr> <tr><td>44</td><td>385</td><td>412</td><td>425</td><td>474</td><td>486</td><td>509</td></tr> <tr><td>46</td><td>377</td><td>402</td><td>414</td><td>461</td><td>472</td><td>493</td></tr> <tr><td>48</td><td>368</td><td>392</td><td>403</td><td>447</td><td>457</td><td>477</td></tr> <tr><td>50</td><td>359</td><td>381</td><td>392</td><td>432</td><td>442</td><td>460</td></tr> <tr><td>52</td><td>349</td><td>370</td><td>380</td><td>418</td><td>427</td><td>443</td></tr> <tr><td>54</td><td>340</td><td>359</td><td>369</td><td>404</td><td>412</td><td>427</td></tr> <tr><td>56</td><td>330</td><td>348</td><td>357</td><td>389</td><td>398</td><td>410</td></tr> <tr><td>58</td><td>320</td><td>337</td><td>345</td><td>375</td><td>381</td><td>394</td></tr> <tr><td>60</td><td>310</td><td>326</td><td>334</td><td>361</td><td>367</td><td>378</td></tr> <tr><td>62</td><td>301</td><td>315</td><td>322</td><td>347</td><td>352</td><td>362</td></tr> <tr><td>64</td><td>291</td><td>305</td><td>311</td><td>333</td><td>338</td><td>347</td></tr> <tr><td>66</td><td>281</td><td>294</td><td>300</td><td>320</td><td>325</td><td>333</td></tr> <tr><td>68</td><td>272</td><td>284</td><td>289</td><td>308</td><td>312</td><td>319</td></tr> <tr><td>70</td><td>263</td><td>273</td><td>278</td><td>295</td><td>299</td><td>306</td></tr> <tr><td>72</td><td>254</td><td>264</td><td>268</td><td>284</td><td>287</td><td>293</td></tr> <tr><td>74</td><td>245</td><td>254</td><td>258</td><td>272</td><td>276</td><td>281</td></tr> <tr><td>76</td><td>237</td><td>245</td><td>249</td><td>262</td><td>265</td><td>270</td></tr> <tr><td>78</td><td>228</td><td>236</td><td>240</td><td>252</td><td>254</td><td>259</td></tr> <tr><td>80</td><td>221</td><td>228</td><td>231</td><td>242</td><td>244</td><td>248</td></tr> <tr><td>82</td><td>213</td><td>219</td><td>222</td><td>232</td><td>235</td><td>239</td></tr> <tr><td>84</td><td>206</td><td>212</td><td>214</td><td>224</td><td>226</td><td>229</td></tr> <tr><td>86</td><td>199</td><td>204</td><td>207</td><td>215</td><td>217</td><td>220</td></tr> <tr><td>88</td><td>192</td><td>197</td><td>199</td><td>207</td><td>209</td><td>212</td></tr> <tr><td>90</td><td>185</td><td>190</td><td>192</td><td>200</td><td>201</td><td>204</td></tr> <tr><td>92</td><td>179</td><td>184</td><td>186</td><td>192</td><td>194</td><td>197</td></tr> <tr><td>94</td><td>173</td><td>177</td><td>179</td><td>186</td><td>187</td><td>189</td></tr> <tr><td>96</td><td>167</td><td>171</td><td>173</td><td>179</td><td>180</td><td>183</td></tr> <tr><td>98</td><td>162</td><td>166</td><td>167</td><td>173</td><td>174</td><td>176</td></tr> <tr><td>100</td><td>157</td><td>160</td><td>162</td><td>167</td><td>168</td><td>170</td></tr> <tr><td>102</td><td>152</td><td>155</td><td>156</td><td>161</td><td>162</td><td>164</td></tr> <tr><td>104</td><td>147</td><td>150</td><td>151</td><td>156</td><td>157</td><td>158</td></tr> <tr><td>106</td><td>142</td><td>145</td><td>146</td><td>151</td><td>152</td><td>153</td></tr> <tr><td>108</td><td>138</td><td>141</td><td>142</td><td>146</td><td>147</td><td>148</td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades, refer to Appendix 8.4.</p>	λ	Steel grade and design strength p_c (N/mm ²)						S550			S690			490	530	550	630	650	690	15	484	522	541	617	636	673	20	470	506	525	608	616	652	25	455	490	507	577	595	629	30	439	472	489	554	571	603	35	421	452	468	529	544	573	40	402	431	445	500	513	539	42	394	421	435	487	500	524	44	385	412	425	474	486	509	46	377	402	414	461	472	493	48	368	392	403	447	457	477	50	359	381	392	432	442	460	52	349	370	380	418	427	443	54	340	359	369	404	412	427	56	330	348	357	389	398	410	58	320	337	345	375	381	394	60	310	326	334	361	367	378	62	301	315	322	347	352	362	64	291	305	311	333	338	347	66	281	294	300	320	325	333	68	272	284	289	308	312	319	70	263	273	278	295	299	306	72	254	264	268	284	287	293	74	245	254	258	272	276	281	76	237	245	249	262	265	270	78	228	236	240	252	254	259	80	221	228	231	242	244	248	82	213	219	222	232	235	239	84	206	212	214	224	226	229	86	199	204	207	215	217	220	88	192	197	199	207	209	212	90	185	190	192	200	201	204	92	179	184	186	192	194	197	94	173	177	179	186	187	189	96	167	171	173	179	180	183	98	162	166	167	173	174	176	100	157	160	162	167	168	170	102	152	155	156	161	162	164	104	147	150	151	156	157	158	106	142	145	146	151	152	153	108	138	141	142	146	147	148
λ	Steel grade and design strength p_c (N/mm ²)																																																																																																																																																																																																																																																																																																												
	S550			S690																																																																																																																																																																																																																																																																																																									
	490	530	550	630	650	690																																																																																																																																																																																																																																																																																																							
15	484	522	541	617	636	673																																																																																																																																																																																																																																																																																																							
20	470	506	525	608	616	652																																																																																																																																																																																																																																																																																																							
25	455	490	507	577	595	629																																																																																																																																																																																																																																																																																																							
30	439	472	489	554	571	603																																																																																																																																																																																																																																																																																																							
35	421	452	468	529	544	573																																																																																																																																																																																																																																																																																																							
40	402	431	445	500	513	539																																																																																																																																																																																																																																																																																																							
42	394	421	435	487	500	524																																																																																																																																																																																																																																																																																																							
44	385	412	425	474	486	509																																																																																																																																																																																																																																																																																																							
46	377	402	414	461	472	493																																																																																																																																																																																																																																																																																																							
48	368	392	403	447	457	477																																																																																																																																																																																																																																																																																																							
50	359	381	392	432	442	460																																																																																																																																																																																																																																																																																																							
52	349	370	380	418	427	443																																																																																																																																																																																																																																																																																																							
54	340	359	369	404	412	427																																																																																																																																																																																																																																																																																																							
56	330	348	357	389	398	410																																																																																																																																																																																																																																																																																																							
58	320	337	345	375	381	394																																																																																																																																																																																																																																																																																																							
60	310	326	334	361	367	378																																																																																																																																																																																																																																																																																																							
62	301	315	322	347	352	362																																																																																																																																																																																																																																																																																																							
64	291	305	311	333	338	347																																																																																																																																																																																																																																																																																																							
66	281	294	300	320	325	333																																																																																																																																																																																																																																																																																																							
68	272	284	289	308	312	319																																																																																																																																																																																																																																																																																																							
70	263	273	278	295	299	306																																																																																																																																																																																																																																																																																																							
72	254	264	268	284	287	293																																																																																																																																																																																																																																																																																																							
74	245	254	258	272	276	281																																																																																																																																																																																																																																																																																																							
76	237	245	249	262	265	270																																																																																																																																																																																																																																																																																																							
78	228	236	240	252	254	259																																																																																																																																																																																																																																																																																																							
80	221	228	231	242	244	248																																																																																																																																																																																																																																																																																																							
82	213	219	222	232	235	239																																																																																																																																																																																																																																																																																																							
84	206	212	214	224	226	229																																																																																																																																																																																																																																																																																																							
86	199	204	207	215	217	220																																																																																																																																																																																																																																																																																																							
88	192	197	199	207	209	212																																																																																																																																																																																																																																																																																																							
90	185	190	192	200	201	204																																																																																																																																																																																																																																																																																																							
92	179	184	186	192	194	197																																																																																																																																																																																																																																																																																																							
94	173	177	179	186	187	189																																																																																																																																																																																																																																																																																																							
96	167	171	173	179	180	183																																																																																																																																																																																																																																																																																																							
98	162	166	167	173	174	176																																																																																																																																																																																																																																																																																																							
100	157	160	162	167	168	170																																																																																																																																																																																																																																																																																																							
102	152	155	156	161	162	164																																																																																																																																																																																																																																																																																																							
104	147	150	151	156	157	158																																																																																																																																																																																																																																																																																																							
106	142	145	146	151	152	153																																																																																																																																																																																																																																																																																																							
108	138	141	142	146	147	148																																																																																																																																																																																																																																																																																																							

⁶⁵ Addition of design strength for S550 and S690 steel for buckling curve c.

Item	Current version	Amendments																																																																																																																																																																																																																																																																																																																			
66. Table 8.8(c) (cont'd) ⁶⁶		<p style="text-align: center;">Table 8.8(c) - Design strength p_c of compression members (cont'd)</p> <p style="text-align: center;">ii) S550 ~ S690 steel (cont'd)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="7" style="text-align: center;">5) Values of p_c in N/mm² with $\lambda \geq 110$ for strut curve c</th> </tr> <tr> <th colspan="7" style="text-align: center;">Steel grade and design strength p_c (N/mm²)</th> </tr> <tr> <th rowspan="2" style="text-align: center;">λ</th> <th colspan="3" style="text-align: center;">S550</th> <th colspan="3" style="text-align: center;">S690</th> </tr> <tr> <th style="text-align: center;">490</th> <th style="text-align: center;">530</th> <th style="text-align: center;">550</th> <th style="text-align: center;">630</th> <th style="text-align: center;">650</th> <th style="text-align: center;">690</th> </tr> </thead> <tbody> <tr><td>110</td><td>134</td><td>136</td><td>137</td><td>141</td><td>142</td><td>143</td></tr> <tr><td>112</td><td>130</td><td>132</td><td>133</td><td>137</td><td>137</td><td>139</td></tr> <tr><td>114</td><td>126</td><td>128</td><td>129</td><td>132</td><td>133</td><td>134</td></tr> <tr><td>116</td><td>122</td><td>124</td><td>125</td><td>128</td><td>129</td><td>130</td></tr> <tr><td>118</td><td>119</td><td>120</td><td>121</td><td>124</td><td>125</td><td>126</td></tr> <tr><td>120</td><td>115</td><td>117</td><td>118</td><td>121</td><td>121</td><td>122</td></tr> <tr><td>122</td><td>112</td><td>114</td><td>114</td><td>117</td><td>118</td><td>119</td></tr> <tr><td>124</td><td>109</td><td>110</td><td>111</td><td>114</td><td>114</td><td>115</td></tr> <tr><td>126</td><td>106</td><td>107</td><td>108</td><td>110</td><td>111</td><td>112</td></tr> <tr><td>128</td><td>103</td><td>104</td><td>105</td><td>107</td><td>108</td><td>109</td></tr> <tr><td>130</td><td>100</td><td>101</td><td>102</td><td>104</td><td>105</td><td>106</td></tr> <tr><td>135</td><td>93</td><td>95</td><td>95</td><td>97</td><td>98</td><td>98</td></tr> <tr><td>140</td><td>88</td><td>89</td><td>89</td><td>91</td><td>91</td><td>92</td></tr> <tr><td>145</td><td>82</td><td>83</td><td>84</td><td>85</td><td>86</td><td>86</td></tr> <tr><td>150</td><td>77</td><td>78</td><td>79</td><td>80</td><td>80</td><td>81</td></tr> <tr><td>155</td><td>73</td><td>74</td><td>74</td><td>75</td><td>75</td><td>76</td></tr> <tr><td>160</td><td>69</td><td>69</td><td>70</td><td>71</td><td>71</td><td>72</td></tr> <tr><td>165</td><td>65</td><td>66</td><td>66</td><td>67</td><td>67</td><td>67</td></tr> <tr><td>170</td><td>61</td><td>62</td><td>62</td><td>63</td><td>63</td><td>64</td></tr> <tr><td>175</td><td>58</td><td>59</td><td>59</td><td>60</td><td>60</td><td>60</td></tr> <tr><td>180</td><td>55</td><td>56</td><td>56</td><td>57</td><td>57</td><td>57</td></tr> <tr><td>185</td><td>52</td><td>53</td><td>53</td><td>54</td><td>54</td><td>54</td></tr> <tr><td>190</td><td>50</td><td>50</td><td>51</td><td>51</td><td>51</td><td>52</td></tr> <tr><td>195</td><td>47</td><td>48</td><td>48</td><td>49</td><td>49</td><td>49</td></tr> <tr><td>200</td><td>45</td><td>46</td><td>46</td><td>46</td><td>47</td><td>47</td></tr> <tr><td>210</td><td>41</td><td>42</td><td>42</td><td>42</td><td>42</td><td>43</td></tr> <tr><td>220</td><td>38</td><td>38</td><td>38</td><td>39</td><td>39</td><td>39</td></tr> <tr><td>230</td><td>35</td><td>35</td><td>35</td><td>36</td><td>36</td><td>36</td></tr> <tr><td>240</td><td>32</td><td>32</td><td>32</td><td>33</td><td>33</td><td>33</td></tr> <tr><td>250</td><td>30</td><td>30</td><td>30</td><td>30</td><td>30</td><td>30</td></tr> <tr><td>260</td><td>28</td><td>28</td><td>28</td><td>28</td><td>28</td><td>28</td></tr> <tr><td>270</td><td>26</td><td>26</td><td>26</td><td>26</td><td>26</td><td>26</td></tr> <tr><td>280</td><td>24</td><td>24</td><td>24</td><td>24</td><td>24</td><td>24</td></tr> <tr><td>290</td><td>22</td><td>22</td><td>22</td><td>23</td><td>23</td><td>23</td></tr> <tr><td>300</td><td>21</td><td>21</td><td>21</td><td>21</td><td>21</td><td>21</td></tr> <tr><td>310</td><td>20</td><td>20</td><td>20</td><td>20</td><td>20</td><td>20</td></tr> <tr><td>320</td><td>18</td><td>19</td><td>19</td><td>19</td><td>19</td><td>19</td></tr> <tr><td>330</td><td>17</td><td>17</td><td>18</td><td>18</td><td>18</td><td>18</td></tr> <tr><td>340</td><td>16</td><td>16</td><td>17</td><td>17</td><td>17</td><td>17</td></tr> <tr><td>350</td><td>16</td><td>16</td><td>16</td><td>16</td><td>16</td><td>16</td></tr> </tbody> </table> <p style="text-align: center;">Note: For other steel grades, refer to Appendix 8.4.</p>	5) Values of p_c in N/mm ² with $\lambda \geq 110$ for strut curve c							Steel grade and design strength p_c (N/mm ²)							λ	S550			S690			490	530	550	630	650	690	110	134	136	137	141	142	143	112	130	132	133	137	137	139	114	126	128	129	132	133	134	116	122	124	125	128	129	130	118	119	120	121	124	125	126	120	115	117	118	121	121	122	122	112	114	114	117	118	119	124	109	110	111	114	114	115	126	106	107	108	110	111	112	128	103	104	105	107	108	109	130	100	101	102	104	105	106	135	93	95	95	97	98	98	140	88	89	89	91	91	92	145	82	83	84	85	86	86	150	77	78	79	80	80	81	155	73	74	74	75	75	76	160	69	69	70	71	71	72	165	65	66	66	67	67	67	170	61	62	62	63	63	64	175	58	59	59	60	60	60	180	55	56	56	57	57	57	185	52	53	53	54	54	54	190	50	50	51	51	51	52	195	47	48	48	49	49	49	200	45	46	46	46	47	47	210	41	42	42	42	42	43	220	38	38	38	39	39	39	230	35	35	35	36	36	36	240	32	32	32	33	33	33	250	30	30	30	30	30	30	260	28	28	28	28	28	28	270	26	26	26	26	26	26	280	24	24	24	24	24	24	290	22	22	22	23	23	23	300	21	21	21	21	21	21	310	20	20	20	20	20	20	320	18	19	19	19	19	19	330	17	17	18	18	18	18	340	16	16	17	17	17	17	350	16	16	16	16	16	16
5) Values of p_c in N/mm ² with $\lambda \geq 110$ for strut curve c																																																																																																																																																																																																																																																																																																																					
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	490	530	550	630	650	690																																																																																																																																																																																																																																																																																																															
110	134	136	137	141	142	143																																																																																																																																																																																																																																																																																																															
112	130	132	133	137	137	139																																																																																																																																																																																																																																																																																																															
114	126	128	129	132	133	134																																																																																																																																																																																																																																																																																																															
116	122	124	125	128	129	130																																																																																																																																																																																																																																																																																																															
118	119	120	121	124	125	126																																																																																																																																																																																																																																																																																																															
120	115	117	118	121	121	122																																																																																																																																																																																																																																																																																																															
122	112	114	114	117	118	119																																																																																																																																																																																																																																																																																																															
124	109	110	111	114	114	115																																																																																																																																																																																																																																																																																																															
126	106	107	108	110	111	112																																																																																																																																																																																																																																																																																																															
128	103	104	105	107	108	109																																																																																																																																																																																																																																																																																																															
130	100	101	102	104	105	106																																																																																																																																																																																																																																																																																																															
135	93	95	95	97	98	98																																																																																																																																																																																																																																																																																																															
140	88	89	89	91	91	92																																																																																																																																																																																																																																																																																																															
145	82	83	84	85	86	86																																																																																																																																																																																																																																																																																																															
150	77	78	79	80	80	81																																																																																																																																																																																																																																																																																																															
155	73	74	74	75	75	76																																																																																																																																																																																																																																																																																																															
160	69	69	70	71	71	72																																																																																																																																																																																																																																																																																																															
165	65	66	66	67	67	67																																																																																																																																																																																																																																																																																																															
170	61	62	62	63	63	64																																																																																																																																																																																																																																																																																																															
175	58	59	59	60	60	60																																																																																																																																																																																																																																																																																																															
180	55	56	56	57	57	57																																																																																																																																																																																																																																																																																																															
185	52	53	53	54	54	54																																																																																																																																																																																																																																																																																																															
190	50	50	51	51	51	52																																																																																																																																																																																																																																																																																																															
195	47	48	48	49	49	49																																																																																																																																																																																																																																																																																																															
200	45	46	46	46	47	47																																																																																																																																																																																																																																																																																																															
210	41	42	42	42	42	43																																																																																																																																																																																																																																																																																																															
220	38	38	38	39	39	39																																																																																																																																																																																																																																																																																																															
230	35	35	35	36	36	36																																																																																																																																																																																																																																																																																																															
240	32	32	32	33	33	33																																																																																																																																																																																																																																																																																																															
250	30	30	30	30	30	30																																																																																																																																																																																																																																																																																																															
260	28	28	28	28	28	28																																																																																																																																																																																																																																																																																																															
270	26	26	26	26	26	26																																																																																																																																																																																																																																																																																																															
280	24	24	24	24	24	24																																																																																																																																																																																																																																																																																																															
290	22	22	22	23	23	23																																																																																																																																																																																																																																																																																																															
300	21	21	21	21	21	21																																																																																																																																																																																																																																																																																																															
310	20	20	20	20	20	20																																																																																																																																																																																																																																																																																																															
320	18	19	19	19	19	19																																																																																																																																																																																																																																																																																																															
330	17	17	18	18	18	18																																																																																																																																																																																																																																																																																																															
340	16	16	17	17	17	17																																																																																																																																																																																																																																																																																																															
350	16	16	16	16	16	16																																																																																																																																																																																																																																																																																																															

⁶⁶ Addition of design strength for S550 and S690 steel for buckling curve c.

Item

Current version

Amendments

67. Table 8.8(d)⁶⁷

Table 8.8(d) - Design strength p_c of compression members

7) Values of p_c in N/mm² with $\lambda < 110$ for strut curve d
Steel grade and design strength p_c (N/mm²)

λ	S275					S355					S460				
	235	245	255	265	275	315	325	335	345	355	400	410	430	440	460
16	235	245	255	265	275	315	325	335	345	355	397	407	425	435	463
20	232	241	250	259	269	305	314	323	332	341	381	390	408	417	434
25	223	231	240	249	257	292	301	309	318	326	365	373	380	388	415
30	213	222	230	238	247	279	287	295	304	312	348	356	372	380	396
35	204	212	220	228	236	267	274	282	290	297	331	339	353	361	375
40	195	203	210	218	225	254	261	268	275	283	314	321	334	341	355
42	192	199	206	214	221	249	256	263	270	277	307	314	327	333	346
44	188	195	202	209	216	244	251	257	264	271	300	306	319	325	337
46	185	192	199	205	212	239	245	252	258	265	293	299	311	317	329
48	181	188	195	201	208	234	240	246	252	259	286	291	303	309	320
50	178	184	191	197	204	228	235	241	247	253	278	284	295	301	311
52	174	181	187	193	199	223	229	235	241	246	271	277	287	292	303
54	171	177	183	189	195	218	224	229	235	240	264	269	279	284	294
56	167	173	179	185	191	213	219	224	229	234	257	262	271	276	285
58	164	170	175	181	187	208	213	218	224	229	250	255	264	268	277
60	161	166	172	177	182	203	208	213	218	223	243	247	256	260	268
62	157	163	168	173	178	198	203	208	212	217	236	240	248	252	260
64	154	159	164	169	174	193	198	202	207	211	229	233	241	245	252
66	150	156	160	165	170	188	193	197	201	205	223	226	234	237	244
68	147	152	157	162	166	184	188	192	196	200	216	220	226	230	236
70	144	149	153	158	162	179	183	187	190	194	210	213	219	222	228
72	141	145	150	154	158	174	178	182	185	189	203	207	213	215	221
74	138	142	146	150	154	170	173	177	180	183	197	200	206	209	214
76	135	139	143	147	151	165	169	172	175	178	191	194	199	202	207
78	132	136	139	143	147	161	164	167	170	173	186	188	193	195	200
80	129	132	136	140	143	156	160	163	165	168	180	182	187	189	194
82	126	129	133	136	140	152	155	158	161	163	175	177	181	183	187
84	123	126	130	133	136	148	151	154	156	159	169	171	176	177	181
86	120	123	127	130	133	144	147	149	152	154	164	166	170	172	175
88	117	120	123	127	129	140	143	145	148	150	159	161	165	167	170
90	114	118	121	123	126	137	139	141	144	146	154	156	160	161	164
92	112	115	118	120	123	133	135	137	139	142	150	152	155	156	159
94	109	112	115	117	120	129	132	134	136	138	145	147	150	152	154
96	107	109	112	115	117	126	128	130	132	134	141	143	146	147	150
98	104	107	109	112	114	123	125	126	128	130	137	138	141	143	145
100	102	104	107	109	111	119	121	123	125	126	133	134	137	138	141
102	99	102	104	106	108	116	118	120	121	123	129	131	133	134	136
104	97	99	102	104	106	113	115	116	118	120	126	127	129	130	132
106	95	97	99	101	103	110	112	113	115	116	122	123	125	126	128
108	93	95	97	99	101	107	109	110	112	113	119	120	122	123	125

Note : For other steel grades, refer to Appendix 8.4.

Table 8.8(d) - Design strength p_c of compression members

ii) S275 ~ S460 steel

7) Values of p_c in N/mm² with $\lambda < 110$ for strut curve d
Steel grade and design strength p_c (N/mm²)

λ	S275					S355					S460				
	235	245	255	265	275	315	325	335	345	355	400	410	430	440	460
16	235	245	255	265	275	315	325	335	345	355	397	407	425	435	463
20	232	241	250	259	269	305	314	323	332	341	381	390	408	417	434
25	223	231	240	249	257	292	301	309	318	326	365	373	380	388	415
30	213	222	230	238	247	279	287	295	304	312	348	356	372	380	396
35	204	212	220	228	236	267	274	282	290	297	331	339	353	361	375
40	195	203	210	218	225	254	261	268	275	283	314	321	334	341	355
42	192	199	206	214	221	249	256	263	270	277	307	314	327	333	346
44	188	195	202	209	216	244	251	257	264	271	300	306	319	325	337
46	185	192	199	205	212	239	245	252	258	265	293	299	311	317	329
48	181	188	195	201	208	234	240	246	252	259	286	291	303	309	320
50	178	184	191	197	204	228	235	241	247	253	278	284	295	301	311
52	174	181	187	193	199	223	229	235	241	246	271	277	287	292	303
54	171	177	183	189	195	218	224	229	235	240	264	269	279	284	294
56	167	173	179	185	191	213	219	224	229	234	257	262	271	276	285
58	164	170	175	181	187	208	213	218	224	229	250	255	264	268	277
60	161	166	172	177	182	203	208	213	218	223	243	247	256	260	268
62	157	163	168	173	178	198	203	208	212	217	236	240	248	252	260
64	154	159	164	169	174	193	198	202	207	211	229	233	241	245	252
66	150	156	160	165	170	188	193	197	201	205	223	226	234	237	244
68	147	152	157	162	166	184	188	192	196	200	216	220	226	230	236
70	144	149	153	158	162	179	183	187	190	194	210	213	219	222	228
72	141	145	150	154	158	174	178	182	185	189	203	207	213	215	221
74	138	142	146	150	154	170	173	177	180	183	197	200	206	209	214
76	135	139	143	147	151	165	169	172	175	178	191	194	199	202	207
78	132	136	139	143	147	161	164	167	170	173	186	188	193	195	200
80	129	132	136	140	143	156	160	163	165	168	180	182	187	189	194
82	126	129	133	136	140	152	155	158	161	163	175	177	181	183	187
84	123	126	130	133	136	148	151	154	156	159	169	171	176	177	181
86	120	123	127	130	133	144	147	149	152	154	164	166	170	172	175
88	117	120	123	127	129	140	143	145	148	150	159	161	165	167	170
90	114	118	121	123	126	137	139	141	144	146	154	156	160	161	164
92	112	115	118	120	123	133	135	137	139	142	150	152	155	156	159
94	109	112	115	117	120	129	132	134	136	138	145	147	150	152	154
96	107	109	112	115	117	126	128	130	132	134	141	143	146	147	150
98	104	107	109	112	114	123	125	126	128	130	137	138	141	143	145
100	102	104	107	109	111	119	121	123	125	126	133	134	137	138	141
102	99	102	104	106	108	116	118	120	121	123	129	131	133	134	136
104	97	99	102	104	106	113	115	116	118	120	126	127	129	130	132
106	95	97	99	101	103	110	112	113	115	116	122	123	125	126	128
108	93	95	97	99	101	107	109	110	112	113	119	120	122	123	125

Note : For other steel grades, refer to Appendix 8.4.

⁶⁷ Addition of relevant steel grade S275 ~ S460 as subtitle of Table 8.8(d) for buckling curve d.

Item	Current version	Amendments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
68. Table 8.8(d) (cont) ⁶⁸	<p style="text-align: center;">Table 8.8(d) - Design strength p_c of compression members (cont'd)</p> <p style="text-align: center;">8) Values of p_c in N/mm² with $\lambda \geq 110$ for strut curve d</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="3">λ</th> <th colspan="16">Steel grade and design strength p_r (N/mm²)</th> </tr> <tr> <th colspan="4">S275</th> <th colspan="4">S355</th> <th colspan="4">S460</th> <th colspan="4"></th> </tr> <tr> <th>235</th><th>245</th><th>255</th><th>275</th> <th>315</th><th>325</th><th>335</th><th>345</th><th>355</th> <th>400</th><th>410</th><th>430</th><th>440</th><th>460</th> <th></th><th></th><th></th><th></th> </tr> </thead> <tbody> <tr><td>110</td><td>91</td><td>93</td><td>95</td><td>98</td><td>105</td><td>105</td><td>108</td><td>109</td><td>110</td><td>115</td><td>116</td><td>118</td><td>119</td><td>121</td><td></td><td></td><td></td><td></td></tr> <tr><td>112</td><td>88</td><td>90</td><td>92</td><td>94</td><td>102</td><td>103</td><td>105</td><td>106</td><td>107</td><td>112</td><td>113</td><td>115</td><td>116</td><td>118</td><td></td><td></td><td></td><td></td></tr> <tr><td>114</td><td>86</td><td>88</td><td>90</td><td>92</td><td>94</td><td>99</td><td>101</td><td>102</td><td>103</td><td>104</td><td>109</td><td>110</td><td>112</td><td>113</td><td>114</td><td></td><td></td><td></td></tr> <tr><td>116</td><td>85</td><td>86</td><td>88</td><td>90</td><td>91</td><td>97</td><td>98</td><td>99</td><td>101</td><td>102</td><td>106</td><td>107</td><td>109</td><td>110</td><td>111</td><td></td><td></td><td></td></tr> <tr><td>118</td><td>83</td><td>84</td><td>86</td><td>88</td><td>89</td><td>95</td><td>96</td><td>97</td><td>98</td><td>99</td><td>103</td><td>104</td><td>106</td><td>107</td><td>108</td><td></td><td></td><td></td></tr> <tr><td>120</td><td>81</td><td>82</td><td>84</td><td>86</td><td>87</td><td>92</td><td>93</td><td>94</td><td>95</td><td>96</td><td>101</td><td>101</td><td>103</td><td>104</td><td>105</td><td></td><td></td><td></td></tr> <tr><td>122</td><td>79</td><td>81</td><td>82</td><td>84</td><td>85</td><td>90</td><td>91</td><td>92</td><td>93</td><td>94</td><td>98</td><td>99</td><td>100</td><td>101</td><td>102</td><td></td><td></td><td></td></tr> <tr><td>124</td><td>77</td><td>79</td><td>80</td><td>82</td><td>83</td><td>88</td><td>89</td><td>90</td><td>91</td><td>92</td><td>95</td><td>96</td><td>98</td><td>98</td><td>99</td><td></td><td></td><td></td></tr> <tr><td>126</td><td>76</td><td>77</td><td>78</td><td>80</td><td>81</td><td>86</td><td>87</td><td>88</td><td>89</td><td>89</td><td>93</td><td>94</td><td>95</td><td>96</td><td>97</td><td></td><td></td><td></td></tr> <tr><td>128</td><td>74</td><td>75</td><td>77</td><td>78</td><td>79</td><td>84</td><td>85</td><td>85</td><td>86</td><td>87</td><td>91</td><td>91</td><td>93</td><td>93</td><td>94</td><td></td><td></td><td></td></tr> <tr><td>130</td><td>72</td><td>74</td><td>75</td><td>76</td><td>77</td><td>82</td><td>83</td><td>83</td><td>84</td><td>85</td><td>88</td><td>89</td><td>90</td><td>91</td><td>92</td><td></td><td></td><td></td></tr> <tr><td>135</td><td>68</td><td>70</td><td>71</td><td>72</td><td>73</td><td>77</td><td>78</td><td>79</td><td>79</td><td>80</td><td>83</td><td>84</td><td>85</td><td>85</td><td>86</td><td></td><td></td><td></td></tr> <tr><td>140</td><td>65</td><td>66</td><td>67</td><td>68</td><td>69</td><td>73</td><td>73</td><td>74</td><td>75</td><td>75</td><td>78</td><td>79</td><td>80</td><td>80</td><td>81</td><td></td><td></td><td></td></tr> <tr><td>145</td><td>62</td><td>63</td><td>64</td><td>65</td><td>65</td><td>69</td><td>69</td><td>70</td><td>71</td><td>71</td><td>74</td><td>74</td><td>75</td><td>75</td><td>76</td><td></td><td></td><td></td></tr> <tr><td>150</td><td>59</td><td>60</td><td>60</td><td>61</td><td>62</td><td>65</td><td>66</td><td>66</td><td>67</td><td>67</td><td>69</td><td>70</td><td>71</td><td>71</td><td>72</td><td></td><td></td><td></td></tr> <tr><td>155</td><td>56</td><td>57</td><td>57</td><td>58</td><td>59</td><td>62</td><td>62</td><td>63</td><td>63</td><td>64</td><td>66</td><td>66</td><td>67</td><td>67</td><td>68</td><td></td><td></td><td></td></tr> <tr><td>160</td><td>53</td><td>54</td><td>55</td><td>55</td><td>56</td><td>58</td><td>59</td><td>59</td><td>60</td><td>60</td><td>62</td><td>62</td><td>63</td><td>63</td><td>64</td><td></td><td></td><td></td></tr> <tr><td>165</td><td>50</td><td>51</td><td>52</td><td>53</td><td>53</td><td>55</td><td>56</td><td>56</td><td>57</td><td>57</td><td>59</td><td>59</td><td>60</td><td>60</td><td>61</td><td></td><td></td><td></td></tr> <tr><td>170</td><td>48</td><td>49</td><td>49</td><td>50</td><td>51</td><td>53</td><td>53</td><td>54</td><td>54</td><td>54</td><td>56</td><td>56</td><td>57</td><td>57</td><td>57</td><td></td><td></td><td></td></tr> <tr><td>175</td><td>46</td><td>47</td><td>47</td><td>48</td><td>48</td><td>50</td><td>51</td><td>51</td><td>51</td><td>52</td><td>53</td><td>53</td><td>54</td><td>54</td><td>55</td><td></td><td></td><td></td></tr> <tr><td>180</td><td>44</td><td>45</td><td>45</td><td>46</td><td>46</td><td>48</td><td>48</td><td>49</td><td>49</td><td>49</td><td>50</td><td>51</td><td>51</td><td>51</td><td>52</td><td></td><td></td><td></td></tr> <tr><td>185</td><td>42</td><td>43</td><td>43</td><td>44</td><td>44</td><td>46</td><td>46</td><td>47</td><td>47</td><td>47</td><td>48</td><td>48</td><td>49</td><td>49</td><td>49</td><td></td><td></td><td></td></tr> <tr><td>190</td><td>40</td><td>41</td><td>41</td><td>42</td><td>42</td><td>44</td><td>44</td><td>44</td><td>44</td><td>45</td><td>46</td><td>46</td><td>46</td><td>47</td><td>47</td><td></td><td></td><td></td></tr> <tr><td>195</td><td>38</td><td>39</td><td>39</td><td>40</td><td>40</td><td>42</td><td>42</td><td>42</td><td>42</td><td>43</td><td>44</td><td>44</td><td>44</td><td>45</td><td>45</td><td></td><td></td><td></td></tr> <tr><td>200</td><td>37</td><td>37</td><td>38</td><td>38</td><td>39</td><td>40</td><td>40</td><td>40</td><td>41</td><td>41</td><td>42</td><td>42</td><td>42</td><td>43</td><td>43</td><td></td><td></td><td></td></tr> <tr><td>210</td><td>34</td><td>34</td><td>35</td><td>35</td><td>35</td><td>37</td><td>37</td><td>37</td><td>37</td><td>37</td><td>38</td><td>38</td><td>39</td><td>39</td><td>39</td><td></td><td></td><td></td></tr> <tr><td>220</td><td>31</td><td>32</td><td>32</td><td>32</td><td>33</td><td>34</td><td>34</td><td>34</td><td>34</td><td>35</td><td>35</td><td>36</td><td>36</td><td>36</td><td>36</td><td></td><td></td><td></td></tr> <tr><td>230</td><td>29</td><td>29</td><td>30</td><td>30</td><td>31</td><td>31</td><td>31</td><td>32</td><td>32</td><td>32</td><td>33</td><td>33</td><td>33</td><td>33</td><td>33</td><td></td><td></td><td></td></tr> <tr><td>240</td><td>27</td><td>27</td><td>28</td><td>28</td><td>28</td><td>29</td><td>29</td><td>29</td><td>29</td><td>29</td><td>30</td><td>30</td><td>30</td><td>31</td><td>31</td><td></td><td></td><td></td></tr> <tr><td>250</td><td>25</td><td>25</td><td>26</td><td>26</td><td>26</td><td>27</td><td>27</td><td>27</td><td>27</td><td>28</td><td>28</td><td>28</td><td>28</td><td>28</td><td>28</td><td></td><td></td><td></td></tr> <tr><td>260</td><td>24</td><td>24</td><td>24</td><td>24</td><td>24</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>26</td><td>26</td><td>26</td><td>26</td><td>26</td><td></td><td></td><td></td></tr> <tr><td>270</td><td>22</td><td>22</td><td>22</td><td>23</td><td>23</td><td>23</td><td>23</td><td>23</td><td>24</td><td>24</td><td>24</td><td>24</td><td>24</td><td>24</td><td>25</td><td></td><td></td><td></td></tr> <tr><td>280</td><td>21</td><td>21</td><td>21</td><td>21</td><td>21</td><td>22</td><td>22</td><td>22</td><td>22</td><td>22</td><td>23</td><td>23</td><td>23</td><td>23</td><td>23</td><td></td><td></td><td></td></tr> <tr><td>290</td><td>19</td><td>20</td><td>20</td><td>20</td><td>20</td><td>21</td><td>21</td><td>21</td><td>21</td><td>21</td><td>21</td><td>21</td><td>21</td><td>21</td><td>21</td><td></td><td></td><td></td></tr> <tr><td>300</td><td>18</td><td>18</td><td>19</td><td>19</td><td>19</td><td>19</td><td>19</td><td>19</td><td>19</td><td>20</td><td>20</td><td>20</td><td>20</td><td>20</td><td>20</td><td></td><td></td><td></td></tr> <tr><td>310</td><td>17</td><td>17</td><td>17</td><td>18</td><td>18</td><td>18</td><td>18</td><td>18</td><td>18</td><td>18</td><td>19</td><td>19</td><td>19</td><td>19</td><td>19</td><td></td><td></td><td></td></tr> <tr><td>320</td><td>16</td><td>16</td><td>16</td><td>17</td><td>17</td><td>17</td><td>17</td><td>17</td><td>17</td><td>17</td><td>18</td><td>18</td><td>18</td><td>18</td><td>18</td><td></td><td></td><td></td></tr> <tr><td>330</td><td>15</td><td>15</td><td>15</td><td>16</td><td>16</td><td>16</td><td>16</td><td>16</td><td>16</td><td>16</td><td>17</td><td>17</td><td>17</td><td>17</td><td>17</td><td></td><td></td><td></td></tr> <tr><td>340</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>16</td><td>16</td><td>16</td><td>16</td><td>16</td><td></td><td></td><td></td></tr> <tr><td>350</td><td>14</td><td>14</td><td>14</td><td>14</td><td>14</td><td>14</td><td>14</td><td>14</td><td>14</td><td>14</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td></td><td></td><td></td></tr> </tbody> </table> <p>Note : For other steel grades, refer to Appendix 8.4.</p>	λ	Steel grade and design strength p_r (N/mm ²)																S275				S355				S460								235	245	255	275	315	325	335	345	355	400	410	430	440	460					110	91	93	95	98	105	105	108	109	110	115	116	118	119	121					112	88	90	92	94	102	103	105	106	107	112	113	115	116	118					114	86	88	90	92	94	99	101	102	103	104	109	110	112	113	114				116	85	86	88	90	91	97	98	99	101	102	106	107	109	110	111				118	83	84	86	88	89	95	96	97	98	99	103	104	106	107	108				120	81	82	84	86	87	92	93	94	95	96	101	101	103	104	105				122	79	81	82	84	85	90	91	92	93	94	98	99	100	101	102				124	77	79	80	82	83	88	89	90	91	92	95	96	98	98	99				126	76	77	78	80	81	86	87	88	89	89	93	94	95	96	97				128	74	75	77	78	79	84	85	85	86	87	91	91	93	93	94				130	72	74	75	76	77	82	83	83	84	85	88	89	90	91	92				135	68	70	71	72	73	77	78	79	79	80	83	84	85	85	86				140	65	66	67	68	69	73	73	74	75	75	78	79	80	80	81				145	62	63	64	65	65	69	69	70	71	71	74	74	75	75	76				150	59	60	60	61	62	65	66	66	67	67	69	70	71	71	72				155	56	57	57	58	59	62	62	63	63	64	66	66	67	67	68				160	53	54	55	55	56	58	59	59	60	60	62	62	63	63	64				165	50	51	52	53	53	55	56	56	57	57	59	59	60	60	61				170	48	49	49	50	51	53	53	54	54	54	56	56	57	57	57				175	46	47	47	48	48	50	51	51	51	52	53	53	54	54	55				180	44	45	45	46	46	48	48	49	49	49	50	51	51	51	52				185	42	43	43	44	44	46	46	47	47	47	48	48	49	49	49				190	40	41	41	42	42	44	44	44	44	45	46	46	46	47	47				195	38	39	39	40	40	42	42	42	42	43	44	44	44	45	45				200	37	37	38	38	39	40	40	40	41	41	42	42	42	43	43				210	34	34	35	35	35	37	37	37	37	37	38	38	39	39	39				220	31	32	32	32	33	34	34	34	34	35	35	36	36	36	36				230	29	29	30	30	31	31	31	32	32	32	33	33	33	33	33				240	27	27	28	28	28	29	29	29	29	29	30	30	30	31	31				250	25	25	26	26	26	27	27	27	27	28	28	28	28	28	28				260	24	24	24	24	24	25	25	25	25	25	26	26	26	26	26				270	22	22	22	23	23	23	23	23	24	24	24	24	24	24	25				280	21	21	21	21	21	22	22	22	22	22	23	23	23	23	23				290	19	20	20	20	20	21	21	21	21	21	21	21	21	21	21				300	18	18	19	19	19	19	19	19	19	20	20	20	20	20	20				310	17	17	17	18	18	18	18	18	18	18	19	19	19	19	19				320	16	16	16	17	17	17	17	17	17	17	18	18	18	18	18				330	15	15	15	16	16	16	16	16	16	16	17	17	17	17	17				340	15	15	15	15	15	15	15	15	15	15	16	16	16	16	16				350	14	14	14	14	14	14	14	14	14	14	15	15	15	15	15				<p style="text-align: center;">Table 8.8(d) - Design strength p_c of compression members (cont'd)</p> <p style="text-align: center;">ii) S275 ~ S460 steel (cont'd)</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="3">λ</th> <th colspan="16">Steel grade and design strength p_r (N/mm²)</th> </tr> <tr> <th colspan="4">S275</th> <th colspan="4">S355</th> <th colspan="4">S460</th> <th colspan="4"></th> </tr> <tr> <th>235</th><th>245</th><th>255</th><th>275</th> <th>315</th><th>325</th><th>335</th><th>345</th><th>355</th> <th>400</th><th>410</th><th>430</th><th>440</th><th>460</th> <th></th><th></th><th></th><th></th> </tr> </thead> <tbody> <tr><td>110</td><td>91</td><td>93</td><td>95</td><td>98</td><td>105</td><td>105</td><td>108</td><td>109</td><td>110</td><td>115</td><td>116</td><td>118</td><td>119</td><td>121</td><td></td><td></td><td></td><td></td></tr> <tr><td>112</td><td>88</td><td>90</td><td>92</td><td>94</td><td>102</td><td>103</td><td>105</td><td>106</td><td>107</td><td>112</td><td>113</td><td>115</td><td>116</td><td>118</td><td></td><td></td><td></td><td></td></tr> <tr><td>114</td><td>86</td><td>88</td><td>90</td><td>92</td><td>94</td><td>99</td><td>101</td><td>102</td><td>103</td><td>104</td><td>109</td><td>110</td><td>112</td><td>113</td><td>114</td><td></td><td></td><td></td></tr> <tr><td>116</td><td>85</td><td>86</td><td>88</td><td>90</td><td>91</td><td>97</td><td>98</td><td>99</td><td>101</td><td>102</td><td>106</td><td>107</td><td>109</td><td>110</td><td>111</td><td></td><td></td><td></td></tr> <tr><td>118</td><td>83</td><td>84</td><td>86</td><td>88</td><td>89</td><td>95</td><td>96</td><td>97</td><td>98</td><td>99</td><td>103</td><td>104</td><td>106</td><td>107</td><td>108</td><td></td><td></td><td></td></tr> <tr><td>120</td><td>81</td><td>82</td><td>84</td><td>86</td><td>87</td><td>92</td><td>93</td><td>94</td><td>95</td><td>96</td><td>101</td><td>101</td><td>103</td><td>104</td><td>105</td><td></td><td></td><td></td></tr> <tr><td>122</td><td>79</td><td>81</td><td>82</td><td>84</td><td>85</td><td>90</td><td>91</td><td>92</td><td>93</td><td>94</td><td>98</td><td>99</td><td>100</td><td>101</td><td>102</td><td></td><td></td><td></td></tr> <tr><td>124</td><td>77</td><td>79</td><td>80</td><td>82</td><td>83</td><td>88</td><td>89</td><td>90</td><td>91</td><td>92</td><td>95</td><td>96</td><td>98</td><td>98</td><td>99</td><td></td><td></td><td></td></tr> <tr><td>126</td><td>76</td><td>77</td><td>78</td><td>80</td><td>81</td><td>86</td><td>87</td><td>88</td><td>89</td><td>89</td><td>93</td><td>94</td><td>95</td><td>96</td><td>97</td><td></td><td></td><td></td></tr> <tr><td>128</td><td>74</td><td>75</td><td>77</td><td>78</td><td>79</td><td>84</td><td>85</td><td>85</td><td>86</td><td>87</td><td>91</td><td>91</td><td>93</td><td>93</td><td>94</td><td></td><td></td><td></td></tr> <tr><td>130</td><td>72</td><td>74</td><td>75</td><td>76</td><td>77</td><td>82</td><td>83</td><td>83</td><td>84</td><td>85</td><td>88</td><td>89</td><td>90</td><td>91</td><td>92</td><td></td><td></td><td></td></tr> <tr><td>135</td><td>68</td><td>70</td><td>71</td><td>72</td><td>73</td><td>77</td><td>78</td><td>79</td><td>79</td><td>80</td><td>83</td><td>84</td><td>85</td><td>85</td><td>86</td><td></td><td></td><td></td></tr> <tr><td>140</td><td>65</td><td>66</td><td>67</td><td>68</td><td>69</td><td>73</td><td>73</td><td>74</td><td>75</td><td>75</td><td>78</td><td>79</td><td>80</td><td>80</td><td>81</td><td></td><td></td><td></td></tr> <tr><td>145</td><td>62</td><td>63</td><td>64</td><td>65</td><td>65</td><td>69</td><td>69</td><td>70</td><td>71</td><td>71</td><td>74</td><td>74</td><td>75</td><td>75</td><td>76</td><td></td><td></td><td></td></tr> <tr><td>150</td><td>59</td><td>60</td><td>60</td><td>61</td><td>62</td><td>65</td><td>66</td><td>66</td><td>67</td><td>67</td><td>69</td><td>70</td><td>71</td><td>71</td><td>72</td><td></td><td></td><td></td></tr> <tr><td>155</td><td>56</td><td>57</td><td>57</td><td>58</td><td>59</td><td>62</td><td>62</td><td>63</td><td>63</td><td>64</td><td>66</td><td>66</td><td>67</td><td>67</td><td>68</td><td></td><td></td><td></td></tr> <tr><td>160</td><td>53</td><td>54</td><td>55</td><td>55</td><td>56</td><td>58</td><td>59</td><td>59</td><td>60</td><td>60</td><td>62</td><td>62</td><td>63</td><td>63</td><td>64</td><td></td><td></td><td></td></tr> <tr><td>165</td><td>50</td><td>51</td><td>52</td><td>53</td><td>53</td><td>55</td><td>56</td><td>56</td><td>57</td><td>57</td><td>59</td><td>59</td><td>60</td><td>60</td><td>61</td><td></td><td></td><td></td></tr> <tr><td>170</td><td>48</td><td>49</td><td>49</td><td>50</td><td>51</td><td>53</td><td>53</td><td>54</td><td>54</td><td>54</td><td>56</td><td>56</td><td>57</td><td>57</td><td>57</td><td></td><td></td><td></td></tr> <tr><td>175</td><td>46</td><td>47</td><td>47</td><td>48</td><td>48</td><td>50</td><td>51</td><td>51</td><td>51</td><td>52</td><td>53</td><td>53</td><td>54</td><td>54</td><td>55</td><td></td><td></td><td></td></tr> <tr><td>180</td><td>44</td><td>45</td><td>45</td><td>46</td><td>46</td><td>48</td><td>48</td><td>49</td><td>49</td><td>49</td><td>50</td><td>51</td><td>51</td><td>51</td><td>52</td><td></td><td></td><td></td></tr> <tr><td>185</td><td>42</td><td>43</td><td>43</td><td>44</td><td>44</td><td>46</td><td>46</td><td>47</td><td>47</td><td>47</td><td>48</td><td>48</td><td>49</td><td>49</td><td>49</td><td></td><td></td><td></td></tr> <tr><td>190</td><td>40</td><td>41</td><td>41</td><td>42</td><td>42</td><td>44</td><td>44</td><td>44</td><td>44</td><td>45</td><td>46</td><td>46</td><td>46</td><td>47</td><td>47</td><td></td><td></td><td></td></tr> <tr><td>195</td><td>38</td><td>39</td><td>39</td><td>40</td><td>40</td><td>42</td><td>42</td><td>42</td><td>42</td><td>43</td><td>44</td><td>44</td><td>44</td><td>45</td><td>45</td><td></td><td></td><td></td></tr> <tr><td>200</td><td>37</td><td>37</td><td>38</td><td>38</td><td>39</td><td>40</td><td>40</td><td>40</td><td>41</td><td>41</td><td>42</td><td>42</td><td>42</td><td>43</td><td>43</td><td></td><td></td><td></td></tr> <tr><td>210</td><td>34</td><td>34</td><td>35</td><td>35</td><td>35</td><td>37</td><td>37</td><td>37</td><td>37</td><td>37</td><td>38</td><td>38</td><td>39</td><td>39</td><td>39</td><td></td><td></td><td></td></tr> <tr><td>220</td><td>31</td><td>32</td><td>32</td><td>32</td><td>33</td><td>34</td><td>34</td><td>34</td><td>34</td><td>35</td><td>35</td><td>36</td><td>36</td><td>36</td><td>36</td><td></td><td></td><td></td></tr> <tr><td>230</td><td>29</td><td>29</td><td>30</td><td>30</td><td>31</td><td>31</td><td>31</td><td>32</td><td>32</td><td>32</td><td>33</td><td>33</td><td>33</td><td>33</td><td>33</td><td></td><td></td><td></td></tr> <tr><td>240</td><td>27</td><td>27</td><td>28</td><td>28</td><td>28</td><td>29</td><td>29</td><td>29</td><td>29</td><td>29</td><td>30</td><td>30</td><td>30</td><td>31</td><td>31</td><td></td><td></td><td></td></tr> <tr><td>250</td><td>25</td><td>25</td><td>26</td><td>26</td><td>26</td><td>27</td><td>27</td><td>27</td><td>27</td><td>28</td><td>28</td><td>28</td><td>28</td><td>28</td><td>28</td><td></td><td></td><td></td></tr> <tr><td>260</td><td>24</td><td>24</td><td>24</td><td>24</td><td>24</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>26</td><td>26</td><td>26</td><td>26</td><td>26</td><td></td><td></td><td></td></tr> <tr><td>270</td><td>22</td><td>22</td><td>22</td><td>23</td><td>23</td><td>23</td><td>23</td><td>23</td><td>24</td><td>24</td><td>24</td><td>24</td><td>24</td><td>24</td><td>25</td><td></td><td></td><td></td></tr> <tr><td>280</td><td>21</td><td>21</td><td>21</td><td>21</td><td>21</td><td>22</td><td>22</td><td>22</td><td>22</td><td>22</td><td>23</td><td>23</td><td>23</td><td>23</td><td>23</td><td></td><td></td><td></td></tr> <tr><td>290</td><td>19</td><td>20</td><td>20</td><td>20</td><td>20</td><td>21</td><td>21</td><td>21</td><td>21</td><td>21</td><td>21</td><td>21</td><td>21</td><td>21</td><td>21</td><td></td><td></td><td></td></tr> <tr><td>300</td><td>18</td><td>18</td><td>19</td><td>19</td><td>19</td><td>19</td><td>19</td><td>19</td><td>19</td><td>20</td><td>20</td><td>20</td><td>20</td><td>20</td><td>20</td><td></td><td></td><td></td></tr> <tr><td>310</td><td>17</td><td>17</td><td>17</td><td>18</td><td>18</td><td>18</td><td>18</td><td>18</td><td>18</td><td>18</td><td>19</td><td>19</td><td>19</td><td>19</td><td>19</td><td></td><td></td><td></td></tr> <tr><td>320</td><td>16</td><td>16</td><td>16</td><td>17</td><td>17</td><td>17</td><td>17</td><td>17</td><td>17</td><td>17</td><td>18</td><td>18</td><td>18</td><td>18</td><td>18</td><td></td><td></td><td></td></tr> <tr><td>330</td><td>15</td><td>15</td><td>15</td><td>16</td><td>16</td><td>16</td><td>16</td><td>16</td><td>16</td><td>16</td><td>17</td><td>17</td><td>17</td><td>17</td><td>17</td><td></td><td></td><td></td></tr> <tr><td>340</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>16</td><td>16</td><td>16</td><td>16</td><td>16</td><td></td><td></td><td></td></tr> <tr><td>350</td><td>14</td><td>14</td><td>14</td><td>14</td><td>14</td><td>14</td><td>14</td><td>14</td><td>14</td><td>14</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td></td><td></td><td></td></tr> </tbody> </table> <p>Note : For other steel grades, refer to Appendix 8.4.</p>	λ	Steel grade and design strength p_r (N/mm ²)																S275				S355				S460								235	245	255	275	315	325	335	345	355	400	410	430	440	460					110	91	93	95	98	105	105	108	109	110	115	116	118	119	121					112	88	90	92	94	102	103	105	106	107	112	113	115	116	118					114	86	88	90	92	94	99	101	102	103	104	109	110	112	113	114				116	85	86	88	90	91	97	98	99	101	102	106	107	109	110	111				118	83	84	86	88	89	95	96	97	98	99	103	104	106	107	108				120	81	82	84	86	87	92	93	94	95	96	101	101	103	104	105				122	79	81	82	84	85	90	91	92	93	94	98	99	100	101	102				124	77	79	80	82	83	88	89	90	91	92	95	96	98	98	99				126	76	77	78	80	81	86	87	88	89	89	93	94	95	96	97				128	74	75	77	78	79	84	85	85	86	87	91	91	93	93	94				130	72	74	75	76	77	82	83	83	84	85	88	89	90	91	92				135	68	70	71	72	73	77	78	79	79	80	83	84	85	85	86				140	65	66	67	68	69	73	73	74	75	75	78	79	80	80	81				145	62	63	64	65	65	69	69	70	71	71	74	74	75	75	76				150	59	60	60	61	62	65	66	66	67	67	69	70	71	71	72				155	56	57	57	58	59	62	62	63	63	64	66	66	67	67	68				160	53	54	55	55	56	58	59	59	60	60	62	62	63	63	64				165	50	51	52	53	53	55	56	56	57	57	59	59	60	60	61				170	48	49	49	50	51	53	53	54	54	54	56	56	57	57	57				175	46	47	47	48	48	50	51	51	51	52	53	53	54	54	55				180	44	45	45	46	46	48	48	49	49	49	50	51	51	51	52				185	42	43	43	44	44	46	46	47	47	47	48	48	49	49	49				190	40	41	41	42	42	44	44	44	44	45	46	46	46	47	47				195	38	39	39	40	40	42	42	42	42	43	44	44	44	45	45				200	37	37	38	38	39	40	40	40	41	41	42	42	42	43	43				210	34	34	35	35	35	37	37	37	37	37	38	38	39	39	39				220	31	32	32	32	33	34	34	34	34	35	35	36	36	36	36				230	29	29	30	30	31	31	31	32	32	32	33	33	33	33	33				240	27	27	28	28	28	29	29	29	29	29	30	30	30	31	31				250	25	25	26	26	26	27	27	27	27	28	28	28	28	28	28				260	24	24	24	24	24	25	25	25	25	25	26	26	26	26	26				270	22	22	22	23	23	23	23	23	24	24	24	24	24	24	25				280	21	21	21	21	21	22	22	22	22	22	23	23	23	23	23				290	19	20	20	20	20	21	21	21	21	21	21	21	21	21	21				300	18	18	19	19	19	19	19	19	19	20	20	20	20	20	20				310	17	17	17	18	18	18	18	18	18	18	19	19	19	19	19				320	16	16	16	17	17	17	17	17	17	17	18	18	18	18	18				330	15	15	15	16	16	16	16	16	16	16	17	17	17	17	17				340	15	15	15	15	15	15	15	15	15	15	16	16	16	16	16				350	14	14	14	14	14	14	14	14	14	14	15	15	15	15	15			
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Table 8.8(d) (cont) ⁶⁹		<p style="text-align: center;">Table 8.8(d) - Design strength p_c of compression members ii) S550 ~ S690 steel</p> <p style="text-align: center;">5) Values of p_c in N/mm² with $\lambda < 110$ for strut curve d</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="3">λ</th> <th colspan="6">Steel grade and design strength p_c (N/mm²)</th> </tr> <tr> <th colspan="3">S550</th> <th colspan="3">S690</th> </tr> <tr> <th>400</th> <th>530</th> <th>550</th> <th>630</th> <th>650</th> <th>690</th> </tr> </thead> <tbody> <tr><td>15</td><td>481</td><td>518</td><td>537</td><td>611</td><td>629</td><td>688</td></tr> <tr><td>20</td><td>461</td><td>496</td><td>514</td><td>584</td><td>602</td><td>637</td></tr> <tr><td>25</td><td>440</td><td>474</td><td>490</td><td>557</td><td>573</td><td>606</td></tr> <tr><td>30</td><td>419</td><td>450</td><td>466</td><td>527</td><td>542</td><td>572</td></tr> <tr><td>35</td><td>397</td><td>426</td><td>440</td><td>498</td><td>509</td><td>536</td></tr> <tr><td>40</td><td>374</td><td>400</td><td>413</td><td>463</td><td>475</td><td>498</td></tr> <tr><td>42</td><td>365</td><td>390</td><td>402</td><td>449</td><td>460</td><td>482</td></tr> <tr><td>44</td><td>356</td><td>379</td><td>391</td><td>435</td><td>446</td><td>468</td></tr> <tr><td>46</td><td>346</td><td>369</td><td>380</td><td>421</td><td>431</td><td>450</td></tr> <tr><td>48</td><td>337</td><td>358</td><td>368</td><td>407</td><td>418</td><td>434</td></tr> <tr><td>50</td><td>327</td><td>347</td><td>357</td><td>393</td><td>402</td><td>418</td></tr> <tr><td>52</td><td>317</td><td>336</td><td>345</td><td>379</td><td>387</td><td>403</td></tr> <tr><td>54</td><td>308</td><td>326</td><td>334</td><td>366</td><td>373</td><td>387</td></tr> <tr><td>56</td><td>298</td><td>315</td><td>323</td><td>352</td><td>359</td><td>372</td></tr> 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<tr><td>78</td><td>206</td><td>214</td><td>218</td><td>230</td><td>233</td><td>238</td></tr> <tr><td>80</td><td>200</td><td>207</td><td>210</td><td>222</td><td>224</td><td>229</td></tr> <tr><td>82</td><td>193</td><td>200</td><td>203</td><td>214</td><td>216</td><td>220</td></tr> <tr><td>84</td><td>186</td><td>193</td><td>196</td><td>206</td><td>208</td><td>212</td></tr> <tr><td>86</td><td>180</td><td>186</td><td>189</td><td>198</td><td>201</td><td>204</td></tr> <tr><td>88</td><td>174</td><td>180</td><td>183</td><td>191</td><td>193</td><td>197</td></tr> <tr><td>90</td><td>169</td><td>174</td><td>176</td><td>185</td><td>186</td><td>190</td></tr> <tr><td>92</td><td>163</td><td>168</td><td>170</td><td>178</td><td>180</td><td>183</td></tr> <tr><td>94</td><td>158</td><td>163</td><td>165</td><td>172</td><td>174</td><td>177</td></tr> <tr><td>96</td><td>153</td><td>157</td><td>159</td><td>166</td><td>168</td><td>170</td></tr> <tr><td>98</td><td>148</td><td>152</td><td>154</td><td>161</td><td>162</td><td>165</td></tr> <tr><td>100</td><td>144</td><td>148</td><td>149</td><td>155</td><td>157</td><td>159</td></tr> <tr><td>102</td><td>139</td><td>143</td><td>145</td><td>150</td><td>152</td><td>154</td></tr> <tr><td>104</td><td>135</td><td>139</td><td>140</td><td>145</td><td>147</td><td>149</td></tr> <tr><td>106</td><td>131</td><td>134</td><td>136</td><td>141</td><td>142</td><td>144</td></tr> <tr><td>108</td><td>127</td><td>130</td><td>132</td><td>136</td><td>137</td><td>139</td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades, refer to Appendix 8.4.</p>	λ	Steel grade and design strength p_c (N/mm ²)						S550			S690			400	530	550	630	650	690	15	481	518	537	611	629	688	20	461	496	514	584	602	637	25	440	474	490	557	573	606	30	419	450	466	527	542	572	35	397	426	440	498	509	536	40	374	400	413	463	475	498	42	365	390	402	449	460	482	44	356	379	391	435	446	468	46	346	369	380	421	431	450	48	337	358	368	407	418	434	50	327	347	357	393	402	418	52	317	336	345	379	387	403	54	308	326	334	366	373	387	56	298	315	323	352	359	372	58	289	305	312	339	346	357	60	280	294	301	327	332	343	62	271	284	291	314	319	329	64	262	275	281	302	307	316	66	253	265	271	291	295	304	68	245	256	261	279	284	291	70	237	247	252	269	273	280	72	229	238	243	258	262	269	74	221	230	234	249	252	258	76	214	222	226	239	242	248	78	206	214	218	230	233	238	80	200	207	210	222	224	229	82	193	200	203	214	216	220	84	186	193	196	206	208	212	86	180	186	189	198	201	204	88	174	180	183	191	193	197	90	169	174	176	185	186	190	92	163	168	170	178	180	183	94	158	163	165	172	174	177	96	153	157	159	166	168	170	98	148	152	154	161	162	165	100	144	148	149	155	157	159	102	139	143	145	150	152	154	104	135	139	140	145	147	149	106	131	134	136	141	142	144	108	127	130	132	136	137	139
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Table 8.8(d) (cont) ⁷⁰		<p style="text-align: center;">Table 8.8(d) - Design strength p_c of compression members (cont'd) ii) S550 – S690 steel (cont'd)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="7" style="text-align: center;">5) Values of p_c in N/mm² with $\lambda \geq 110$ for strut curve d</th> </tr> <tr> <th colspan="7" style="text-align: center;">Steel grade and design strength p_c (N/mm²)</th> </tr> <tr> <th rowspan="2">λ</th> <th colspan="3" style="text-align: center;">S550</th> <th colspan="3" style="text-align: center;">S690</th> </tr> <tr> <th>490</th> <th>530</th> <th>550</th> <th>630</th> <th>650</th> <th>690</th> </tr> </thead> <tbody> <tr><td>110</td><td>123</td><td>126</td><td>128</td><td>132</td><td>133</td><td>135</td></tr> <tr><td>112</td><td>120</td><td>123</td><td>124</td><td>128</td><td>129</td><td>131</td></tr> <tr><td>114</td><td>116</td><td>119</td><td>120</td><td>124</td><td>125</td><td>127</td></tr> 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<tr><td>200</td><td>43</td><td>44</td><td>44</td><td>45</td><td>45</td><td>45</td></tr> <tr><td>210</td><td>40</td><td>40</td><td>40</td><td>41</td><td>41</td><td>41</td></tr> <tr><td>220</td><td>36</td><td>37</td><td>37</td><td>37</td><td>38</td><td>38</td></tr> <tr><td>230</td><td>33</td><td>34</td><td>34</td><td>34</td><td>34</td><td>35</td></tr> <tr><td>240</td><td>31</td><td>31</td><td>31</td><td>32</td><td>32</td><td>32</td></tr> <tr><td>250</td><td>29</td><td>29</td><td>29</td><td>29</td><td>29</td><td>30</td></tr> <tr><td>260</td><td>27</td><td>27</td><td>27</td><td>27</td><td>27</td><td>27</td></tr> <tr><td>270</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>26</td></tr> <tr><td>280</td><td>23</td><td>23</td><td>23</td><td>24</td><td>24</td><td>24</td></tr> <tr><td>290</td><td>22</td><td>22</td><td>22</td><td>22</td><td>22</td><td>22</td></tr> <tr><td>300</td><td>20</td><td>20</td><td>20</td><td>21</td><td>21</td><td>21</td></tr> <tr><td>310</td><td>19</td><td>19</td><td>19</td><td>19</td><td>19</td><td>20</td></tr> <tr><td>320</td><td>18</td><td>18</td><td>18</td><td>18</td><td>18</td><td>18</td></tr> <tr><td>330</td><td>17</td><td>17</td><td>17</td><td>17</td><td>17</td><td>17</td></tr> <tr><td>340</td><td>16</td><td>16</td><td>16</td><td>16</td><td>16</td><td>16</td></tr> <tr><td>350</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades, refer to Appendix 8.4.</p>	5) Values of p_c in N/mm ² with $\lambda \geq 110$ for strut curve d							Steel grade and design strength p_c (N/mm ²)							λ	S550			S690			490	530	550	630	650	690	110	123	126	128	132	133	135	112	120	123	124	128	129	131	114	116	119	120	124	125	127	116	113	116	117	121	121	123	118	110	112	113	117	118	119	120	107	109	110	114	114	116	122	104	106	107	110	111	112	124	101	103	104	107	108	109	126	98	100	101	104	105	106	128	96	98	99	101	102	103	130	93	95	96	99	99	100	135	87	89	90	92	93	94	140	82	84	84	86	87	88	145	77	78	79	81	81	82	150	73	74	74	76	77	77	155	69	70	70	72	72	73	160	65	66	66	68	68	69	165	61	62	63	64	64	65	170	58	59	59	61	61	61	175	55	56	56	57	58	58	180	52	53	53	54	55	55	185	50	51	51	52	52	52	190	48	48	48	49	49	50	195	45	46	46	47	47	47	200	43	44	44	45	45	45	210	40	40	40	41	41	41	220	36	37	37	37	38	38	230	33	34	34	34	34	35	240	31	31	31	32	32	32	250	29	29	29	29	29	30	260	27	27	27	27	27	27	270	25	25	25	25	25	26	280	23	23	23	24	24	24	290	22	22	22	22	22	22	300	20	20	20	21	21	21	310	19	19	19	19	19	20	320	18	18	18	18	18	18	330	17	17	17	17	17	17	340	16	16	16	16	16	16	350	15	15	15	15	15	15
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center;">Q390</th> <th style="text-align: center;">Q420</th> </tr> <tr> <th style="text-align: center;">215</th> <th style="text-align: center;">310</th> <th style="text-align: center;">360</th> <th style="text-align: center;">380</th> <th style="text-align: center;">215</th> <th style="text-align: center;">310</th> <th style="text-align: center;">350</th> <th style="text-align: center;">380</th> </tr> </thead> <tbody> <tr><td>16</td><td>215</td><td>310</td><td>360</td><td>379</td><td>110</td><td>125</td><td>141</td><td>144</td><td>147</td></tr> <tr><td>20</td><td>214</td><td>307</td><td>346</td><td>375</td><td>112</td><td>122</td><td>136</td><td>140</td><td>142</td></tr> <tr><td>25</td><td>212</td><td>304</td><td>342</td><td>371</td><td>114</td><td>119</td><td>132</td><td>138</td><td>138</td></tr> <tr><td>30</td><td>210</td><td>300</td><td>338</td><td>366</td><td>116</td><td>116</td><td>128</td><td>132</td><td>133</td></tr> 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<tr><td>52</td><td>197</td><td>278</td><td>310</td><td>334</td><td>135</td><td>91</td><td>98</td><td>100</td><td>101</td></tr> <tr><td>54</td><td>196</td><td>275</td><td>307</td><td>330</td><td>140</td><td>86</td><td>92</td><td>93</td><td>94</td></tr> <tr><td>56</td><td>194</td><td>272</td><td>303</td><td>325</td><td>145</td><td>81</td><td>86</td><td>87</td><td>88</td></tr> <tr><td>58</td><td>193</td><td>269</td><td>299</td><td>320</td><td>150</td><td>76</td><td>81</td><td>82</td><td>83</td></tr> <tr><td>60</td><td>191</td><td>265</td><td>294</td><td>314</td><td>155</td><td>72</td><td>76</td><td>77</td><td>78</td></tr> <tr><td>62</td><td>189</td><td>262</td><td>289</td><td>309</td><td>160</td><td>68</td><td>72</td><td>73</td><td>73</td></tr> <tr><td>64</td><td>187</td><td>258</td><td>284</td><td>302</td><td>165</td><td>64</td><td>68</td><td>68</td><td>69</td></tr> <tr><td>66</td><td>186</td><td>254</td><td>279</td><td>296</td><td>170</td><td>61</td><td>64</td><td>65</td><td>65</td></tr> <tr><td>68</td><td>184</td><td>249</td><td>273</td><td>289</td><td>175</td><td>58</td><td>60</td><td>61</td><td>61</td></tr> <tr><td>70</td><td>182</td><td>245</td><td>267</td><td>281</td><td>180</td><td>55</td><td>57</td><td>58</td><td>58</td></tr> <tr><td>72</td><td>179</td><td>240</td><td>260</td><td>274</td><td>185</td><td>52</td><td>54</td><td>55</td><td>55</td></tr> <tr><td>74</td><td>177</td><td>235</td><td>254</td><td>266</td><td>190</td><td>50</td><td>52</td><td>52</td><td>52</td></tr> <tr><td>76</td><td>175</td><td>229</td><td>247</td><td>258</td><td>195</td><td>47</td><td>49</td><td>50</td><td>50</td></tr> <tr><td>78</td><td>172</td><td>224</td><td>240</td><td>250</td><td>200</td><td>45</td><td>47</td><td>47</td><td>47</td></tr> <tr><td>80</td><td>170</td><td>218</td><td>233</td><td>242</td><td>210</td><td>41</td><td>43</td><td>43</td><td>43</td></tr> <tr><td>82</td><td>167</td><td>213</td><td>226</td><td>235</td><td>220</td><td>38</td><td>39</td><td>39</td><td>39</td></tr> <tr><td>84</td><td>164</td><td>207</td><td>219</td><td>227</td><td>230</td><td>35</td><td>36</td><td>36</td><td>36</td></tr> <tr><td>86</td><td>162</td><td>202</td><td>213</td><td>219</td><td>240</td><td>32</td><td>33</td><td>33</td><td>33</td></tr> <tr><td>88</td><td>159</td><td>196</td><td>206</td><td>212</td><td>250</td><td>29</td><td>30</td><td>30</td><td>31</td></tr> <tr><td>90</td><td>156</td><td>190</td><td>199</td><td>205</td><td>260</td><td>27</td><td>28</td><td>28</td><td>28</td></tr> <tr><td>92</td><td>153</td><td>185</td><td>193</td><td>198</td><td>270</td><td>25</td><td>26</td><td>26</td><td>26</td></tr> <tr><td>94</td><td>150</td><td>179</td><td>187</td><td>191</td><td>280</td><td>24</td><td>24</td><td>24</td><td>24</td></tr> <tr><td>96</td><td>146</td><td>174</td><td>181</td><td>185</td><td>290</td><td>22</td><td>23</td><td>23</td><td>23</td></tr> <tr><td>98</td><td>143</td><td>169</td><td>175</td><td>179</td><td>300</td><td>21</td><td>21</td><td>21</td><td>21</td></tr> <tr><td>100</td><td>140</td><td>164</td><td>169</td><td>173</td><td>310</td><td>19</td><td>20</td><td>20</td><td>20</td></tr> <tr><td>102</td><td>137</td><td>159</td><td>164</td><td>167</td><td>320</td><td>18</td><td>18</td><td>19</td><td>19</td></tr> <tr><td>104</td><td>134</td><td>154</td><td>159</td><td>162</td><td>330</td><td>17</td><td>17</td><td>17</td><td>17</td></tr> <tr><td>106</td><td>131</td><td>149</td><td>154</td><td>156</td><td>340</td><td>16</td><td>16</td><td>16</td><td>16</td></tr> <tr><td>108</td><td>128</td><td>145</td><td>149</td><td>151</td><td>350</td><td>15</td><td>15</td><td>15</td><td>16</td></tr> </tbody> </table> <p style="text-align: center;">Note : For other steel grades, refer to Appendix 8.4.</p>	Values of p_c in N/mm ² with $\lambda < 110$ for strut curve a					Values of p_c in N/mm ² with $\lambda \geq 110$ for strut curve a					λ	Steel grade and design strength (N/mm ²)				λ	Steel grade and design strength (N/mm ²)				Q235	Q345	Q390	Q420	Q235	Q345	Q390	Q420	215	310	360	380	215	310	350	380	16	215	310	360	379	110	125	141	144	147	20	214	307	346	375	112	122	136	140	142	25	212	304	342	371	114	119	132	138	138	30	210	300	338	366	116	116	128	132	133	35	207	296	333	361	118	113	125	128	129	40	204	291	328	354	120	110	121	124	125	42	203	289	325	352	122	107	118	120	122	44	202	287	323	349	124	105	114	117	118	46	201	285	320	345	126	102	111	113	115	48	200	283	317	342	128	100	108	110	111	50	198	280	314	338	130	97	105	107	108	52	197	278	310	334	135	91	98	100	101	54	196	275	307	330	140	86	92	93	94	56	194	272	303	325	145	81	86	87	88	58	193	269	299	320	150	76	81	82	83	60	191	265	294	314	155	72	76	77	78	62	189	262	289	309	160	68	72	73	73	64	187	258	284	302	165	64	68	68	69	66	186	254	279	296	170	61	64	65	65	68	184	249	273	289	175	58	60	61	61	70	182	245	267	281	180	55	57	58	58	72	179	240	260	274	185	52	54	55	55	74	177	235	254	266	190	50	52	52	52	76	175	229	247	258	195	47	49	50	50	78	172	224	240	250	200	45	47	47	47	80	170	218	233	242	210	41	43	43	43	82	167	213	226	235	220	38	39	39	39	84	164	207	219	227	230	35	36	36	36	86	162	202	213	219	240	32	33	33	33	88	159	196	206	212	250	29	30	30	31	90	156	190	199	205	260	27	28	28	28	92	153	185	193	198	270	25	26	26	26	94	150	179	187	191	280	24	24	24	24	96	146	174	181	185	290	22	23	23	23	98	143	169	175	179	300	21	21	21	21	100	140	164	169	173	310	19	20	20	20	102	137	159	164	167	320	18	18	19	19	104	134	154	159	162	330	17	17	17	17	106	131	149	154	156	340	16	16	16	16	108	128	145	149	151	350	15	15	15	16	<p style="text-align: center;">Table 8.8(e) - Design strength p_c of compression members</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="6" style="text-align: center;">Values of p_c in N/mm² with $\lambda < 110$ for strut curve a</th> </tr> <tr> <th rowspan="3" style="text-align: center;">λ</th> <th colspan="5" style="text-align: center;">Steel grade and design strength (N/mm²)</th> </tr> <tr> <th style="text-align: center;">Q235</th> <th style="text-align: center;">Q345/Q355</th> <th style="text-align: center;">Q390</th> <th style="text-align: center;">Q420</th> <th style="text-align: center;">Q460</th> </tr> <tr> <th style="text-align: center;">215</th> <th style="text-align: center;">305</th> <th style="text-align: center;">345</th> <th style="text-align: center;">375</th> <th style="text-align: center;">410</th> </tr> </thead> <tbody> <tr><td>15</td><td>215</td><td>305</td><td>345</td><td>375</td><td>400</td></tr> <tr><td>20</td><td>215</td><td>303</td><td>342</td><td>371</td><td>405</td></tr> <tr><td>25</td><td>212</td><td>299</td><td>338</td><td>366</td><td>400</td></tr> <tr><td>30</td><td>210</td><td>296</td><td>333</td><td>362</td><td>395</td></tr> <tr><td>35</td><td>208</td><td>292</td><td>329</td><td>357</td><td>389</td></tr> <tr><td>40</td><td>205</td><td>287</td><td>324</td><td>350</td><td>382</td></tr> <tr><td>42</td><td>204</td><td>285</td><td>321</td><td>348</td><td>378</td></tr> <tr><td>44</td><td>203</td><td>283</td><td>319</td><td>345</td><td>375</td></tr> <tr><td>46</td><td>201</td><td>281</td><td>316</td><td>342</td><td>371</td></tr> <tr><td>48</td><td>200</td><td>279</td><td>313</td><td>338</td><td>367</td></tr> <tr><td>50</td><td>199</td><td>277</td><td>310</td><td>335</td><td>363</td></tr> <tr><td>52</td><td>198</td><td>274</td><td>307</td><td>331</td><td>358</td></tr> <tr><td>54</td><td>196</td><td>271</td><td>303</td><td>327</td><td>353</td></tr> <tr><td>56</td><td>195</td><td>268</td><td>300</td><td>322</td><td>347</td></tr> <tr><td>58</td><td>193</td><td>265</td><td>295</td><td>317</td><td>341</td></tr> <tr><td>60</td><td>191</td><td>262</td><td>291</td><td>312</td><td>334</td></tr> <tr><td>62</td><td>190</td><td>259</td><td>286</td><td>306</td><td>327</td></tr> <tr><td>64</td><td>188</td><td>255</td><td>281</td><td>300</td><td>320</td></tr> <tr><td>66</td><td>186</td><td>251</td><td>276</td><td>293</td><td>312</td></tr> <tr><td>68</td><td>184</td><td>247</td><td>270</td><td>287</td><td>303</td></tr> <tr><td>70</td><td>182</td><td>242</td><td>265</td><td>279</td><td>295</td></tr> <tr><td>72</td><td>180</td><td>237</td><td>258</td><td>272</td><td>288</td></tr> <tr><td>74</td><td>178</td><td>233</td><td>252</td><td>265</td><td>277</td></tr> <tr><td>76</td><td>175</td><td>227</td><td>245</td><td>257</td><td>268</td></tr> <tr><td>78</td><td>173</td><td>222</td><td>239</td><td>249</td><td>259</td></tr> <tr><td>80</td><td>170</td><td>217</td><td>232</td><td>241</td><td>251</td></tr> <tr><td>82</td><td>168</td><td>211</td><td>225</td><td>234</td><td>242</td></tr> <tr><td>84</td><td>165</td><td>206</td><td>219</td><td>228</td><td>234</td></tr> <tr><td>86</td><td>162</td><td>200</td><td>212</td><td>219</td><td>225</td></tr> <tr><td>88</td><td>159</td><td>195</td><td>205</td><td>212</td><td>218</td></tr> <tr><td>90</td><td>156</td><td>189</td><td>199</td><td>205</td><td>210</td></tr> <tr><td>92</td><td>153</td><td>184</td><td>193</td><td>198</td><td>203</td></tr> <tr><td>94</td><td>150</td><td>179</td><td>187</td><td>191</td><td>196</td></tr> <tr><td>96</td><td>147</td><td>173</td><td>181</td><td>185</td><td>189</td></tr> <tr><td>98</td><td>144</td><td>168</td><td>175</td><td>179</td><td>182</td></tr> <tr><td>100</td><td>141</td><td>163</td><td>169</td><td>173</td><td>176</td></tr> <tr><td>102</td><td>137</td><td>158</td><td>164</td><td>167</td><td>170</td></tr> 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²)					Q235	Q345/Q355	Q390	Q420	Q460	215	305	345	375	410	15	215	305	345	375	400	20	215	303	342	371	405	25	212	299	338	366	400	30	210	296	333	362	395	35	208	292	329	357	389	40	205	287	324	350	382	42	204	285	321	348	378	44	203	283	319	345	375	46	201	281	316	342	371	48	200	279	313	338	367	50	199	277	310	335	363	52	198	274	307	331	358	54	196	271	303	327	353	56	195	268	300	322	347	58	193	265	295	317	341	60	191	262	291	312	334	62	190	259	286	306	327	64	188	255	281	300	320	66	186	251	276	293	312	68	184	247	270	287	303	70	182	242	265	279	295	72	180	237	258	272	288	74	178	233	252	265	277	76	175	227	245	257	268	78	173	222	239	249	259	80	170	217	232	241	251	82	168	211	225	234	242	84	165	206	219	228	234	86	162	200	212	219	225	88	159	195	205	212	218	90	156	189	199	205	210	92	153	184	193	198	203	94	150	179	187	191	196	96	147	173	181	185	189	98	144	168	175	179	182	100	141	163	169	173	176	102	137	158	164	167	170	104	134	154	159	162	165	106	131	149	154	157	159	108	128	145	149	152	154
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⁷¹ Addition of design strength for Q355 and Q460 steel for buckling curve a; Revision of design strength for Q235, Q345, Q390 and Q420 steel for buckling curve a.

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		<p style="text-align: center;">Table 8.8(e) - Design strength p_c of compression members (cont'd)</p> <p style="text-align: center;">Values of p_c in N/mm² with $\lambda \geq 110$ for strut curve a</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="3">λ</th> <th colspan="5">Steel grade and design strength (N/mm²)</th> </tr> <tr> <th>Q235</th> <th>Q345/Q355</th> <th>Q390</th> <th>Q420</th> <th>Q460</th> </tr> <tr> <th>215</th> <th>305</th> <th>345</th> <th>375</th> <th>410</th> </tr> </thead> <tbody> <tr><td>110</td><td>125</td><td>140</td><td>144</td><td>147</td><td>149</td></tr> <tr><td>112</td><td>122</td><td>138</td><td>140</td><td>142</td><td>144</td></tr> <tr><td>114</td><td>119</td><td>132</td><td>136</td><td>138</td><td>140</td></tr> <tr><td>116</td><td>116</td><td>129</td><td>132</td><td>134</td><td>135</td></tr> <tr><td>118</td><td>113</td><td>125</td><td>128</td><td>129</td><td>131</td></tr> <tr><td>120</td><td>111</td><td>121</td><td>124</td><td>126</td><td>127</td></tr> <tr><td>122</td><td>108</td><td>118</td><td>120</td><td>122</td><td>123</td></tr> <tr><td>124</td><td>105</td><td>115</td><td>117</td><td>118</td><td>120</td></tr> <tr><td>126</td><td>103</td><td>111</td><td>114</td><td>115</td><td>116</td></tr> <tr><td>128</td><td>100</td><td>108</td><td>110</td><td>112</td><td>113</td></tr> <tr><td>130</td><td>98</td><td>105</td><td>107</td><td>108</td><td>110</td></tr> <tr><td>135</td><td>92</td><td>98</td><td>100</td><td>101</td><td>102</td></tr> <tr><td>140</td><td>86</td><td>92</td><td>94</td><td>95</td><td>95</td></tr> <tr><td>145</td><td>81</td><td>86</td><td>88</td><td>88</td><td>89</td></tr> <tr><td>150</td><td>77</td><td>81</td><td>82</td><td>83</td><td>84</td></tr> <tr><td>155</td><td>73</td><td>76</td><td>77</td><td>78</td><td>79</td></tr> <tr><td>160</td><td>69</td><td>72</td><td>73</td><td>73</td><td>74</td></tr> <tr><td>165</td><td>65</td><td>68</td><td>69</td><td>69</td><td>70</td></tr> <tr><td>170</td><td>62</td><td>64</td><td>65</td><td>65</td><td>66</td></tr> <tr><td>175</td><td>58</td><td>61</td><td>61</td><td>62</td><td>62</td></tr> <tr><td>180</td><td>55</td><td>58</td><td>58</td><td>59</td><td>59</td></tr> <tr><td>185</td><td>53</td><td>55</td><td>55</td><td>56</td><td>56</td></tr> <tr><td>190</td><td>50</td><td>52</td><td>53</td><td>53</td><td>53</td></tr> <tr><td>195</td><td>48</td><td>50</td><td>50</td><td>50</td><td>51</td></tr> <tr><td>200</td><td>46</td><td>47</td><td>48</td><td>48</td><td>48</td></tr> <tr><td>210</td><td>42</td><td>43</td><td>43</td><td>44</td><td>44</td></tr> <tr><td>220</td><td>38</td><td>39</td><td>40</td><td>40</td><td>40</td></tr> <tr><td>230</td><td>35</td><td>36</td><td>36</td><td>36</td><td>37</td></tr> <tr><td>240</td><td>32</td><td>33</td><td>33</td><td>34</td><td>34</td></tr> <tr><td>250</td><td>30</td><td>31</td><td>31</td><td>31</td><td>31</td></tr> <tr><td>260</td><td>28</td><td>28</td><td>29</td><td>29</td><td>29</td></tr> <tr><td>270</td><td>26</td><td>26</td><td>27</td><td>27</td><td>27</td></tr> <tr><td>280</td><td>24</td><td>25</td><td>25</td><td>25</td><td>25</td></tr> <tr><td>290</td><td>23</td><td>23</td><td>23</td><td>23</td><td>23</td></tr> <tr><td>300</td><td>21</td><td>22</td><td>22</td><td>22</td><td>22</td></tr> <tr><td>310</td><td>20</td><td>20</td><td>20</td><td>20</td><td>20</td></tr> <tr><td>320</td><td>19</td><td>19</td><td>19</td><td>19</td><td>19</td></tr> <tr><td>330</td><td>18</td><td>18</td><td>18</td><td>18</td><td>18</td></tr> <tr><td>340</td><td>17</td><td>17</td><td>17</td><td>17</td><td>17</td></tr> <tr><td>350</td><td>16</td><td>16</td><td>16</td><td>16</td><td>16</td></tr> </tbody> </table> <p style="text-align: center;">Note: For other steel grades, refer to Appendix 8.4.</p>	λ	Steel grade and design strength (N/mm ²)					Q235	Q345/Q355	Q390	Q420	Q460	215	305	345	375	410	110	125	140	144	147	149	112	122	138	140	142	144	114	119	132	136	138	140	116	116	129	132	134	135	118	113	125	128	129	131	120	111	121	124	126	127	122	108	118	120	122	123	124	105	115	117	118	120	126	103	111	114	115	116	128	100	108	110	112	113	130	98	105	107	108	110	135	92	98	100	101	102	140	86	92	94	95	95	145	81	86	88	88	89	150	77	81	82	83	84	155	73	76	77	78	79	160	69	72	73	73	74	165	65	68	69	69	70	170	62	64	65	65	66	175	58	61	61	62	62	180	55	58	58	59	59	185	53	55	55	56	56	190	50	52	53	53	53	195	48	50	50	50	51	200	46	47	48	48	48	210	42	43	43	44	44	220	38	39	40	40	40	230	35	36	36	36	37	240	32	33	33	34	34	250	30	31	31	31	31	260	28	28	29	29	29	270	26	26	27	27	27	280	24	25	25	25	25	290	23	23	23	23	23	300	21	22	22	22	22	310	20	20	20	20	20	320	19	19	19	19	19	330	18	18	18	18	18	340	17	17	17	17	17	350	16	16	16	16	16
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Table 8.8(f) ⁷²	<p style="text-align: center;">Table 8.8(f) - Design strength p_c of compression members</p> <table border="1"> <thead> <tr> <th colspan="5">Values of p_c in N/mm² with $\lambda < 110$ for strut curve b</th> <th colspan="5">Values of p_c in N/mm² with $\lambda \geq 110$ for strut curve b</th> </tr> <tr> <th rowspan="2">λ</th> <th colspan="4">Steel grade and design strength (N/mm²)</th> <th rowspan="2">λ</th> <th colspan="4">Steel grade and design strength (N/mm²)</th> </tr> <tr> <th>Q235</th> <th>Q345</th> <th>Q390</th> <th>Q420</th> <th>Q235</th> <th>Q345</th> <th 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<tr><td>86</td><td>144</td><td>180</td><td>191</td><td>198</td><td>240</td><td>30</td><td>31</td><td>32</td><td>32</td></tr> <tr><td>88</td><td>141</td><td>175</td><td>185</td><td>192</td><td>250</td><td>28</td><td>29</td><td>29</td><td>30</td></tr> <tr><td>90</td><td>138</td><td>170</td><td>180</td><td>188</td><td>260</td><td>26</td><td>27</td><td>27</td><td>27</td></tr> <tr><td>92</td><td>135</td><td>165</td><td>174</td><td>180</td><td>270</td><td>24</td><td>25</td><td>25</td><td>25</td></tr> <tr><td>94</td><td>132</td><td>161</td><td>169</td><td>174</td><td>280</td><td>22</td><td>23</td><td>24</td><td>24</td></tr> <tr><td>96</td><td>129</td><td>156</td><td>164</td><td>169</td><td>290</td><td>21</td><td>22</td><td>22</td><td>22</td></tr> <tr><td>98</td><td>127</td><td>152</td><td>159</td><td>163</td><td>300</td><td>20</td><td>20</td><td>21</td><td>21</td></tr> <tr><td>100</td><td>124</td><td>148</td><td>154</td><td>158</td><td>310</td><td>18</td><td>19</td><td>19</td><td>19</td></tr> <tr><td>102</td><td>121</td><td>143</td><td>150</td><td>153</td><td>320</td><td>17</td><td>18</td><td>18</td><td>18</td></tr> <tr><td>104</td><td>118</td><td>139</td><td>145</td><td>149</td><td>330</td><td>16</td><td>17</td><td>17</td><td>17</td></tr> <tr><td>106</td><td>116</td><td>135</td><td>141</td><td>144</td><td>340</td><td>15</td><td>16</td><td>16</td><td>16</td></tr> <tr><td>108</td><td>113</td><td>132</td><td>137</td><td>140</td><td>350</td><td>15</td><td>15</td><td>15</td><td>15</td></tr> </tbody> </table> <p>Note : For other steel grades, refer to Appendix 8.4.</p>	Values of p_c in N/mm ² with $\lambda < 110$ for strut curve b					Values of p_c in N/mm ² with $\lambda \geq 110$ for strut curve b					λ	Steel grade and design strength (N/mm ²)				λ	Steel grade and design strength (N/mm ²)				Q235	Q345	Q390	Q420	Q235	Q345	Q390	Q420		215	310	350	380		215	310	350	380	15	215	310	350	379	110	110	128	133	138	20	214	305	343	372	112	108	124	129	132	25	210	299	337	365	114	105	121	125	128	30	208	293	329	357	116	103	118	121	124	35	202	287	322	348	118	100	114	118	120	40	198	279	313	338	120	98	111	115	117	42	196	276	310	334	122	96	108	112	114	44	194	273	308	330	124	94	105	108	110	46	192	270	302	325	126	91	103	105	107	48	190	267	298	320	128	89	100	103	104	50	188	263	293	315	130	87	97	100	101	52	186	260	289	310	135	82	91	93	95	54	184	256	284	304	140	78	88	88	89	56	182	252	279	299	145	74	80	82	83	58	180	248	274	293	150	70	76	77	78	60	177	243	269	286	155	66	71	73	74	62	175	239	263	280	160	62	67	69	69	64	173	234	257	273	165	59	64	65	66	66	170	230	252	267	170	56	60	61	62	68	168	225	246	260	175	53	57	58	59	70	165	220	240	253	180	51	54	55	56	72	163	215	233	246	185	49	52	52	53	74	160	210	227	239	190	46	49	50	50	76	157	205	221	232	195	44	47	47	48	78	155	200	215	225	200	42	45	45	46	80	152	195	209	218	210	39	41	41	41	82	149	190	203	211	220	35	37	38	38	84	146	185	197	205	230	33	34	35	35	86	144	180	191	198	240	30	31	32	32	88	141	175	185	192	250	28	29	29	30	90	138	170	180	188	260	26	27	27	27	92	135	165	174	180	270	24	25	25	25	94	132	161	169	174	280	22	23	24	24	96	129	156	164	169	290	21	22	22	22	98	127	152	159	163	300	20	20	21	21	100	124	148	154	158	310	18	19	19	19	102	121	143	150	153	320	17	18	18	18	104	118	139	145	149	330	16	17	17	17	106	116	135	141	144	340	15	16	16	16	108	113	132	137	140	350	15	15	15	15	<p style="text-align: center;">Table 8.8(f) - Design strength p_c of compression members</p> <table border="1"> <thead> <tr> <th colspan="8">Values of p_c in N/mm² with $\lambda < 110$ for strut curve b</th> </tr> <tr> <th rowspan="2">λ</th> <th colspan="7">Steel grade and design strength (N/mm²)</th> </tr> <tr> <th>Q235</th> <th>Q345/Q355</th> <th>Q390</th> <th>Q420</th> <th>Q460</th> <th>Q550</th> <th>Q690</th> </tr> <tr> <td></td> <td>215</td> <td>305</td> <td>345</td> <td>375</td> <td>410</td> <td>520</td> <td>630</td> </tr> </thead> <tbody> <tr><td>15</td><td>215</td><td>305</td><td>345</td><td>375</td><td>409</td><td>515</td><td>621</td></tr> <tr><td>20</td><td>215</td><td>301</td><td>339</td><td>368</td><td>401</td><td>505</td><td>609</td></tr> <tr><td>25</td><td>211</td><td>295</td><td>332</td><td>360</td><td>393</td><td>494</td><td>595</td></tr> <tr><td>30</td><td>207</td><td>289</td><td>325</td><td>353</td><td>384</td><td>482</td><td>579</td></tr> <tr><td>35</td><td>202</td><td>283</td><td>318</td><td>344</td><td>374</td><td>468</td><td>560</td></tr> <tr><td>40</td><td>198</td><td>278</td><td>310</td><td>335</td><td>364</td><td>452</td><td>537</td></tr> <tr><td>42</td><td>196</td><td>273</td><td>306</td><td>331</td><td>356</td><td>445</td><td>526</td></tr> <tr><td>44</td><td>194</td><td>270</td><td>302</td><td>326</td><td>354</td><td>437</td><td>514</td></tr> <tr><td>46</td><td>193</td><td>267</td><td>298</td><td>322</td><td>349</td><td>429</td><td>502</td></tr> <tr><td>48</td><td>191</td><td>263</td><td>294</td><td>317</td><td>343</td><td>420</td><td>489</td></tr> <tr><td>50</td><td>189</td><td>260</td><td>290</td><td>312</td><td>337</td><td>411</td><td>475</td></tr> <tr><td>52</td><td>187</td><td>256</td><td>286</td><td>307</td><td>331</td><td>401</td><td>460</td></tr> <tr><td>54</td><td>185</td><td>253</td><td>281</td><td>302</td><td>325</td><td>390</td><td>445</td></tr> <tr><td>56</td><td>182</td><td>249</td><td>278</td><td>296</td><td>318</td><td>380</td><td>429</td></tr> <tr><td>58</td><td>180</td><td>245</td><td>271</td><td>290</td><td>311</td><td>368</td><td>414</td></tr> <tr><td>60</td><td>178</td><td>241</td><td>266</td><td>284</td><td>304</td><td>357</td><td>398</td></tr> <tr><td>62</td><td>176</td><td>236</td><td>261</td><td>278</td><td>296</td><td>346</td><td>382</td></tr> <tr><td>64</td><td>173</td><td>232</td><td>255</td><td>271</td><td>289</td><td>334</td><td>367</td></tr> <tr><td>66</td><td>171</td><td>227</td><td>249</td><td>265</td><td>281</td><td>322</td><td>352</td></tr> <tr><td>68</td><td>168</td><td>223</td><td>244</td><td>258</td><td>273</td><td>311</td><td>337</td></tr> <tr><td>70</td><td>166</td><td>218</td><td>238</td><td>251</td><td>265</td><td>300</td><td>323</td></tr> <tr><td>72</td><td>163</td><td>213</td><td>232</td><td>244</td><td>257</td><td>289</td><td>310</td></tr> <tr><td>74</td><td>161</td><td>208</td><td>226</td><td>237</td><td>249</td><td>278</td><td>297</td></tr> <tr><td>76</td><td>158</td><td>204</td><td>220</td><td>230</td><td>241</td><td>268</td><td>285</td></tr> <tr><td>78</td><td>155</td><td>199</td><td>214</td><td>224</td><td>234</td><td>258</td><td>273</td></tr> <tr><td>80</td><td>153</td><td>194</td><td>208</td><td>217</td><td>226</td><td>248</td><td>262</td></tr> <tr><td>82</td><td>150</td><td>189</td><td>202</td><td>210</td><td>219</td><td>239</td><td>251</td></tr> <tr><td>84</td><td>147</td><td>184</td><td>196</td><td>204</td><td>212</td><td>230</td><td>241</td></tr> <tr><td>86</td><td>144</td><td>179</td><td>190</td><td>198</td><td>205</td><td>221</td><td>232</td></tr> <tr><td>88</td><td>141</td><td>174</td><td>185</td><td>191</td><td>198</td><td>213</td><td>223</td></tr> <tr><td>90</td><td>138</td><td>169</td><td>179</td><td>185</td><td>192</td><td>206</td><td>214</td></tr> <tr><td>92</td><td>136</td><td>165</td><td>174</td><td>180</td><td>185</td><td>198</td><td>206</td></tr> <tr><td>94</td><td>133</td><td>160</td><td>169</td><td>174</td><td>179</td><td>191</td><td>199</td></tr> <tr><td>96</td><td>130</td><td>156</td><td>164</td><td>169</td><td>173</td><td>184</td><td>191</td></tr> <tr><td>98</td><td>127</td><td>151</td><td>159</td><td>163</td><td>168</td><td>178</td><td>184</td></tr> <tr><td>100</td><td>124</td><td>147</td><td>154</td><td>158</td><td>162</td><td>172</td><td>178</td></tr> <tr><td>102</td><td>121</td><td>143</td><td>149</td><td>153</td><td>157</td><td>166</td><td>171</td></tr> <tr><td>104</td><td>119</td><td>139</td><td>145</td><td>149</td><td>152</td><td>160</td><td>165</td></tr> <tr><td>106</td><td>116</td><td>135</td><td>141</td><td>144</td><td>148</td><td>155</td><td>160</td></tr> <tr><td>108</td><td>113</td><td>131</td><td>137</td><td>140</td><td>143</td><td>150</td><td>154</td></tr> </tbody> </table> <p>Note : For other steel grades, refer to Appendix 8.4.</p>	Values of p_c in N/mm ² with $\lambda < 110$ for strut curve b								λ	Steel grade and design strength (N/mm ²)							Q235	Q345/Q355	Q390	Q420	Q460	Q550	Q690		215	305	345	375	410	520	630	15	215	305	345	375	409	515	621	20	215	301	339	368	401	505	609	25	211	295	332	360	393	494	595	30	207	289	325	353	384	482	579	35	202	283	318	344	374	468	560	40	198	278	310	335	364	452	537	42	196	273	306	331	356	445	526	44	194	270	302	326	354	437	514	46	193	267	298	322	349	429	502	48	191	263	294	317	343	420	489	50	189	260	290	312	337	411	475	52	187	256	286	307	331	401	460	54	185	253	281	302	325	390	445	56	182	249	278	296	318	380	429	58	180	245	271	290	311	368	414	60	178	241	266	284	304	357	398	62	176	236	261	278	296	346	382	64	173	232	255	271	289	334	367	66	171	227	249	265	281	322	352	68	168	223	244	258	273	311	337	70	166	218	238	251	265	300	323	72	163	213	232	244	257	289	310	74	161	208	226	237	249	278	297	76	158	204	220	230	241	268	285	78	155	199	214	224	234	258	273	80	153	194	208	217	226	248	262	82	150	189	202	210	219	239	251	84	147	184	196	204	212	230	241	86	144	179	190	198	205	221	232	88	141	174	185	191	198	213	223	90	138	169	179	185	192	206	214	92	136	165	174	180	185	198	206	94	133	160	169	174	179	191	199	96	130	156	164	169	173	184	191	98	127	151	159	163	168	178	184	100	124	147	154	158	162	172	178	102	121	143	149	153	157	166	171	104	119	139	145	149	152	160	165	106	116	135	141	144	148	155	160	108	113	131	137	140	143	150	154
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		<p style="text-align: center;">Table 8.8(f) – Design strength p_c of compression members (cont'd)</p> <p style="text-align: center;">Values of p_c in N/mm² with $\lambda \geq 110$ for strut curve b</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="3">λ</th> <th colspan="7">Steel grade and design strength (N/mm²)</th> </tr> <tr> <th>Q235</th> <th>Q345/Q355</th> <th>Q390</th> <th>Q420</th> <th>Q460</th> <th>Q550</th> <th>Q690</th> </tr> <tr> <th>215</th> <th>305</th> <th>345</th> <th>375</th> <th>410</th> <th>520</th> <th>630</th> </tr> </thead> <tbody> <tr><td>110</td><td>111</td><td>128</td><td>133</td><td>130</td><td>130</td><td>145</td><td>140</td></tr> <tr><td>112</td><td>108</td><td>124</td><td>129</td><td>132</td><td>134</td><td>140</td><td>144</td></tr> <tr><td>114</td><td>106</td><td>121</td><td>125</td><td>128</td><td>130</td><td>138</td><td>140</td></tr> <tr><td>116</td><td>103</td><td>117</td><td>122</td><td>124</td><td>126</td><td>132</td><td>135</td></tr> <tr><td>118</td><td>101</td><td>114</td><td>118</td><td>120</td><td>123</td><td>128</td><td>131</td></tr> <tr><td>120</td><td>99</td><td>111</td><td>115</td><td>117</td><td>119</td><td>124</td><td>127</td></tr> <tr><td>122</td><td>96</td><td>108</td><td>112</td><td>114</td><td>116</td><td>120</td><td>123</td></tr> <tr><td>124</td><td>94</td><td>105</td><td>109</td><td>111</td><td>112</td><td>117</td><td>119</td></tr> <tr><td>126</td><td>92</td><td>103</td><td>106</td><td>107</td><td>109</td><td>113</td><td>116</td></tr> <tr><td>128</td><td>90</td><td>100</td><td>103</td><td>105</td><td>106</td><td>110</td><td>113</td></tr> <tr><td>130</td><td>88</td><td>97</td><td>100</td><td>102</td><td>103</td><td>107</td><td>109</td></tr> <tr><td>135</td><td>83</td><td>91</td><td>94</td><td>95</td><td>97</td><td>100</td><td>102</td></tr> <tr><td>140</td><td>78</td><td>86</td><td>88</td><td>89</td><td>90</td><td>93</td><td>95</td></tr> <tr><td>145</td><td>74</td><td>81</td><td>83</td><td>84</td><td>85</td><td>87</td><td>89</td></tr> <tr><td>150</td><td>70</td><td>76</td><td>78</td><td>79</td><td>80</td><td>82</td><td>83</td></tr> <tr><td>155</td><td>66</td><td>72</td><td>73</td><td>74</td><td>75</td><td>77</td><td>78</td></tr> <tr><td>160</td><td>63</td><td>68</td><td>69</td><td>70</td><td>71</td><td>72</td><td>74</td></tr> <tr><td>165</td><td>60</td><td>64</td><td>65</td><td>66</td><td>67</td><td>68</td><td>69</td></tr> <tr><td>170</td><td>57</td><td>61</td><td>62</td><td>62</td><td>63</td><td>65</td><td>65</td></tr> <tr><td>175</td><td>54</td><td>58</td><td>59</td><td>59</td><td>60</td><td>61</td><td>62</td></tr> <tr><td>180</td><td>51</td><td>55</td><td>56</td><td>56</td><td>57</td><td>58</td><td>59</td></tr> <tr><td>185</td><td>49</td><td>52</td><td>53</td><td>53</td><td>54</td><td>55</td><td>56</td></tr> 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<tr><td>280</td><td>23</td><td>24</td><td>24</td><td>24</td><td>24</td><td>25</td><td>25</td></tr> <tr><td>290</td><td>22</td><td>22</td><td>22</td><td>23</td><td>23</td><td>23</td><td>23</td></tr> <tr><td>300</td><td>20</td><td>21</td><td>21</td><td>21</td><td>21</td><td>23</td><td>23</td></tr> <tr><td>310</td><td>19</td><td>20</td><td>20</td><td>20</td><td>20</td><td>20</td><td>20</td></tr> <tr><td>320</td><td>18</td><td>18</td><td>19</td><td>19</td><td>19</td><td>19</td><td>19</td></tr> <tr><td>330</td><td>17</td><td>17</td><td>17</td><td>18</td><td>18</td><td>18</td><td>18</td></tr> <tr><td>340</td><td>16</td><td>16</td><td>17</td><td>17</td><td>17</td><td>17</td><td>17</td></tr> <tr><td>350</td><td>15</td><td>16</td><td>16</td><td>16</td><td>16</td><td>16</td><td>16</td></tr> </tbody> </table> <p>Note: For other steel grades, refer to Appendix 8.4.</p>	λ	Steel grade and design strength (N/mm ²)							Q235	Q345/Q355	Q390	Q420	Q460	Q550	Q690	215	305	345	375	410	520	630	110	111	128	133	130	130	145	140	112	108	124	129	132	134	140	144	114	106	121	125	128	130	138	140	116	103	117	122	124	126	132	135	118	101	114	118	120	123	128	131	120	99	111	115	117	119	124	127	122	96	108	112	114	116	120	123	124	94	105	109	111	112	117	119	126	92	103	106	107	109	113	116	128	90	100	103	105	106	110	113	130	88	97	100	102	103	107	109	135	83	91	94	95	97	100	102	140	78	86	88	89	90	93	95	145	74	81	83	84	85	87	89	150	70	76	78	79	80	82	83	155	66	72	73	74	75	77	78	160	63	68	69	70	71	72	74	165	60	64	65	66	67	68	69	170	57	61	62	62	63	65	65	175	54	58	59	59	60	61	62	180	51	55	56	56	57	58	59	185	49	52	53	53	54	55	56	190	47	49	50	51	51	52	53	195	45	47	48	48	49	50	50	200	43	45	46	46	46	47	48	210	39	41	42	42	42	43	44	220	36	38	38	38	39	39	40	230	33	35	35	35	36	36	36	240	31	32	32	32	33	33	34	250	28	30	30	30	30	31	31	260	26	27	28	28	28	28	29	270	25	26	26	26	26	26	27	280	23	24	24	24	24	25	25	290	22	22	22	23	23	23	23	300	20	21	21	21	21	23	23	310	19	20	20	20	20	20	20	320	18	18	19	19	19	19	19	330	17	17	17	18	18	18	18	340	16	16	17	17	17	17	17	350	15	16	16	16	16	16	16
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73. Table 8.8(g) ⁷³	<p style="text-align: center;">Table 8.8(g) - Design strength p_c of compression members</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="5" style="text-align: center;">Values of p_c in N/mm² with $\lambda < 110$ for strut curve c</th> <th colspan="5" style="text-align: center;">Values of p_c in N/mm² with $\lambda \geq 110$ for strut curve c</th> </tr> <tr> <th rowspan="2">λ</th> <th colspan="4" style="text-align: center;">Steel grade and design strength (N/mm²)</th> <th rowspan="2">λ</th> <th colspan="4" style="text-align: center;">Steel grade and design strength (N/mm²)</th> </tr> <tr> <th>Q235</th> <th>Q345</th> <th>Q390</th> <th>Q420</th> <th>Q235</th> <th>Q345</th> <th>Q390</th> <th>Q420</th> </tr> </thead> <tbody> <tr><td>15</td><td>215</td><td>310</td><td>350</td><td>379</td><td>110</td><td>97</td><td>115</td><td>121</td><td>124</td></tr> <tr><td>20</td><td>214</td><td>303</td><td>340</td><td>368</td><td>112</td><td>95</td><td>112</td><td>117</td><td>120</td></tr> <tr><td>25</td><td>208</td><td>294</td><td>330</td><td>357</td><td>114</td><td>93</td><td>109</td><td>114</td><td>117</td></tr> <tr><td>30</td><td>202</td><td>285</td><td>319</td><td>345</td><td>116</td><td>91</td><td>106</td><td>111</td><td>114</td></tr> <tr><td>35</td><td>185</td><td>275</td><td>308</td><td>333</td><td>118</td><td>89</td><td>104</td><td>108</td><td>111</td></tr> <tr><td>40</td><td>189</td><td>265</td><td>297</td><td>320</td><td>120</td><td>87</td><td>101</td><td>105</td><td>108</td></tr> <tr><td>42</td><td>187</td><td>261</td><td>292</td><td>314</td><td>122</td><td>85</td><td>98</td><td>102</td><td>105</td></tr> <tr><td>44</td><td>184</td><td>257</td><td>287</td><td>309</td><td>124</td><td>83</td><td>96</td><td>100</td><td>102</td></tr> <tr><td>46</td><td>182</td><td>253</td><td>282</td><td>303</td><td>126</td><td>81</td><td>93</td><td>97</td><td>99</td></tr> <tr><td>48</td><td>179</td><td>249</td><td>277</td><td>297</td><td>128</td><td>79</td><td>91</td><td>94</td><td>97</td></tr> <tr><td>50</td><td>176</td><td>244</td><td>271</td><td>291</td><td>130</td><td>78</td><td>89</td><td>92</td><td>94</td></tr> <tr><td>52</td><td>174</td><td>240</td><td>266</td><td>285</td><td>135</td><td>73</td><td>84</td><td>88</td><td>88</td></tr> <tr><td>54</td><td>171</td><td>235</td><td>260</td><td>278</td><td>140</td><td>70</td><td>79</td><td>81</td><td>83</td></tr> <tr><td>56</td><td>168</td><td>231</td><td>255</td><td>272</td><td>145</td><td>66</td><td>74</td><td>76</td><td>78</td></tr> <tr><td>58</td><td>166</td><td>226</td><td>249</td><td>266</td><td>150</td><td>63</td><td>70</td><td>72</td><td>73</td></tr> <tr><td>60</td><td>163</td><td>221</td><td>243</td><td>259</td><td>155</td><td>59</td><td>66</td><td>68</td><td>69</td></tr> <tr><td>62</td><td>160</td><td>216</td><td>238</td><td>252</td><td>160</td><td>56</td><td>63</td><td>64</td><td>65</td></tr> <tr><td>64</td><td>158</td><td>212</td><td>232</td><td>246</td><td>165</td><td>54</td><td>59</td><td>61</td><td>62</td></tr> <tr><td>66</td><td>155</td><td>207</td><td>228</td><td>239</td><td>170</td><td>51</td><td>56</td><td>58</td><td>59</td></tr> <tr><td>68</td><td>152</td><td>202</td><td>220</td><td>233</td><td>175</td><td>49</td><td>53</td><td>55</td><td>55</td></tr> <tr><td>70</td><td>149</td><td>197</td><td>214</td><td>226</td><td>180</td><td>47</td><td>51</td><td>52</td><td>53</td></tr> <tr><td>72</td><td>146</td><td>192</td><td>209</td><td>220</td><td>185</td><td>44</td><td>48</td><td>49</td><td>50</td></tr> <tr><td>74</td><td>144</td><td>188</td><td>203</td><td>213</td><td>190</td><td>42</td><td>46</td><td>47</td><td>48</td></tr> <tr><td>76</td><td>141</td><td>183</td><td>197</td><td>207</td><td>195</td><td>41</td><td>44</td><td>45</td><td>45</td></tr> <tr><td>78</td><td>138</td><td>178</td><td>192</td><td>201</td><td>200</td><td>39</td><td>42</td><td>43</td><td>43</td></tr> <tr><td>80</td><td>135</td><td>174</td><td>186</td><td>195</td><td>210</td><td>36</td><td>38</td><td>39</td><td>40</td></tr> <tr><td>82</td><td>132</td><td>169</td><td>181</td><td>189</td><td>220</td><td>33</td><td>35</td><td>36</td><td>36</td></tr> <tr><td>84</td><td>130</td><td>164</td><td>176</td><td>183</td><td>230</td><td>30</td><td>32</td><td>33</td><td>33</td></tr> <tr><td>86</td><td>127</td><td>160</td><td>171</td><td>178</td><td>240</td><td>28</td><td>30</td><td>30</td><td>31</td></tr> <tr><td>88</td><td>124</td><td>156</td><td>166</td><td>173</td><td>250</td><td>26</td><td>28</td><td>28</td><td>28</td></tr> <tr><td>90</td><td>122</td><td>152</td><td>161</td><td>167</td><td>260</td><td>24</td><td>26</td><td>26</td><td>26</td></tr> <tr><td>92</td><td>119</td><td>147</td><td>156</td><td>162</td><td>270</td><td>23</td><td>24</td><td>24</td><td>25</td></tr> <tr><td>94</td><td>116</td><td>143</td><td>152</td><td>157</td><td>280</td><td>21</td><td>22</td><td>23</td><td>23</td></tr> <tr><td>96</td><td>114</td><td>140</td><td>148</td><td>153</td><td>290</td><td>20</td><td>21</td><td>21</td><td>21</td></tr> <tr><td>98</td><td>111</td><td>136</td><td>143</td><td>148</td><td>300</td><td>19</td><td>20</td><td>20</td><td>20</td></tr> <tr><td>100</td><td>109</td><td>132</td><td>139</td><td>144</td><td>310</td><td>17</td><td>18</td><td>19</td><td>19</td></tr> <tr><td>102</td><td>106</td><td>129</td><td>135</td><td>139</td><td>320</td><td>16</td><td>17</td><td>17</td><td>18</td></tr> <tr><td>104</td><td>104</td><td>125</td><td>131</td><td>135</td><td>330</td><td>16</td><td>16</td><td>16</td><td>17</td></tr> <tr><td>106</td><td>102</td><td>122</td><td>128</td><td>131</td><td>340</td><td>15</td><td>15</td><td>16</td><td>16</td></tr> <tr><td>108</td><td>99</td><td>118</td><td>124</td><td>128</td><td>350</td><td>14</td><td>14</td><td>15</td><td>15</td></tr> </tbody> </table> <p>Note : For other steel grades, refer to Appendix 8.4.</p>	Values of p_c in N/mm ² with $\lambda < 110$ for strut curve c					Values of p_c in N/mm ² with $\lambda \geq 110$ for strut curve c					λ	Steel grade and design strength (N/mm ²)				λ	Steel grade and design strength (N/mm ²)				Q235	Q345	Q390	Q420	Q235	Q345	Q390	Q420	15	215	310	350	379	110	97	115	121	124	20	214	303	340	368	112	95	112	117	120	25	208	294	330	357	114	93	109	114	117	30	202	285	319	345	116	91	106	111	114	35	185	275	308	333	118	89	104	108	111	40	189	265	297	320	120	87	101	105	108	42	187	261	292	314	122	85	98	102	105	44	184	257	287	309	124	83	96	100	102	46	182	253	282	303	126	81	93	97	99	48	179	249	277	297	128	79	91	94	97	50	176	244	271	291	130	78	89	92	94	52	174	240	266	285	135	73	84	88	88	54	171	235	260	278	140	70	79	81	83	56	168	231	255	272	145	66	74	76	78	58	166	226	249	266	150	63	70	72	73	60	163	221	243	259	155	59	66	68	69	62	160	216	238	252	160	56	63	64	65	64	158	212	232	246	165	54	59	61	62	66	155	207	228	239	170	51	56	58	59	68	152	202	220	233	175	49	53	55	55	70	149	197	214	226	180	47	51	52	53	72	146	192	209	220	185	44	48	49	50	74	144	188	203	213	190	42	46	47	48	76	141	183	197	207	195	41	44	45	45	78	138	178	192	201	200	39	42	43	43	80	135	174	186	195	210	36	38	39	40	82	132	169	181	189	220	33	35	36	36	84	130	164	176	183	230	30	32	33	33	86	127	160	171	178	240	28	30	30	31	88	124	156	166	173	250	26	28	28	28	90	122	152	161	167	260	24	26	26	26	92	119	147	156	162	270	23	24	24	25	94	116	143	152	157	280	21	22	23	23	96	114	140	148	153	290	20	21	21	21	98	111	136	143	148	300	19	20	20	20	100	109	132	139	144	310	17	18	19	19	102	106	129	135	139	320	16	17	17	18	104	104	125	131	135	330	16	16	16	17	106	102	122	128	131	340	15	15	16	16	108	99	118	124	128	350	14	14	15	15	<p style="text-align: center;">Table 8.8(g) - Design strength p_c of compression members</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="8" style="text-align: center;">Values of p_c in N/mm² with $\lambda < 110$ for strut curve c</th> </tr> <tr> <th rowspan="2">λ</th> <th colspan="7" style="text-align: center;">Steel grade and design strength (N/mm²)</th> </tr> <tr> <th>Q235</th> <th>Q345/Q355</th> <th>Q390</th> <th>Q420</th> <th>Q460</th> <th>Q550</th> <th>Q690</th> </tr> </thead> <tbody> <tr><td>15</td><td>215</td><td>305</td><td>345</td><td>375</td><td>410</td><td>520</td><td>630</td></tr> <tr><td>20</td><td>214</td><td>299</td><td>336</td><td>364</td><td>396</td><td>497</td><td>598</td></tr> <tr><td>25</td><td>208</td><td>290</td><td>326</td><td>353</td><td>384</td><td>481</td><td>577</td></tr> <tr><td>30</td><td>202</td><td>281</td><td>315</td><td>341</td><td>371</td><td>464</td><td>554</td></tr> <tr><td>35</td><td>196</td><td>272</td><td>305</td><td>329</td><td>357</td><td>445</td><td>529</td></tr> <tr><td>40</td><td>190</td><td>262</td><td>293</td><td>316</td><td>343</td><td>424</td><td>500</td></tr> <tr><td>42</td><td>187</td><td>258</td><td>288</td><td>311</td><td>337</td><td>415</td><td>487</td></tr> <tr><td>44</td><td>185</td><td>254</td><td>284</td><td>305</td><td>330</td><td>405</td><td>474</td></tr> <tr><td>46</td><td>182</td><td>250</td><td>279</td><td>300</td><td>324</td><td>396</td><td>461</td></tr> <tr><td>48</td><td>180</td><td>246</td><td>274</td><td>294</td><td>317</td><td>386</td><td>447</td></tr> <tr><td>50</td><td>177</td><td>241</td><td>268</td><td>288</td><td>310</td><td>375</td><td>432</td></tr> <tr><td>52</td><td>174</td><td>237</td><td>263</td><td>282</td><td>303</td><td>365</td><td>418</td></tr> <tr><td>54</td><td>172</td><td>232</td><td>258</td><td>276</td><td>296</td><td>354</td><td>404</td></tr> <tr><td>56</td><td>169</td><td>228</td><td>252</td><td>270</td><td>289</td><td>344</td><td>389</td></tr> <tr><td>58</td><td>166</td><td>223</td><td>247</td><td>263</td><td>282</td><td>333</td><td>375</td></tr> <tr><td>60</td><td>164</td><td>219</td><td>241</td><td>257</td><td>274</td><td>322</td><td>361</td></tr> <tr><td>62</td><td>161</td><td>214</td><td>236</td><td>251</td><td>267</td><td>312</td><td>347</td></tr> <tr><td>64</td><td>158</td><td>210</td><td>230</td><td>244</td><td>260</td><td>301</td><td>333</td></tr> <tr><td>66</td><td>155</td><td>205</td><td>224</td><td>238</td><td>252</td><td>291</td><td>320</td></tr> <tr><td>68</td><td>152</td><td>200</td><td>219</td><td>231</td><td>245</td><td>281</td><td>306</td></tr> <tr><td>70</td><td>150</td><td>195</td><td>213</td><td>225</td><td>238</td><td>271</td><td>295</td></tr> <tr><td>72</td><td>147</td><td>191</td><td>207</td><td>219</td><td>231</td><td>261</td><td>284</td></tr> 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<tr><td>92</td><td>120</td><td>147</td><td>156</td><td>162</td><td>168</td><td>183</td><td>192</td></tr> <tr><td>94</td><td>117</td><td>143</td><td>151</td><td>157</td><td>163</td><td>178</td><td>186</td></tr> <tr><td>96</td><td>114</td><td>139</td><td>147</td><td>152</td><td>158</td><td>170</td><td>179</td></tr> <tr><td>98</td><td>112</td><td>135</td><td>143</td><td>148</td><td>153</td><td>165</td><td>173</td></tr> <tr><td>100</td><td>109</td><td>132</td><td>139</td><td>143</td><td>148</td><td>159</td><td>167</td></tr> <tr><td>102</td><td>107</td><td>128</td><td>135</td><td>139</td><td>144</td><td>154</td><td>161</td></tr> <tr><td>104</td><td>105</td><td>125</td><td>131</td><td>135</td><td>139</td><td>149</td><td>156</td></tr> <tr><td>106</td><td>102</td><td>121</td><td>127</td><td>131</td><td>135</td><td>144</td><td>151</td></tr> <tr><td>108</td><td>100</td><td>118</td><td>124</td><td>128</td><td>131</td><td>140</td><td>148</td></tr> </tbody> </table> <p>Note : For other steel grades, refer to Appendix 8.4.</p>	Values of p_c in N/mm ² with $\lambda < 110$ for strut curve c								λ	Steel grade and design strength (N/mm ²)							Q235	Q345/Q355	Q390	Q420	Q460	Q550	Q690	15	215	305	345	375	410	520	630	20	214	299	336	364	396	497	598	25	208	290	326	353	384	481	577	30	202	281	315	341	371	464	554	35	196	272	305	329	357	445	529	40	190	262	293	316	343	424	500	42	187	258	288	311	337	415	487	44	185	254	284	305	330	405	474	46	182	250	279	300	324	396	461	48	180	246	274	294	317	386	447	50	177	241	268	288	310	375	432	52	174	237	263	282	303	365	418	54	172	232	258	276	296	354	404	56	169	228	252	270	289	344	389	58	166	223	247	263	282	333	375	60	164	219	241	257	274	322	361	62	161	214	236	251	267	312	347	64	158	210	230	244	260	301	333	66	155	205	224	238	252	291	320	68	152	200	219	231	245	281	306	70	150	195	213	225	238	271	295	72	147	191	207	219	231	261	284	74	144	186	202	212	223	252	272	76	141	181	196	206	217	243	262	78	139	177	191	200	210	234	252	80	136	172	185	194	203	226	242	82	133	168	180	188	197	218	232	84	130	163	175	183	191	210	224	86	128	159	170	177	185	203	215	88	125	155	165	172	179	196	207	90	122	151	161	167	173	189	200	92	120	147	156	162	168	183	192	94	117	143	151	157	163	178	186	96	114	139	147	152	158	170	179	98	112	135	143	148	153	165	173	100	109	132	139	143	148	159	167	102	107	128	135	139	144	154	161	104	105	125	131	135	139	149	156	106	102	121	127	131	135	144	151	108	100	118	124	128	131	140	148
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⁷³ Addition of design strength for Q355, Q460, Q550 and Q690 steel for buckling curve c; Revision of design strength for Q235, Q345, Q390 and Q420 steel for buckling curve c.

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		<p style="text-align: center;">Table 8.8(g) - Design strength p_c of compression members (cont'd)</p> <p style="text-align: center;">Values of p_c in N/mm² with $\lambda \geq 110$ for strut curve c</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">λ</th> <th colspan="7">Steel grade and design strength (N/mm²)</th> </tr> <tr> <th>Q235</th> <th>Q345/Q355</th> <th>Q390</th> <th>Q420</th> <th>Q460</th> <th>Q550</th> <th>Q690</th> </tr> </thead> <tbody> <tr><td></td><td>215</td><td>305</td><td>345</td><td>375</td><td>410</td><td>520</td><td>630</td></tr> <tr><td>110</td><td>98</td><td>115</td><td>120</td><td>124</td><td>127</td><td>136</td><td>141</td></tr> <tr><td>112</td><td>96</td><td>112</td><td>117</td><td>120</td><td>124</td><td>131</td><td>137</td></tr> <tr><td>114</td><td>93</td><td>109</td><td>114</td><td>117</td><td>120</td><td>127</td><td>132</td></tr> 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²)							Q235	Q345/Q355	Q390	Q420	Q460	Q550	Q690		215	305	345	375	410	520	630	110	98	115	120	124	127	136	141	112	96	112	117	120	124	131	137	114	93	109	114	117	120	127	132	116	91	106	111	114	117	124	128	118	89	104	108	111	114	120	124	120	87	101	105	108	110	117	121	122	85	98	102	105	107	113	117	124	84	96	100	102	104	110	114	126	82	93	97	99	102	107	110	128	80	91	95	97	99	104	107	130	78	89	92	94	96	101	104	135	74	84	87	88	90	94	97	140	70	79	81	83	85	88	91	145	66	74	77	78	80	83	85	150	63	70	72	74	75	78	80	155	60	66	68	69	71	73	75	160	57	63	65	66	67	69	71	165	54	60	61	62	63	65	67	170	52	57	58	59	60	62	63	175	49	54	55	56	57	59	60	180	47	51	52	53	54	56	57	185	45	49	50	50	51	53	54	190	43	46	47	48	49	50	51	195	41	44	45	46	46	48	49	200	39	42	43	44	44	46	46	210	36	39	40	40	40	42	42	220	33	36	36	37	37	38	39	230	31	33	33	34	34	35	36	240	29	30	31	31	31	32	33	250	27	28	29	29	29	30	30	260	25	26	27	27	27	28	28	270	23	24	25	25	25	26	26	280	22	23	23	23	24	24	24	290	20	21	22	22	22	22	23	300	19	20	20	20	21	21	21	310	18	19	19	19	19	20	20	320	17	18	18	18	18	19	19	330	16	17	17	17	17	17	18	340	15	16	16	16	16	16	17	350	14	15	15	15	15	16	16
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<tr><td>48</td><td>167</td><td>230</td><td>255</td><td>273</td><td>128</td><td>70</td><td>83</td><td>86</td><td>89</td></tr> <tr><td>50</td><td>164</td><td>225</td><td>249</td><td>267</td><td>130</td><td>69</td><td>81</td><td>84</td><td>86</td></tr> <tr><td>52</td><td>161</td><td>220</td><td>243</td><td>260</td><td>135</td><td>65</td><td>76</td><td>79</td><td>81</td></tr> <tr><td>54</td><td>158</td><td>215</td><td>237</td><td>253</td><td>140</td><td>62</td><td>72</td><td>75</td><td>76</td></tr> <tr><td>56</td><td>155</td><td>210</td><td>231</td><td>247</td><td>145</td><td>59</td><td>68</td><td>70</td><td>72</td></tr> <tr><td>58</td><td>152</td><td>205</td><td>226</td><td>240</td><td>150</td><td>56</td><td>64</td><td>66</td><td>68</td></tr> <tr><td>60</td><td>149</td><td>200</td><td>220</td><td>234</td><td>155</td><td>53</td><td>61</td><td>63</td><td>64</td></tr> <tr><td>62</td><td>146</td><td>195</td><td>214</td><td>227</td><td>160</td><td>51</td><td>58</td><td>60</td><td>61</td></tr> <tr><td>64</td><td>143</td><td>190</td><td>208</td><td>221</td><td>165</td><td>48</td><td>55</td><td>56</td><td>58</td></tr> <tr><td>66</td><td>140</td><td>186</td><td>203</td><td>215</td><td>170</td><td>46</td><td>52</td><td>54</td><td>55</td></tr> <tr><td>68</td><td>137</td><td>181</td><td>197</td><td>209</td><td>175</td><td>44</td><td>49</td><td>51</td><td>52</td></tr> <tr><td>70</td><td>134</td><td>176</td><td>192</td><td>203</td><td>180</td><td>42</td><td>47</td><td>49</td><td>49</td></tr> <tr><td>72</td><td>131</td><td>172</td><td>186</td><td>197</td><td>185</td><td>40</td><td>45</td><td>46</td><td>47</td></tr> <tr><td>74</td><td>128</td><td>167</td><td>181</td><td>191</td><td>190</td><td>38</td><td>43</td><td>44</td><td>45</td></tr> <tr><td>76</td><td>125</td><td>163</td><td>176</td><td>185</td><td>195</td><td>37</td><td>41</td><td>42</td><td>43</td></tr> <tr><td>78</td><td>123</td><td>159</td><td>171</td><td>180</td><td>200</td><td>35</td><td>39</td><td>40</td><td>41</td></tr> <tr><td>80</td><td>120</td><td>154</td><td>166</td><td>174</td><td>210</td><td>33</td><td>36</td><td>37</td><td>37</td></tr> <tr><td>82</td><td>117</td><td>150</td><td>162</td><td>169</td><td>220</td><td>30</td><td>33</td><td>34</td><td>34</td></tr> <tr><td>84</td><td>115</td><td>146</td><td>157</td><td>164</td><td>230</td><td>28</td><td>30</td><td>31</td><td>32</td></tr> <tr><td>86</td><td>112</td><td>142</td><td>153</td><td>159</td><td>240</td><td>26</td><td>28</td><td>29</td><td>29</td></tr> <tr><td>88</td><td>110</td><td>139</td><td>148</td><td>155</td><td>250</td><td>24</td><td>26</td><td>27</td><td>27</td></tr> <tr><td>90</td><td>107</td><td>135</td><td>144</td><td>150</td><td>260</td><td>23</td><td>24</td><td>25</td><td>25</td></tr> <tr><td>92</td><td>105</td><td>131</td><td>140</td><td>146</td><td>270</td><td>21</td><td>23</td><td>23</td><td>23</td></tr> <tr><td>94</td><td>103</td><td>128</td><td>136</td><td>142</td><td>280</td><td>20</td><td>21</td><td>22</td><td>22</td></tr> <tr><td>96</td><td>100</td><td>124</td><td>132</td><td>138</td><td>290</td><td>19</td><td>20</td><td>20</td><td>20</td></tr> <tr><td>98</td><td>98</td><td>121</td><td>129</td><td>134</td><td>300</td><td>17</td><td>19</td><td>19</td><td>19</td></tr> <tr><td>100</td><td>96</td><td>118</td><td>125</td><td>130</td><td>310</td><td>16</td><td>18</td><td>18</td><td>18</td></tr> <tr><td>102</td><td>94</td><td>115</td><td>122</td><td>126</td><td>320</td><td>15</td><td>16</td><td>17</td><td>17</td></tr> <tr><td>104</td><td>92</td><td>112</td><td>118</td><td>123</td><td>330</td><td>15</td><td>16</td><td>16</td><td>16</td></tr> <tr><td>106</td><td>90</td><td>109</td><td>115</td><td>119</td><td>340</td><td>14</td><td>15</td><td>15</td><td>15</td></tr> <tr><td>108</td><td>88</td><td>106</td><td>112</td><td>116</td><td>350</td><td>13</td><td>14</td><td>14</td><td>14</td></tr> </tbody> </table> <p>Note : For other steel grades, refer to Appendix 8.4.</p>	Values of p_c in N/mm ² with $\lambda < 110$ for strut curve d					Values of p_c in N/mm ² with $\lambda \geq 110$ for strut curve d					λ	Steel grade and design strength (N/mm ²)				λ	Steel grade and design strength (N/mm ²)				Q235	Q345	Q390	Q420	Q235	Q345	Q390	Q420	215	310	350	380	215	310	350	380	16	223	313	350	378	110	86	103	109	113	20	213	300	336	363	112	84	101	108	110	25	205	287	321	347	114	82	98	103	107	30	198	275	307	331	116	80	96	101	104	35	188	262	293	316	118	78	93	98	101	40	180	250	278	300	120	77	91	95	98	42	177	245	273	293	122	75	89	93	96	44	173	240	267	286	124	73	87	91	93	46	170	235	261	280	126	72	85	88	91	48	167	230	255	273	128	70	83	86	89	50	164	225	249	267	130	69	81	84	86	52	161	220	243	260	135	65	76	79	81	54	158	215	237	253	140	62	72	75	76	56	155	210	231	247	145	59	68	70	72	58	152	205	226	240	150	56	64	66	68	60	149	200	220	234	155	53	61	63	64	62	146	195	214	227	160	51	58	60	61	64	143	190	208	221	165	48	55	56	58	66	140	186	203	215	170	46	52	54	55	68	137	181	197	209	175	44	49	51	52	70	134	176	192	203	180	42	47	49	49	72	131	172	186	197	185	40	45	46	47	74	128	167	181	191	190	38	43	44	45	76	125	163	176	185	195	37	41	42	43	78	123	159	171	180	200	35	39	40	41	80	120	154	166	174	210	33	36	37	37	82	117	150	162	169	220	30	33	34	34	84	115	146	157	164	230	28	30	31	32	86	112	142	153	159	240	26	28	29	29	88	110	139	148	155	250	24	26	27	27	90	107	135	144	150	260	23	24	25	25	92	105	131	140	146	270	21	23	23	23	94	103	128	136	142	280	20	21	22	22	96	100	124	132	138	290	19	20	20	20	98	98	121	129	134	300	17	19	19	19	100	96	118	125	130	310	16	18	18	18	102	94	115	122	126	320	15	16	17	17	104	92	112	118	123	330	15	16	16	16	106	90	109	115	119	340	14	15	15	15	108	88	106	112	116	350	13	14	14	14	<p align="center">Table 8.8(h) - Design strength p_c of compression members</p> <table border="1"> <thead> <tr> <th colspan="8">Values of p_c in N/mm² with $\lambda < 110$ for strut curve d</th> </tr> <tr> <th rowspan="3">λ</th> <th colspan="7">Steel grade and design strength (N/mm²)</th> </tr> <tr> <th>Q235</th> <th>Q345/Q355</th> <th>Q390</th> <th>Q420</th> <th>Q460</th> <th>Q550</th> <th>Q690</th> </tr> <tr> <th>215</th> <th>305</th> <th>345</th> <th>375</th> <th>410</th> <th>520</th> <th>630</th> </tr> </thead> <tbody> <tr><td>15</td><td>215</td><td>305</td><td>345</td><td>374</td><td>407</td><td>509</td><td>611</td></tr> <tr><td>20</td><td>214</td><td>296</td><td>332</td><td>359</td><td>390</td><td>488</td><td>584</td></tr> <tr><td>25</td><td>205</td><td>283</td><td>318</td><td>343</td><td>373</td><td>468</td><td>557</td></tr> <tr><td>30</td><td>197</td><td>271</td><td>304</td><td>328</td><td>356</td><td>443</td><td>527</td></tr> <tr><td>35</td><td>188</td><td>259</td><td>290</td><td>312</td><td>339</td><td>419</td><td>496</td></tr> <tr><td>40</td><td>180</td><td>247</td><td>275</td><td>297</td><td>321</td><td>394</td><td>463</td></tr> <tr><td>42</td><td>177</td><td>242</td><td>270</td><td>290</td><td>314</td><td>384</td><td>449</td></tr> <tr><td>44</td><td>174</td><td>237</td><td>264</td><td>284</td><td>306</td><td>373</td><td>435</td></tr> <tr><td>46</td><td>171</td><td>232</td><td>258</td><td>277</td><td>299</td><td>363</td><td>421</td></tr> <tr><td>48</td><td>168</td><td>227</td><td>252</td><td>271</td><td>291</td><td>353</td><td>407</td></tr> <tr><td>50</td><td>164</td><td>222</td><td>247</td><td>264</td><td>284</td><td>342</td><td>393</td></tr> <tr><td>52</td><td>161</td><td>217</td><td>241</td><td>258</td><td>277</td><td>332</td><td>379</td></tr> <tr><td>54</td><td>158</td><td>213</td><td>235</td><td>251</td><td>269</td><td>321</td><td>366</td></tr> <tr><td>56</td><td>155</td><td>208</td><td>229</td><td>245</td><td>262</td><td>311</td><td>352</td></tr> <tr><td>58</td><td>152</td><td>203</td><td>224</td><td>238</td><td>255</td><td>301</td><td>339</td></tr> <tr><td>60</td><td>149</td><td>198</td><td>218</td><td>232</td><td>247</td><td>291</td><td>327</td></tr> <tr><td>62</td><td>146</td><td>193</td><td>212</td><td>226</td><td>240</td><td>281</td><td>314</td></tr> <tr><td>64</td><td>143</td><td>189</td><td>207</td><td>219</td><td>233</td><td>272</td><td>302</td></tr> <tr><td>66</td><td>140</td><td>184</td><td>201</td><td>213</td><td>226</td><td>262</td><td>291</td></tr> <tr><td>68</td><td>137</td><td>179</td><td>196</td><td>207</td><td>220</td><td>253</td><td>279</td></tr> <tr><td>70</td><td>134</td><td>175</td><td>190</td><td>201</td><td>213</td><td>244</td><td>269</td></tr> <tr><td>72</td><td>132</td><td>170</td><td>185</td><td>195</td><td>207</td><td>236</td><td>258</td></tr> 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²)							Q235	Q345/Q355	Q390	Q420	Q460	Q550	Q690	215	305	345	375	410	520	630	15	215	305	345	374	407	509	611	20	214	296	332	359	390	488	584	25	205	283	318	343	373	468	557	30	197	271	304	328	356	443	527	35	188	259	290	312	339	419	496	40	180	247	275	297	321	394	463	42	177	242	270	290	314	384	449	44	174	237	264	284	306	373	435	46	171	232	258	277	299	363	421	48	168	227	252	271	291	353	407	50	164	222	247	264	284	342	393	52	161	217	241	258	277	332	379	54	158	213	235	251	269	321	366	56	155	208	229	245	262	311	352	58	152	203	224	238	255	301	339	60	149	198	218	232	247	291	327	62	146	193	212	226	240	281	314	64	143	189	207	219	233	272	302	66	140	184	201	213	226	262	291	68	137	179	196	207	220	253	279	70	134	175	190	201	213	244	269	72	132	170	185	195	207	236	258	74	129	166	180	190	200	228	249	76	126	162	175	184	194	220	239	78	123	157	170	179	188	212	230	80	121	153	165	174	182	205	222	82	118	149	161	169	177	198	214	84	115	145	156	164	171	191	206	86	113	142	152	159	166	185	198	88	110	138	148	154	161	179	191	90	108	134	144	150	158	173	185	92	105	131	139	145	152	167	178	94	103	127	136	141	147	162	172	96	101	124	132	137	143	156	166	98	99	121	128	133	138	151	161	100	96	117	125	129	134	147	155	102	94	114	121	126	131	142	150	104	92	111	118	122	127	138	145	106	90	109	115	119	123	134	141	108	88	106	112	116	120	130	136
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⁷⁴ Addition of design strength for Q355, Q460, Q550 and Q690 steel for buckling curve d; Revision of design strength for Q235, Q345, Q390 and Q420 steel for buckling curve d.

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		<p style="text-align: center;">Table 8.8(h) - Design strength p_c of compression members (cont'd)</p> <table border="1"> <thead> <tr> <th colspan="8" style="text-align: center;">Values of p_c in N/mm² with $\lambda \geq 110$ for strut curve d</th> </tr> <tr> <th colspan="8" style="text-align: center;">Steel grade and design strength (N/mm²)</th> </tr> <tr> <th>λ</th> <th>Q235</th> <th>Q345/Q355</th> <th>Q390</th> <th>Q420</th> <th>Q460</th> <th>Q550</th> <th>Q690</th> </tr> </thead> <tbody> <tr><td>110</td><td>86</td><td>103</td><td>109</td><td>113</td><td>118</td><td>128</td><td>132</td></tr> <tr><td>112</td><td>84</td><td>101</td><td>108</td><td>110</td><td>113</td><td>122</td><td>128</td></tr> <tr><td>114</td><td>82</td><td>98</td><td>103</td><td>107</td><td>110</td><td>118</td><td>124</td></tr> <tr><td>118</td><td>81</td><td>96</td><td>101</td><td>104</td><td>107</td><td>115</td><td>121</td></tr> <tr><td>118</td><td>79</td><td>93</td><td>98</td><td>101</td><td>104</td><td>112</td><td>117</td></tr> <tr><td>120</td><td>77</td><td>91</td><td>95</td><td>98</td><td>101</td><td>109</td><td>114</td></tr> <tr><td>122</td><td>76</td><td>89</td><td>93</td><td>96</td><td>99</td><td>106</td><td>110</td></tr> <tr><td>124</td><td>74</td><td>87</td><td>91</td><td>93</td><td>96</td><td>103</td><td>107</td></tr> <tr><td>126</td><td>72</td><td>85</td><td>89</td><td>91</td><td>94</td><td>100</td><td>104</td></tr> <tr><td>128</td><td>71</td><td>83</td><td>88</td><td>89</td><td>91</td><td>97</td><td>101</td></tr> <tr><td>130</td><td>69</td><td>81</td><td>84</td><td>87</td><td>89</td><td>95</td><td>99</td></tr> <tr><td>135</td><td>66</td><td>78</td><td>79</td><td>81</td><td>84</td><td>89</td><td>92</td></tr> <tr><td>140</td><td>62</td><td>72</td><td>75</td><td>77</td><td>79</td><td>83</td><td>88</td></tr> <tr><td>145</td><td>59</td><td>68</td><td>71</td><td>72</td><td>74</td><td>78</td><td>81</td></tr> <tr><td>150</td><td>58</td><td>64</td><td>67</td><td>68</td><td>70</td><td>74</td><td>78</td></tr> <tr><td>155</td><td>54</td><td>61</td><td>63</td><td>65</td><td>66</td><td>69</td><td>72</td></tr> <tr><td>160</td><td>51</td><td>58</td><td>60</td><td>61</td><td>62</td><td>66</td><td>68</td></tr> <tr><td>165</td><td>49</td><td>55</td><td>57</td><td>58</td><td>59</td><td>62</td><td>64</td></tr> <tr><td>170</td><td>47</td><td>52</td><td>54</td><td>55</td><td>56</td><td>59</td><td>61</td></tr> <tr><td>175</td><td>45</td><td>50</td><td>51</td><td>52</td><td>53</td><td>56</td><td>57</td></tr> <tr><td>180</td><td>43</td><td>47</td><td>49</td><td>50</td><td>51</td><td>53</td><td>54</td></tr> <tr><td>185</td><td>41</td><td>45</td><td>47</td><td>47</td><td>48</td><td>50</td><td>52</td></tr> <tr><td>190</td><td>39</td><td>43</td><td>44</td><td>45</td><td>46</td><td>48</td><td>49</td></tr> <tr><td>195</td><td>37</td><td>41</td><td>42</td><td>43</td><td>44</td><td>46</td><td>47</td></tr> <tr><td>200</td><td>36</td><td>40</td><td>41</td><td>41</td><td>42</td><td>44</td><td>45</td></tr> <tr><td>210</td><td>33</td><td>38</td><td>37</td><td>38</td><td>38</td><td>40</td><td>41</td></tr> <tr><td>220</td><td>31</td><td>33</td><td>34</td><td>35</td><td>35</td><td>37</td><td>37</td></tr> <tr><td>230</td><td>28</td><td>31</td><td>32</td><td>32</td><td>33</td><td>34</td><td>34</td></tr> <tr><td>240</td><td>26</td><td>29</td><td>29</td><td>30</td><td>30</td><td>31</td><td>32</td></tr> <tr><td>250</td><td>25</td><td>27</td><td>27</td><td>28</td><td>28</td><td>29</td><td>29</td></tr> <tr><td>260</td><td>23</td><td>25</td><td>25</td><td>26</td><td>26</td><td>27</td><td>27</td></tr> <tr><td>270</td><td>22</td><td>23</td><td>24</td><td>24</td><td>24</td><td>25</td><td>25</td></tr> <tr><td>280</td><td>20</td><td>22</td><td>22</td><td>22</td><td>23</td><td>23</td><td>24</td></tr> <tr><td>290</td><td>19</td><td>20</td><td>21</td><td>21</td><td>21</td><td>22</td><td>22</td></tr> <tr><td>300</td><td>18</td><td>19</td><td>19</td><td>20</td><td>20</td><td>20</td><td>21</td></tr> <tr><td>310</td><td>17</td><td>18</td><td>18</td><td>18</td><td>19</td><td>19</td><td>19</td></tr> <tr><td>320</td><td>16</td><td>17</td><td>17</td><td>17</td><td>18</td><td>18</td><td>18</td></tr> <tr><td>330</td><td>15</td><td>16</td><td>16</td><td>16</td><td>17</td><td>17</td><td>17</td></tr> <tr><td>340</td><td>14</td><td>15</td><td>15</td><td>16</td><td>16</td><td>16</td><td>16</td></tr> <tr><td>350</td><td>14</td><td>14</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td></tr> </tbody> </table> <p>Note: For other steel grades, refer to Appendix 8.4.</p>	Values of p_c in N/mm ² with $\lambda \geq 110$ for strut curve d								Steel grade and design strength (N/mm ²)								λ	Q235	Q345/Q355	Q390	Q420	Q460	Q550	Q690	110	86	103	109	113	118	128	132	112	84	101	108	110	113	122	128	114	82	98	103	107	110	118	124	118	81	96	101	104	107	115	121	118	79	93	98	101	104	112	117	120	77	91	95	98	101	109	114	122	76	89	93	96	99	106	110	124	74	87	91	93	96	103	107	126	72	85	89	91	94	100	104	128	71	83	88	89	91	97	101	130	69	81	84	87	89	95	99	135	66	78	79	81	84	89	92	140	62	72	75	77	79	83	88	145	59	68	71	72	74	78	81	150	58	64	67	68	70	74	78	155	54	61	63	65	66	69	72	160	51	58	60	61	62	66	68	165	49	55	57	58	59	62	64	170	47	52	54	55	56	59	61	175	45	50	51	52	53	56	57	180	43	47	49	50	51	53	54	185	41	45	47	47	48	50	52	190	39	43	44	45	46	48	49	195	37	41	42	43	44	46	47	200	36	40	41	41	42	44	45	210	33	38	37	38	38	40	41	220	31	33	34	35	35	37	37	230	28	31	32	32	33	34	34	240	26	29	29	30	30	31	32	250	25	27	27	28	28	29	29	260	23	25	25	26	26	27	27	270	22	23	24	24	24	25	25	280	20	22	22	22	23	23	24	290	19	20	21	21	21	22	22	300	18	19	19	20	20	20	21	310	17	18	18	18	19	19	19	320	16	17	17	17	18	18	18	330	15	16	16	16	17	17	17	340	14	15	15	16	16	16	16	350	14	14	15	15	15	15	15
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Item	Current version	Amendments
75. Clause 8.9.3 ⁷⁵		<p>8.9.3 Member buckling resistance – (Alternative to 8.9.2)</p> <p>Members which are subjected to combined bending and axial compression should satisfy:</p> $\frac{F_c}{A_g p_{cx}} + k_{xx} \frac{M_x}{M_b} + k_{xy} \frac{M_y}{M_{cy}} \leq 1 \quad (8.82a)$ $\frac{F_c}{A_g p_{cy}} + k_{yx} \frac{M_x}{M_b} + k_{yy} \frac{M_y}{M_{cy}} \leq 1 \quad (8.82b)$ <p>where F_c, M_x and M_y are the design values of the compression force and the maximum moments about the major (x-x) axis and the minor (y-y) axis along the member, respectively</p> <p>M_b is the buckling resistance moment in clause 8.3.5.2</p> <p>M_{cy} is the moment capacity about the minor axis from clause 8.2.2</p> <p>p_{cx}, p_{cy} are the axial strength under column buckling about the major (x-x) axis, and the minor (y-y) axis</p> <p>$k_{xx}, k_{xy}, k_{yx}, k_{yy}$ are the interaction factors given in Table 8.10.</p> <p>Refer to Table 8.10 for members not susceptible to torsional deformations, or refer to Table 8.11 for members susceptible to torsional deformation</p>



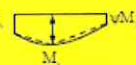


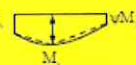


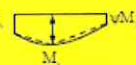
⁷⁵ Addition of Clause 8.9.3 for alternative method of member buckling resistance design.

Item	Current version	Amendments																								
76. Table 8.10 ⁷⁶		<p style="text-align: center;">Table 8.10 Interaction factors for combined axial compression and bending</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 15%;">Interaction factors</th> <th rowspan="2" style="width: 10%;">Type of sections</th> <th colspan="2" style="width: 75%;">Design assumptions</th> </tr> <tr> <th style="width: 35%;">Elastic cross-sectional properties Class 3, Effective cross-sectional properties Class 4</th> <th style="width: 35%;">Plastic cross-sectional properties Class 1, Class 2</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">k_{xx}</td> <td style="text-align: center;">I-sections RHS</td> <td style="text-align: center;">$C_{m1} \left(1 + 0.6\tilde{\lambda}_{xx} \frac{F_c}{P_{cx}} \right)$ $\leq C_{m1} \left(1 + 0.6 \frac{F_c}{P_{cx}} \right)$</td> <td style="text-align: center;">$C_{m1} \left(1 + (\tilde{\lambda}_{xx} - 0.2) \frac{F_c}{P_{cx}} \right)$ $\leq C_{m1} \left(1 + 0.8 \frac{F_c}{P_{cx}} \right)$</td> </tr> <tr> <td style="text-align: center;">k_{yy}</td> <td style="text-align: center;">I-sections RHS</td> <td style="text-align: center;">k_{yy}</td> <td style="text-align: center;">$0.6k_{yy}$</td> </tr> <tr> <td style="text-align: center;">k_{yy}</td> <td style="text-align: center;">I-sections RHS</td> <td style="text-align: center;">$0.8k_{xx}$</td> <td style="text-align: center;">$0.6k_{xx}$</td> </tr> <tr> <td rowspan="2" style="text-align: center;">k_{yy}</td> <td style="text-align: center;">I-sections</td> <td rowspan="2" style="text-align: center;">$C_{m2} \left(1 + 0.6\tilde{\lambda}_{yy} \frac{F_c}{P_{cy}} \right)$ $\leq C_{m2} \left(1 + 0.6 \frac{F_c}{P_{cy}} \right)$</td> <td style="text-align: center;">$C_{m2} \left(1 + (2\tilde{\lambda}_{yy} - 0.6) \frac{F_c}{P_{cy}} \right)$ $\leq C_{m2} \left(1 + 1.4 \frac{F_c}{P_{cy}} \right)$</td> </tr> <tr> <td style="text-align: center;">RHS</td> <td style="text-align: center;">$C_{m2} \left(1 + (\tilde{\lambda}_{yy} - 0.2) \frac{F_c}{P_{cy}} \right)$ $\leq C_{m2} \left(1 + 0.8 \frac{F_c}{P_{cy}} \right)$</td> </tr> </tbody> </table> <p style="font-size: small;">For I- and H-sections and rectangular hollow sections under axial compression and uniaxial bending M_{xx}, the coefficient k_{yy} may be $k_{yy} = 0$.</p> <p>Note:</p> $\tilde{\lambda}_{xx} = \frac{\lambda_{xx}}{\pi \sqrt{\frac{E}{P_{cx}}}}$ $\tilde{\lambda}_{yy} = \frac{\lambda_{yy}}{\pi \sqrt{\frac{E}{P_{cy}}}}$	Interaction factors	Type of sections	Design assumptions		Elastic cross-sectional properties Class 3, Effective cross-sectional properties Class 4	Plastic cross-sectional properties Class 1, Class 2	k_{xx}	I-sections RHS	$C_{m1} \left(1 + 0.6\tilde{\lambda}_{xx} \frac{F_c}{P_{cx}} \right)$ $\leq C_{m1} \left(1 + 0.6 \frac{F_c}{P_{cx}} \right)$	$C_{m1} \left(1 + (\tilde{\lambda}_{xx} - 0.2) \frac{F_c}{P_{cx}} \right)$ $\leq C_{m1} \left(1 + 0.8 \frac{F_c}{P_{cx}} \right)$	k_{yy}	I-sections RHS	k_{yy}	$0.6k_{yy}$	k_{yy}	I-sections RHS	$0.8k_{xx}$	$0.6k_{xx}$	k_{yy}	I-sections	$C_{m2} \left(1 + 0.6\tilde{\lambda}_{yy} \frac{F_c}{P_{cy}} \right)$ $\leq C_{m2} \left(1 + 0.6 \frac{F_c}{P_{cy}} \right)$	$C_{m2} \left(1 + (2\tilde{\lambda}_{yy} - 0.6) \frac{F_c}{P_{cy}} \right)$ $\leq C_{m2} \left(1 + 1.4 \frac{F_c}{P_{cy}} \right)$	RHS	$C_{m2} \left(1 + (\tilde{\lambda}_{yy} - 0.2) \frac{F_c}{P_{cy}} \right)$ $\leq C_{m2} \left(1 + 0.8 \frac{F_c}{P_{cy}} \right)$
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⁷⁶ Addition of Table 8.10 for alternative method of member buckling resistance design.

Item	Current version	Amendments																	
77. Table 8.11 ⁷⁷		<p style="text-align: center;">Table 8.11 Interaction factors k_{ij} for members susceptible to torsional deformations</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 10%;">Interaction factors</th> <th colspan="2" style="background-color: #ffff00;">Design assumptions</th> </tr> <tr> <th style="width: 40%;">Elastic cross-sectional properties Class 3, Effective cross-sectional properties Class 4</th> <th style="width: 50%;">Plastic cross-sectional properties Class 1, Class 2</th> </tr> </thead> <tbody> <tr> <td>k_{z1}</td> <td>k_{zy} from Table 8.10)</td> <td>k_{zy} from Table 8.10)</td> </tr> <tr> <td>k_{zy}</td> <td>k_{zy} from Table 8.10)</td> <td>k_{zy} from Table 8.10)</td> </tr> <tr> <td>k_{yz}</td> <td> $\begin{cases} 1 - \frac{0.05\bar{\lambda}_{zy}^2 \frac{F_c}{P_{zy}}}{(C_{mLT} - 0.25) P_{zy}} \\ \vee \left[1 - \frac{0.05 \frac{F_c}{P_{zy}}}{(C_{mLT} - 0.25) P_{zy}} \right] \end{cases}$ </td> <td> $\begin{cases} 1 - \frac{0.1\bar{\lambda}_{zy}^2 \frac{F_c}{P_{zy}}}{(C_{mLT} - 0.25) P_{zy}} \\ \geq \left[1 - \frac{0.1 \frac{F_c}{P_{zy}}}{(C_{mLT} - 0.25) P_{zy}} \right] \end{cases}$ <p style="text-align: center;">for $\bar{\lambda}_{zy} < 0.4$:</p> $k_{zy} = 0.6 + \bar{\lambda}_{zy} \leq 1 - \frac{0.1\bar{\lambda}_{zy}^2 \frac{F_c}{P_{zy}}}{(C_{mLT} - 0.25) P_{zy}}$ </td> </tr> <tr> <td>k_{yy}</td> <td>k_{yy} from Table 8.10</td> <td>k_{yy} from Table 8.10</td> </tr> </tbody> </table>	Interaction factors	Design assumptions		Elastic cross-sectional properties Class 3, Effective cross-sectional properties Class 4	Plastic cross-sectional properties Class 1, Class 2	k_{z1}	k_{zy} from Table 8.10)	k_{zy} from Table 8.10)	k_{zy}	k_{zy} from Table 8.10)	k_{zy} from Table 8.10)	k_{yz}	$\begin{cases} 1 - \frac{0.05\bar{\lambda}_{zy}^2 \frac{F_c}{P_{zy}}}{(C_{mLT} - 0.25) P_{zy}} \\ \vee \left[1 - \frac{0.05 \frac{F_c}{P_{zy}}}{(C_{mLT} - 0.25) P_{zy}} \right] \end{cases}$	$\begin{cases} 1 - \frac{0.1\bar{\lambda}_{zy}^2 \frac{F_c}{P_{zy}}}{(C_{mLT} - 0.25) P_{zy}} \\ \geq \left[1 - \frac{0.1 \frac{F_c}{P_{zy}}}{(C_{mLT} - 0.25) P_{zy}} \right] \end{cases}$ <p style="text-align: center;">for $\bar{\lambda}_{zy} < 0.4$:</p> $k_{zy} = 0.6 + \bar{\lambda}_{zy} \leq 1 - \frac{0.1\bar{\lambda}_{zy}^2 \frac{F_c}{P_{zy}}}{(C_{mLT} - 0.25) P_{zy}}$	k_{yy}	k_{yy} from Table 8.10	k_{yy} from Table 8.10
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78. Table 8.12 ⁷⁸		<p style="text-align: center;">Table 8.12 Equivalent uniform moment factors, C_m in Tables 8.10 and 8.11</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 25%;">Moment diagram</th> <th colspan="2" rowspan="2" style="width: 25%;">Range</th> <th colspan="2" style="width: 50%;">C_{mx} and C_{my} and C_{mLT}</th> </tr> <tr> <th style="width: 25%;">Uniform loading</th> <th style="width: 25%;">Concentrated load</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">  M_1 vM_2 </td> <td colspan="2" style="text-align: center;">$-1 \leq \psi \leq 1$</td> <td colspan="2" style="text-align: center;">$0.6 + 0.4\psi \geq 0.4$</td> </tr> <tr> <td rowspan="2" style="text-align: center;">  M_1 vM_2 $\alpha_1 = M_1 / M_2$ </td> <td style="text-align: center;">$0 \leq \alpha_1 \leq 1$</td> <td style="text-align: center;">$-1 \leq \psi \leq 1$</td> <td style="text-align: center;">$0.2 + 0.8\alpha_1 \geq 0.4$</td> <td style="text-align: center;">$0.2 + 0.8\alpha_1 \geq 0.4$</td> </tr> <tr> <td style="text-align: center;">$-1 \leq \alpha_1 \leq 0$</td> <td style="text-align: center;">$0 \leq \psi \leq 1$</td> <td style="text-align: center;">$0.1 - 0.8\alpha_1 \geq 0.4$</td> <td style="text-align: center;">$-0.8\alpha_1 \geq 0.4$</td> </tr> <tr> <td></td> <td style="text-align: center;">$-1 \leq \alpha_1 \leq 0$</td> <td style="text-align: center;">$-1 \leq \psi \leq 0$</td> <td style="text-align: center;">$0.1(1-\psi) - 0.8\alpha_1 \geq 0.4$</td> <td style="text-align: center;">$0.2(-\psi) - 0.8\alpha_1 \geq 0.4$</td> </tr> <tr> <td rowspan="3" style="text-align: center;">  M_1 vM_2 M $\alpha_1 = M_1 / M_2$ </td> <td style="text-align: center;">$0 \leq \alpha_1 \leq 1$</td> <td style="text-align: center;">$-1 \leq \psi \leq 1$</td> <td style="text-align: center;">$0.95 - 0.05\alpha_1$</td> <td style="text-align: center;">$0.90 + 0.10\alpha_1$</td> </tr> <tr> <td style="text-align: center;">$-1 \leq \alpha_1 \leq 0$</td> <td style="text-align: center;">$0 \leq \psi \leq 1$</td> <td style="text-align: center;">$0.95 + 0.05\alpha_1$</td> <td style="text-align: center;">$0.90 + 0.10\alpha_1$</td> </tr> <tr> <td style="text-align: center;">$-1 \leq \alpha_1 \leq 0$</td> <td style="text-align: center;">$-1 \leq \psi \leq 0$</td> <td style="text-align: center;">$0.95 - 0.05\alpha_1(1+2\psi)$</td> <td style="text-align: center;">$0.90 - 0.10\alpha_1(1+2\psi)$</td> </tr> </tbody> </table> <p>For members with sway buckling mode the equivalent uniform moment factor should be taken $C_{mx} = 0.9$ or $C_{my} = 0.9$ respectively.</p> <p>C_{mx}, C_{my} and C_{mLT} should be obtained according to the bending moment diagram between the relevant braced points as follows:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">moment factor</th> <th style="width: 25%;">Bending axis</th> <th style="width: 60%;">Points braced in direction</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">C_{mx}</td> <td style="text-align: center;">x-x</td> <td style="text-align: center;">y-y</td> </tr> <tr> <td style="text-align: center;">C_{my}</td> <td style="text-align: center;">y-y</td> <td style="text-align: center;">x-x</td> </tr> <tr> <td style="text-align: center;">C_{mLT}</td> <td style="text-align: center;">x-x</td> <td style="text-align: center;">x-x</td> </tr> </tbody> </table>	Moment diagram	Range		C _{mx} and C _{my} and C _{mLT}		Uniform loading	Concentrated load	 M_1 vM_2	$-1 \leq \psi \leq 1$		$0.6 + 0.4\psi \geq 0.4$		 M_1 vM_2 $\alpha_1 = M_1 / M_2$	$0 \leq \alpha_1 \leq 1$	$-1 \leq \psi \leq 1$	$0.2 + 0.8\alpha_1 \geq 0.4$	$0.2 + 0.8\alpha_1 \geq 0.4$	$-1 \leq \alpha_1 \leq 0$	$0 \leq \psi \leq 1$	$0.1 - 0.8\alpha_1 \geq 0.4$	$-0.8\alpha_1 \geq 0.4$		$-1 \leq \alpha_1 \leq 0$	$-1 \leq \psi \leq 0$	$0.1(1-\psi) - 0.8\alpha_1 \geq 0.4$	$0.2(-\psi) - 0.8\alpha_1 \geq 0.4$	 M_1 vM_2 M $\alpha_1 = M_1 / M_2$	$0 \leq \alpha_1 \leq 1$	$-1 \leq \psi \leq 1$	$0.95 - 0.05\alpha_1$	$0.90 + 0.10\alpha_1$	$-1 \leq \alpha_1 \leq 0$	$0 \leq \psi \leq 1$	$0.95 + 0.05\alpha_1$	$0.90 + 0.10\alpha_1$	$-1 \leq \alpha_1 \leq 0$	$-1 \leq \psi \leq 0$	$0.95 - 0.05\alpha_1(1+2\psi)$	$0.90 - 0.10\alpha_1(1+2\psi)$	moment factor	Bending axis	Points braced in direction	C_{mx}	x-x	y-y	C_{my}	y-y	x-x	C_{mLT}	x-x	x-x
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Item	Current version	Amendments
79. Page index ⁷⁹	<p>8 DESIGN OF STRUCTURAL MEMBERS.....75</p> <p>8.1 GENERAL.....75</p> <p>8.2 RESTRAINED BEAMS.....75</p> <p>8.2.1 Shear capacity.....75</p> <p>8.2.2 Moment capacity.....76</p> <p>8.2.3 Beams with web openings.....76</p> <p>8.2.4 Castellated beams.....78</p> <p>8.3 LATERAL-TORSIONAL BUCKLING OF BEAMS.....79</p> <p>8.3.1 Intermediate and end lateral restraints.....79</p> <p>8.3.2 Torsional restraint.....80</p> <p>8.3.3 Normal and destabilizing loads.....80</p> <p>8.3.4 Effective length for lateral-torsional buckling.....80</p> <p>8.3.5 Moment resistance to lateral-torsional buckling.....82</p> <p>8.4 PLATE GIRDERS.....89</p> <p>8.4.1 Design strength.....89</p> <p>8.4.2 Minimum web thickness for serviceability.....89</p> <p>8.4.3 Minimum web thickness to avoid compression flange buckling.....89</p> <p>8.4.4 Moment capacity of restrained girders.....89</p> <p>8.4.5 Effects of axial force.....90</p> <p>8.4.6 Shear buckling resistance.....90</p> <p>8.4.7 Intermediate transverse web stiffeners.....90</p> <p>8.4.8 End anchorage.....105</p> <p>8.4.9 Panels with openings.....105</p> <p>8.4.10 Web capacity and stiffeners design.....105</p> <p>8.4.11 Other types of stiffeners.....108</p> <p>8.4.12 Connections between web stiffeners and webs.....108</p> <p>8.4.13 Connections between web stiffeners and flanges.....108</p> <p>8.5 BUCKLING RESISTANCE MOMENT FOR SINGLE ANGLE MEMBERS.....109</p> <p>8.6 TENSION MEMBERS.....109</p> <p>8.6.1 Tension capacity.....109</p> <p>8.6.2 Members with eccentric connections.....109</p> <p>8.6.3 Single and double angle, channel and T-sections.....109</p> <p>8.6.4 Double angle, channel and T-sections with intermediate connections.....110</p> <p>8.7 COMPRESSION MEMBERS.....110</p> <p>8.7.1 Segment length.....110</p> <p>8.7.2 Effective length in general.....110</p> <p>8.7.3 Restraints.....111</p> <p>8.7.4 Slenderness.....111</p> <p>8.7.5 Compression resistance.....111</p> <p>8.7.6 Compressive strength.....112</p> <p>8.7.7 Eccentric connections.....127</p> <p>8.7.8 Simple construction.....127</p> <p>8.7.9 Effective length of sections in triangulated structures and trusses.....127</p> <p>8.8 TENSION MEMBERS UNDER COMBINED AXIAL FORCE AND MOMENTS.....128</p> <p>8.9 COMPRESSION MEMBERS UNDER COMBINED AXIAL FORCE AND MOMENTS.....129</p> <p>8.9.1 Cross-section capacity.....129</p> <p>8.9.2 Member buckling resistance.....129</p> <p>8.10 TORSIONAL AND FLEXURAL-TORSIONAL BUCKLING OF COMPRESSION MEMBERS.....132</p> <p>8.11 PORTAL FRAMES.....132</p> <p>8.11.1 General.....132</p> <p>8.11.2 Elastic design.....132</p> <p>8.11.3 Plastic design.....132</p> <p>8.11.4 In-plane stability.....132</p> <p>8.11.5 Out-of-plane stability.....135</p> <p>8.12 LACED AND BATTENED STRUTS.....139</p> <p>8.12.1 Laced struts.....139</p> <p>8.12.2 Battened struts.....139</p>	<p>8 DESIGN OF STRUCTURAL MEMBERS.....75</p> <p>8.1 GENERAL.....75</p> <p>8.2 RESTRAINED BEAMS.....75</p> <p>8.2.1 Shear capacity.....75</p> <p>8.2.2 Moment capacity.....76</p> <p>8.2.3 Beams with web openings.....77</p> <p>8.2.4 Castellated beams.....70</p> <p>8.3 LATERAL-TORSIONAL BUCKLING OF BEAMS.....79</p> <p>8.3.1 Intermediate and end lateral restraints.....79</p> <p>8.3.2 Torsional restraint.....80</p> <p>8.3.3 Normal and destabilizing loads.....80</p> <p>8.3.4 Effective length for lateral-torsional buckling.....80</p> <p>8.3.5 Moment resistance to lateral-torsional buckling.....82</p> <p>8.4 PLATE GIRDER S.....91</p> <p>8.4.1 Design strength.....91</p> <p>8.4.2 Minimum web thickness for serviceability.....91</p> <p>8.4.3 Minimum web thickness to avoid compression flange buckling.....91</p> <p>8.4.4 Moment capacity of restrained girders.....91</p> <p>8.4.5 Effects of axial force.....92</p> <p>8.4.6 Shear buckling resistance.....92</p> <p>8.4.7 Intermediate transverse web stiffeners.....92</p> <p>8.4.8 End anchorage.....118</p> <p>8.4.9 Panels with openings.....119</p> <p>8.4.10 Web capacity and stiffeners design.....119</p> <p>8.4.11 Other types of stiffeners.....122</p> <p>8.4.12 Connections between web stiffeners and webs.....122</p> <p>8.4.13 Connections between web stiffeners and flanges.....122</p> <p>8.5 BUCKLING RESISTANCE MOMENT FOR SINGLE ANGLE MEMBERS.....123</p> <p>8.6 TENSION MEMBERS.....123</p> <p>8.6.1 Tension capacity.....123</p> <p>8.6.2 Members with eccentric connections.....123</p> <p>8.6.3 Single and double angle, channel and T-sections.....123</p> <p>8.6.4 Double angle, channel and T-sections with intermediate connections.....124</p> <p>8.7 COMPRESSION MEMBERS.....124</p> <p>8.7.1 Segment length.....124</p> <p>8.7.2 Effective length in general.....124</p> <p>8.7.3 Restraints.....125</p> <p>8.7.4 Slenderness.....125</p> <p>8.7.5 Compression resistance.....125</p> <p>8.7.6 Compressive strength.....126</p> <p>8.7.7 Eccentric connections.....151</p> <p>8.7.8 Simple construction.....151</p> <p>8.7.9 Effective length of sections in triangulated structures and trusses.....151</p> <p>8.8 TENSION MEMBERS UNDER COMBINED AXIAL FORCE AND MOMENTS.....152</p> <p>8.9 COMPRESSION MEMBERS UNDER COMBINED AXIAL FORCE AND MOMENTS.....153</p> <p>8.9.1 Cross-section capacity.....153</p> <p>8.9.2 Member buckling resistance.....153</p> <p>8.10 TORSIONAL AND FLEXURAL-TORSIONAL BUCKLING OF COMPRESSION MEMBERS.....156</p> <p>8.11 PORTAL FRAMES.....160</p> <p>8.11.1 General.....160</p> <p>8.11.2 Elastic design.....160</p> <p>8.11.3 Plastic design.....160</p> <p>8.11.4 In-plane stability.....160</p> <p>8.11.5 Out-of-plane stability.....163</p> <p>8.12 LACED AND BATTENED STRUTS.....166</p> <p>8.12.1 Laced struts.....166</p> <p>8.12.2 Battened struts.....166</p>

⁷⁹ Revision of page index of Section 8.

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⁸⁰ Addition of design strength of electrode for S550 and S690 steel and design strength of electrode complying AWS.

⁸¹ Addition of design strength of electrode for Q355, Q550 and Q690 steel.

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⁸³ Addition of bolt grade ISO 6.8 and 12.9; Revision of shear strength of other bolt grade.

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⁸⁴ Addition of bolt grade ISO 6.8 and 12.9.

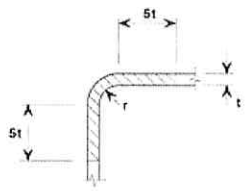
⁸⁵ Addition of bearing strength of connected parts for S550 and S690 steel.

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86. Table 9.8 ⁸⁶	<p>Table 9.8 - Design tension strength of bolts</p> <table border="1"> <thead> <tr> <th colspan="2">Bolt grade</th> <th>Design tension strength ρ_t (N/mm²)</th> </tr> </thead> <tbody> <tr> <td rowspan="3">ISO</td> <td>4.6</td> <td>240</td> </tr> <tr> <td>8.8</td> <td>560</td> </tr> <tr> <td>10.9</td> <td>700</td> </tr> <tr> <td rowspan="3">BS</td> <td rowspan="2">General grade HSFG</td> <td>\leq M24</td> <td>590</td> </tr> <tr> <td>\geq M27</td> <td>515</td> </tr> <tr> <td>Higher grade HSFG</td> <td>700</td> </tr> <tr> <td rowspan="3">ASTM</td> <td>A307</td> <td>310</td> </tr> <tr> <td>A325</td> <td>620</td> </tr> <tr> <td>A490</td> <td>780</td> </tr> <tr> <td rowspan="2">GB50017</td> <td>8.8</td> <td>400</td> </tr> <tr> <td>10.9</td> <td>500</td> </tr> <tr> <td colspan="2">Other grades ($U_t \leq 1000$ N/mm²)</td> <td>$0.7 U_t$, but $\leq Y_b$</td> </tr> <tr> <td colspan="3">Note: U_t is the specified minimum tensile strength of the bolt. Y_b is the specified minimum yield strength of the bolt.</td> </tr> </tbody> </table>	Bolt grade		Design tension strength ρ_t (N/mm ²)	ISO	4.6	240	8.8	560	10.9	700	BS	General grade HSFG	\leq M24	590	\geq M27	515	Higher grade HSFG	700	ASTM	A307	310	A325	620	A490	780	GB50017	8.8	400	10.9	500	Other grades ($U_t \leq 1000$ N/mm ²)		$0.7 U_t$, but $\leq Y_b$	Note: U_t is the specified minimum tensile strength of the bolt. Y_b is the specified minimum yield strength of the bolt.			<p>Table 9.8 - Design tension strength of bolts</p> <table border="1"> <thead> <tr> <th colspan="2">Bolt grade</th> <th>Design tension strength ρ_t (N/mm²)</th> </tr> </thead> <tbody> <tr> <td rowspan="4">ISO</td> <td>4.6</td> <td>240</td> </tr> <tr> <td>6.8</td> <td>480</td> </tr> <tr> <td>8.8</td> <td>560</td> </tr> <tr> <td>10.9</td> <td>700</td> </tr> <tr> <td rowspan="3">BS</td> <td rowspan="2">General grade HSFG</td> <td>\leq M24</td> <td>590</td> </tr> <tr> <td>\geq M27</td> <td>515</td> </tr> <tr> <td>Higher grade HSFG</td> <td>700</td> </tr> <tr> <td rowspan="3">ASTM</td> <td>A307</td> <td>310</td> </tr> <tr> <td>A325</td> <td>620</td> </tr> <tr> <td>A490</td> <td>780</td> </tr> <tr> <td rowspan="2">GB50017</td> <td>8.8</td> <td>400</td> </tr> <tr> <td>10.9</td> <td>500</td> </tr> <tr> <td colspan="2">Other grades ($U_t \leq 1200$ N/mm²)</td> <td>$0.7 U_t$, but $\leq Y_b$</td> </tr> <tr> <td colspan="3">Note: U_t is the specified minimum tensile strength of the bolt. Y_b is the specified minimum yield strength of the bolt.</td> </tr> </tbody> </table>	Bolt grade		Design tension strength ρ_t (N/mm ²)	ISO	4.6	240	6.8	480	8.8	560	10.9	700	BS	General grade HSFG	\leq M24	590	\geq M27	515	Higher grade HSFG	700	ASTM	A307	310	A325	620	A490	780	GB50017	8.8	400	10.9	500	Other grades ($U_t \leq 1200$ N/mm ²)		$0.7 U_t$, but $\leq Y_b$	Note: U_t is the specified minimum tensile strength of the bolt. Y_b is the specified minimum yield strength of the bolt.		
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⁸⁶ Addition of bolt grade ISO 6.8 and 12.9; Revision of tension strength of other bolt grade.

Item	Current version	Amendments
87. Clause 11.7.3 ⁸⁷	<p>11.7.3 Mechanical properties</p> <p>Cold forming is a process whereby the main forming of metal section is done at ambient temperature. It changes the material properties of steel and impairs ductility as well as toughness but enhances strength. These changes may also limit the ability to weld in cold deformed areas. The extent to which the properties are changed depends upon the type of steel, the forming temperature and the degree of deformation.</p> <p>The basic requirements on strength and ductility are given in clause 3.1.2. As a conservative design, no strength enhancement is allowed.</p> <p>To ensure sufficient notch toughness, the minimum average Charpy V-notch impact test energy at the required design temperature should be in accordance with clause 3.2.</p>	<p>11.7.3 Mechanical properties</p> <p>Cold forming is a process whereby the main forming of metal section is done at ambient temperature. It changes the material properties of steel and impairs ductility as well as toughness but enhances strength.</p> <p>■ The extent to which the properties are changed depends upon the type of steel, the forming temperature and the degree of deformation. Accounting for the changes in material properties, welding requirements as stipulated in clause 11.7.5 shall be followed.</p> <p>The basic requirements on strength and ductility are given in clause 3.1.2. As a conservative design, no strength enhancement in round corners due to cold-forming is allowed.</p> <p>To ensure sufficient notch toughness, the minimum average Charpy V-notch impact test energy at the required design temperature should be in accordance with clause 3.2.</p>

⁸⁷ Deletion of limitation of welding in cold formed areas; Addition of welding requirement.

Item	Current version	Amendments																																																												
88. Table 11.7.5 ⁸⁸	<p>11.7.5 Welding at cold-formed zones</p> <p>Welding may be carried out within a length $5t$ either side of a cold-formed area, provided that one of the following conditions is satisfied:</p> <p>(a) the cold-formed areas are normalized after cold forming but before welding;</p> <p>(b) the internal radius-to-thickness r/t ratio satisfies the relevant value given in Table 11.5; or</p> <p>(c) the welding procedure shall fulfill the Welding Procedure Specification (WPS) as stipulated in clause 14.3.3.</p> <p>Table 11.5 Conditions for welding cold-formed areas and adjacent materials</p> <table border="1"> <thead> <tr> <th rowspan="3">Minimum internal radius/thickness (r/t) ratio</th> <th rowspan="3">Strain due to cold forming (%)</th> <th colspan="3">Maximum thickness (mm)</th> </tr> <tr> <th colspan="2">Generally</th> <th rowspan="2">Fully killed Aluminium-killed steel (AL ≥ 0.02 %)</th> </tr> <tr> <th>Predominantly static loading</th> <th>Where fatigue predominates</th> </tr> </thead> <tbody> <tr> <td>≥ 3.0</td> <td>≤ 14</td> <td>22</td> <td>12</td> <td>22</td> </tr> <tr> <td>≥ 2.0</td> <td>≤ 20</td> <td>12</td> <td>10</td> <td>12</td> </tr> <tr> <td>≥ 1.5</td> <td>≤ 25</td> <td>8</td> <td>8</td> <td>10</td> </tr> <tr> <td>≥ 1.0</td> <td>≤ 33</td> <td>4</td> <td>4</td> <td>6</td> </tr> </tbody> </table>  <p>NOTE: Cold-formed hollow sections according to BS EN 10219 which do not satisfy the limits given in Table 11.5 can be assumed to satisfy these limits if these sections have a thickness not exceeding 12.5 mm and are Aluminium-killed with a quality J2H, K2H, MH, MLH, NH or NLH as defined in BS EN 10219 and further satisfy $C \leq 0.18\%$, $P \leq 0.020\%$ and $S \leq 0.012\%$.</p> <p>In other cases welding is only permitted within a distance of $5t$ from the corners if it can be shown by tests that welding is permitted for that particular application.</p>	Minimum internal radius/thickness (r/t) ratio	Strain due to cold forming (%)	Maximum thickness (mm)			Generally		Fully killed Aluminium-killed steel (AL ≥ 0.02 %)	Predominantly static loading	Where fatigue predominates	≥ 3.0	≤ 14	22	12	22	≥ 2.0	≤ 20	12	10	12	≥ 1.5	≤ 25	8	8	10	≥ 1.0	≤ 33	4	4	6	<p>11.7.5 Welding at cold-formed zones</p> <p>Welding may be carried out in the corners and the adjacent cold-formed zones, provided that one of the following conditions is satisfied:</p> <p>(a) the internal radius-to-thickness r/t ratio satisfies the relevant value given in Table 11.5; or</p> <p>Table 11.5 Conditions for welding cold-formed areas and adjacent materials</p> <table border="1"> <thead> <tr> <th rowspan="3">Minimum internal radius/thickness (r/t) ratio</th> <th rowspan="3">Strain due to cold forming (%)</th> <th colspan="3">Maximum thickness (mm)</th> </tr> <tr> <th colspan="2">Generally</th> <th rowspan="2">Fully killed Aluminium-killed steel (AL ≥ 0.02 %)</th> </tr> <tr> <th>Predominantly static loading</th> <th>Where fatigue predominates</th> </tr> </thead> <tbody> <tr> <td>≥ 3.0</td> <td>≤ 14</td> <td>22</td> <td>12</td> <td>22</td> </tr> <tr> <td>≥ 2.0</td> <td>≤ 20</td> <td>12</td> <td>10</td> <td>12</td> </tr> <tr> <td>≥ 1.5</td> <td>≤ 25</td> <td>8</td> <td>8</td> <td>10</td> </tr> <tr> <td>≥ 1.0</td> <td>≤ 33</td> <td>4</td> <td>4</td> <td>6</td> </tr> </tbody> </table> <p>(b) the welding procedure shall fulfill the Welding Procedure Specification (WPS) as stipulated in clause 14.3.3.</p> <p>Alternatively, welding may be carried out in the corners and the adjacent cold-formed zones of those cold-formed hollow sections which are produced to those relevant materials specifications of cold-formed hollow sections given in Annex A1.1.</p>	Minimum internal radius/thickness (r/t) ratio	Strain due to cold forming (%)	Maximum thickness (mm)			Generally		Fully killed Aluminium-killed steel (AL ≥ 0.02 %)	Predominantly static loading	Where fatigue predominates	≥ 3.0	≤ 14	22	12	22	≥ 2.0	≤ 20	12	10	12	≥ 1.5	≤ 25	8	8	10	≥ 1.0	≤ 33	4	4	6
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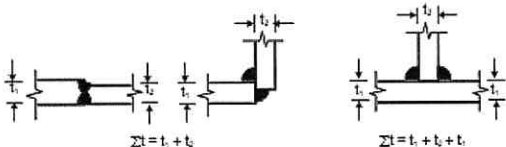
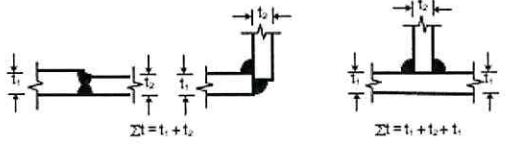
⁸⁸ Deletion of restriction of welding at cold formed zone.

Item	Current version	Amendments
89. Clause 12.1.3 ⁸⁹	<p>Whenever fire protection materials are required to achieve the specified fire resistance period, the thicknesses of the fire protection materials should be derived from standard fire tests at accredited laboratories whilst the recommendations should be prepared by a suitably qualified person. Alternatively, current assessment methods include (a) standard fire tests, (b) limiting temperature methods, (c) performance-based design methods, and (d) simplified calculation methods.</p>	<p>Whenever fire protection materials are required to achieve the specified fire resistance period, the thicknesses of the fire protection materials should be derived from standard fire tests at accredited laboratories whilst the recommendations should be prepared by a suitably qualified person. Alternatively, current assessment methods include (a) standard fire tests, (b) limiting temperature methods, (c) performance-based design methods, and (d) simplified calculation methods.</p> <p>Connection plates, stiffeners and similar elements should be ordinarily treated with the same fire protection thickness as the primary steel member to which they are attached.</p>

⁸⁹ Addition of fire protection requirement for connection plates.

Item	Current version	Amendments
90. Clause 14.3.6.4 ⁹⁰	<p><i>14.3.6.4 Hold time before final NDT</i></p> <p>Owing to the risk of delayed cracking, a hold time period of at least 16 hours should generally be allowed before the final inspection is made of as-welded fabrications. This hold time should be reduced for thin materials whose yield strength is less than 500 N/mm² or should be increased for materials of combined thickness greater than 50 mm or of a yield strength over 500 N/mm². Typical hold times conforming with this requirement are illustrated in Table 14.2b. The hold time is the waiting time normally required after completion of welding. In high restraint situations (e.g. cruciform welds), the hold time might need to be increased; with evidence of continual satisfactory production, hold times might be reduced. For material with a yield strength greater than 500 N/mm² hold time should be decided by a welding engineer and Table 14.2b should not be used.</p>	<p><i>14.3.6.4 Hold time before final NDT</i></p> <p>Owing to the risk of delayed cracking, a hold time period of at least 16 hours should generally be allowed before the final inspection is made of as-welded fabrications. This hold time should be reduced for thin materials whose yield strength is less than 690 N/mm² or should be increased for materials of combined thickness greater than 50 mm or of a yield strength over 690 N/mm². Typical hold times conforming with this requirement are illustrated in Table 14.2b. The hold time is the waiting time normally required after completion of welding. In high restraint situations (e.g. cruciform welds), the hold time might need to be increased; with evidence of continual satisfactory production, hold times might be reduced.</p> <p>For material with a yield strength greater than 690N/mm², the hold time should be submitted by the Responsible Engineer based on the advice of a welding engineer or the supplier of the welding consumables, and Table 14.2b should not be used.</p>

⁹⁰ Revision of yield strength of steel for hold time.

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91. Table 14.2b ⁹¹	<p>Table 14.2b - Illustrative hold times</p> <table border="1"> <thead> <tr> <th>Nominal Carbon Equivalent Value (CEV)⁽²⁾</th> <th>$\Sigma t^{(3)} < 30\text{mm}$</th> <th>$\Sigma t^{(3)} \leq 60\text{mm}$</th> <th>$\Sigma t^{(3)} \leq 90\text{mm}$</th> <th>$\Sigma t^{(3)} > 90\text{mm}$</th> </tr> </thead> <tbody> <tr> <td>≤ 0.40</td> <td>None</td> <td>8 hours</td> <td>16 hours</td> <td>40 hours⁽¹⁾</td> </tr> <tr> <td>≤ 0.45</td> <td>8 hours</td> <td>16 hours</td> <td>40 hours⁽¹⁾</td> <td>40 hours⁽¹⁾</td> </tr> <tr> <td>≤ 0.48</td> <td>16 hours</td> <td>40 hours⁽¹⁾</td> <td>40 hours⁽¹⁾</td> <td>40 hours⁽¹⁾</td> </tr> <tr> <td>> 0.48</td> <td>40 hours⁽¹⁾</td> <td>40 hours⁽¹⁾</td> <td>40 hours⁽¹⁾</td> <td>40 hours⁽¹⁾</td> </tr> </tbody> </table> <p>Notes: (1) Where the figures are in bold, generally, the advice of a welding engineer should be sought. (2) The Carbon equivalent value is that of the parent material to the International Institute of welding (IIW) formula and is calculated as follows: $CEV = C + \frac{Mn}{8} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15}$ (not applicable to Class 1H steel) (T14.1) (3) Σt is the combined thickness as shown in Figure 14.1.</p>  <p>Figure 14.1 - Combined thickness</p> <p>Whatever hold-time period is to be used shall be stated in the inspection records.</p>	Nominal Carbon Equivalent Value (CEV) ⁽²⁾	$\Sigma t^{(3)} < 30\text{mm}$	$\Sigma t^{(3)} \leq 60\text{mm}$	$\Sigma t^{(3)} \leq 90\text{mm}$	$\Sigma t^{(3)} > 90\text{mm}$	≤ 0.40	None	8 hours	16 hours	40 hours ⁽¹⁾	≤ 0.45	8 hours	16 hours	40 hours ⁽¹⁾	40 hours ⁽¹⁾	≤ 0.48	16 hours	40 hours ⁽¹⁾	40 hours ⁽¹⁾	40 hours ⁽¹⁾	> 0.48	40 hours ⁽¹⁾	40 hours ⁽¹⁾	40 hours ⁽¹⁾	40 hours ⁽¹⁾	<p>Table 14.2b - Illustrative hold times</p> <table border="1"> <thead> <tr> <th>Nominal Carbon Equivalent Value (CEV)⁽²⁾</th> <th>$\Sigma t^{(3)} < 30\text{mm}$</th> <th>$\Sigma t^{(3)} \leq 60\text{mm}$</th> <th>$\Sigma t^{(3)} \leq 90\text{mm}$</th> <th>$\Sigma t^{(3)} > 90\text{mm}$</th> </tr> </thead> <tbody> <tr> <td>≤ 0.40</td> <td>None</td> <td>8 hours</td> <td>16 hours</td> <td>40 hours⁽¹⁾</td> </tr> <tr> <td>≤ 0.45</td> <td>8 hours</td> <td>16 hours</td> <td>40 hours⁽¹⁾</td> <td>40 hours⁽¹⁾</td> </tr> <tr> <td>≤ 0.48</td> <td>16 hours</td> <td>40 hours⁽¹⁾</td> <td>40 hours⁽¹⁾</td> <td>40 hours⁽¹⁾</td> </tr> <tr> <td>≤ 0.65</td> <td>40 hours⁽¹⁾</td> <td>40 hours⁽¹⁾</td> <td>40 hours⁽¹⁾</td> <td>40 hours⁽¹⁾</td> </tr> <tr> <td>> 0.65</td> <td>48 hours⁽¹⁾</td> <td>48 hours⁽¹⁾</td> <td>48 hours⁽¹⁾</td> <td>48 hours⁽¹⁾</td> </tr> </tbody> </table> <p>Notes: (1) Where the figures are in bold, generally, the advice of a welding engineer or the supplier of the welding consumables should be sought. (2) The Carbon equivalent value is that of the parent material to the International Institute of welding (IIW) formula and is calculated as follows: $CEV = C + \frac{Mn}{8} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15}$ (T14.1) (3) Σt is the combined thickness as shown in Figure 14.1.</p>  <p>Figure 14.1 - Combined thickness</p> <p>Whatever hold-time period is to be used shall be stated in the inspection records.</p>	Nominal Carbon Equivalent Value (CEV) ⁽²⁾	$\Sigma t^{(3)} < 30\text{mm}$	$\Sigma t^{(3)} \leq 60\text{mm}$	$\Sigma t^{(3)} \leq 90\text{mm}$	$\Sigma t^{(3)} > 90\text{mm}$	≤ 0.40	None	8 hours	16 hours	40 hours ⁽¹⁾	≤ 0.45	8 hours	16 hours	40 hours ⁽¹⁾	40 hours ⁽¹⁾	≤ 0.48	16 hours	40 hours ⁽¹⁾	40 hours ⁽¹⁾	40 hours ⁽¹⁾	≤ 0.65	40 hours ⁽¹⁾	40 hours ⁽¹⁾	40 hours ⁽¹⁾	40 hours ⁽¹⁾	> 0.65	48 hours⁽¹⁾	48 hours⁽¹⁾	48 hours⁽¹⁾	48 hours⁽¹⁾
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AS/NZS 1594: 2002	Hot-rolled steel flat products																																																								
AS/NZS 3678: 2011	Structural steel - Hot-rolled plates, floorplates and slabs																																																								
AS/NZS 3679.1: 2010	Structural steel - Hot-rolled bars and sections																																																								
AS/NZS 3679.2: 2010	Structural steel - Welded I sections																																																								
AS/NZS 1163: 2016	Cold-formed structural steel hollow sections																																																								
AS/NZS 1594: 2002 (R2016)	Hot-rolled steel flat products																																																								
AS/NZS 1595: 1998 (R2016)	Cold-rolled, unalloyed, steel sheet and strip																																																								
AS/NZS 3678: 2016	Structural steel - Hot-rolled plates, floorplates and slabs																																																								
AS/NZS 3679.1: 2016	Structural steel - Hot-rolled bars and sections																																																								
AS/NZS 3679.2: 2016	Structural steel - Welded I sections																																																								

⁹¹ Revision of hold times for CEV > 0.48; Deletion of restriction of Class 1H steel for formula of CEV calculation.

⁹² Revision of updated standards.

<p>93. Annex A1.1.2⁹³</p>	<p>A1.1.2 American standards</p> <p>ASTM A36/A36M-08 Standard Specification for Carbon Structural Steel</p> <p>ASTM A500/A500M-10a Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes</p> <p>ASTM A514/A514M-05(2009) Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding</p> <p>ASTM A572/A572M-07 Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel</p> <p>ASTM A618/A618M-04(2010) Standard Specification for Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing</p> <p>ASTM A847/A847M-11 Standard Specification for Cold-Formed Welded and Seamless High-Strength, Low-Alloy Structural Tubing with Improved Atmospheric Corrosion Resistance</p> <p>ASTM A913/A913M-07 Standard Specification for High-Strength Low-Alloy Steel Shapes of Structural Quality, Produced by Quenching and Self-Tempering Process (QST)</p> <p>ASTM A992/A992M-11 Standard Specification for Structural Steel Shapes</p>	<p>A1.1.2 American standards</p> <p>ASTM A36/A36M-19 Standard Specification for Carbon Structural Steel</p> <p>ASTM A283/A283-18 Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates</p> <p>ASTM A308-2010 Standard Specification for Steel Sheet, Tempe (Lead-Tin Alloy) Coated by the Hot-Dip Process</p> <p>ASTM A423/A423M-19 Standard Specification for Seamless and Electric-Welded Low-Alloy Steel Tubes</p> <p>ASTM A500/A500M-21a Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes</p> <p>ASTM A514/A514M-18e1 Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding</p> <p>ASTM A529/A529M-19 Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality</p> <p>ASTM A572/A572M-21e1 Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel</p> <p>ASTM A588/A588M-19 Standard Specification for High-Strength Low-Alloy Structural Steel, up to 50 ksi (345 MPa) Minimum Yield Point, with Atmospheric Corrosion Resistance</p> <p>ASTM A595/A595M-18 Standard Specification for Steel Tubes, Low-Carbon or High-Strength Low-Alloy, Tapered for Structural Use</p> <p>ASTM A618/A618M-21 Standard Specification for Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing</p> <p>ASTM A653/A653M-20 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process</p> <p>ASTM A656/A656M-18 Standard Specification for Hot-Rolled Structural Steel, High-Strength Low-Alloy Plate with Improved Formability</p> <p>ASTM A709/A709M-21 Standard Specification for Structural Steel for Bridges</p>
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⁹³ Revision of updated standards.

Item	Current version	Amendments
		<p>ASTM A847/A847M-21 Standard Specification for Cold-Formed Welded and Seamless High-Strength, Low-Alloy Structural Tubing with Improved Atmospheric Corrosion Resistance</p> <p>ASTM A871/A871M-20 Standard Specification for High-Strength Low-Alloy Structural Steel Plate with Atmospheric Corrosion Resistance</p> <p>ASTM A875/A875M-21 Standard Specification for Steel Sheet, Zinc-5% Aluminum Alloy-Coated by the Hot-Dip Process</p> <p>ASTM A913/A913M-19 Standard Specification for High-Strength Low-Alloy Steel Shapes of Structural Quality, Produced by Quenching and Self-Tempering Process (QST)</p> <p>ASTM A924/A924M-20 Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process</p> <p>ASTM A945-2006 Standard Specification for High-Strength Low-Alloy Structural Steel Plate with Low Carbon and Restricted Sulfur for Improved Weldability, Formability, and Toughness</p> <p>ASTM A973/A973M-20 Standard Specification for Structural Steel Shapes</p> <p>ASTM A992/A992M-20 Standard Specification for Structural Steel Shapes</p> <p>ASTM A1011/A1011M-18a Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength</p>

Item	Current version	Amendments
94. Annex A1.1.3 ⁹⁴	<p>A1.1.3 Chinese standards</p> <p>GB/T 247 - 1997 Rules of acceptance, package, label and certification for plate, strip and wide flat in structural steel</p> <p>GB/T 700 - 2006 Carbon structural steel</p> <p>GB/T 709 - 2006 Dimension, appearance, weight and tolerance of plate, strip and wide flat in hot rolled structural steel</p> <p>GB/T 1591 - 2006 High strength structural steel</p> <p>GB/T 5313 - 1985 Through thickness properties of steel plates</p> <p>YB 4104 - 2000 Steel plate for high rise building structure</p> <p>GB 50017 - 2003 Code for design of steel structures</p> <p>GB 50205 - 2001 Code for acceptance of construction quality of steel structures</p>	<p>A1.1.3 Chinese standards</p> <p>GB/T 247 - 2008 Rules of acceptance, package, label and certification for plate, strip and wide flat in structural steel</p> <p>GB/T 700 - 2006 Carbon structural steel</p> <p>GB/T 709 - 2019 Dimension, appearance, weight and tolerance of plate, strip and wide flat in hot rolled structural steel</p> <p>GB/T 1591 - 2018 High strength low alloy structural steel</p> <p>GB/T 5313 - 2010 Steel plates with through-thickness characteristics</p> <p>YB 4104 - 2000 Steel plate for high rise building structure</p> <p>GB/T 18270 - 2009 High strength structural steel plates in the quenched and tempered condition</p> <p>GB 50017 - 2017 Code for design of steel structures</p> <p>GB 50205 - 2020 Standard for acceptance of construction quality of steel structures</p>
95. Annex A1.1.4 ⁹⁵	<p>1.1.4 Japanese standards</p> <p>JIS G 3101: 2010 Rolled steels for general structure</p> <p>JIS G 3106: 2008 Rolled steels for welded structure</p> <p>JIS G 3136: 2005 Rolled steels for building structure</p> <p>JIS G 3350: 2009 Light gauge steels sections for general structure</p> <p>JIS G 3352: 2003 Steel decks</p> <p>JIS G 3444: 2010 Carbon steel tubes for general structure</p> <p>JIS G 3466: 2010 Carbon steel square rectangular tubes for general structure</p> <p>JIS A 5523: 2006 Weldable hot rolled steel sheet piles</p> <p>JIS A 5528: 2006 Hot rolled steel sheet piles</p>	<p>A1.1.4 Japanese standards</p> <p>JIS G 3101: 2020 Rolled steels for general structure</p> <p>JIS G 3106: 2020 Rolled steels for welded structure</p> <p>JIS G 3136: 2012 Rolled steels for building structure</p> <p>JIS G 3350: 2021 Light-gauge steels sections for general structure</p> <p>JIS G 3352: 2014 Steel decks</p> <p>JIS G 3444: 2021 Carbon steel tubes for general structure</p> <p>JIS G 3466: 2021 Carbon steel square rectangular tubes for general structure</p> <p>JIS A 5523: 2021 Weldable hot rolled steel sheet piles</p> <p>JIS A 5528: 2021 Hot rolled steel sheet piles</p>

⁹⁴ Revision of updated standards.

⁹⁵ Revision of updated standards.

96. Annex A1.1.5⁹⁶

A1.1.5 UK and European standards


BS EN 10025: 2004	Hot rolled products of non-alloy structural steels - Technical delivery conditions.
BS EN 10164: 2004	Steel products with improved deformation properties perpendicular to the surface of the product - Technical delivery conditions.
BS EN 10210-1: 2006	Hot finished structural hollow sections of non-alloy and fine grain structural steels. Part 1: Technical delivery requirements.
BS EN 10248-1: 1996	Hot rolled sheet piling of non alloy steels. Part 1: Technical delivery conditions
BS EN 10147: 2000	Continuous hot dip zinc coated carbon steel sheet of structural quality

A1.1.5 UK and European standards

BS EN 10025-1: 2019	Hot rolled products of non-alloy structural steels. Part 1: General technical delivery conditions
BS EN 10025-2: 2019	Hot rolled products of non-alloy structural steels. Part 2: Technical delivery conditions for non-alloy structural steels
BS EN 10025-3: 2019	Hot rolled products of non-alloy structural steels. Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels
BS EN 10025-4: 2019	Hot rolled products of non-alloy structural steels. Part 4: Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels
BS EN 10025-5: 2019	Hot rolled products of non-alloy structural steels. Part 5: Technical delivery conditions for structural steels with improved atmospheric corrosion resistance
BS EN 10025-6: 2019	Hot rolled products of non-alloy structural steels. Part 6: Technical delivery conditions for flat products of high yield strength structural steels in the quenched and tempered condition
BS EN 10164: 2018	Steel products with improved deformation properties perpendicular to the surface of the product - Technical delivery conditions.
BS EN 10210-1: 2006	Hot finished structural hollow sections of non-alloy and fine grain structural steels. Part 1: Technical delivery requirements.
BS EN 10210-2: 2019	Hot finished steel structural hollow sections. Tolerances, dimensions and sectional properties.
BS EN 10210-3: 2020	Hot finished steel structural hollow sections. Technical delivery conditions for high strength and weather resistant steels.
BS EN 10248-1: 1996	Hot rolled sheet piling of non alloy steels. Part 1: Technical delivery conditions
BS EN 10147: 2000	Continuous hot dip zinc coated carbon steel sheet of structural quality (withdrawn, and replaced by BS EN 10346:2016)
BS EN 10149-1: 2013	Hot rolled flat products made of high strength steels for cold forming – Part 1: General technical delivery conditions
BS EN 10149-2: 2013	Hot rolled flat products made of high strength steels for cold forming – Part 1: Technical delivery conditions for thermomechanically rolled steels

⁹⁶ Revision of updated standards.

Item	Current version	Amendments
		<p>BS EN 10149-3: 2013 Hot rolled flat products made of high strength steels for cold forming – Part 3: Technical delivery conditions for normalized or normalized rolled steels</p> <p>BS EN 10346: 2015 Continuously hot-dip coated steel flat products for cold forming</p> <p>BS EN 10219-1: 2006 Cold formed welded structural hollow sections of non-ally and fine grain steels. Technical delivery requirements</p> <p>BS EN 10219-2: 2019 Cold formed welded steel structural hollow sections. Tolerances, dimensions and sectional properties</p> <p>BS EN 10219-3: 2020 Cold formed welded steel structural hollow sections. Technical delivery conditions for high strength and weather resistant steels</p>

Item	Current version	Amendments
97. Annex A1.1.6 ⁹⁷	<p>A1.1.6 Standards for destructive tests</p> <p>BS EN 10002-1:2001 Tensile testing of metallic materials. Part 1: Method of test at ambient temperature. (Withdrawn in the UK, replaced by BS EN ISO 6892-1:2009)</p> <p>BS EN 10045-1:1990 Charpy impact test on metallic materials – Part 1: Test method (V- and U-notches) (Withdrawn in the UK, replaced by BS EN ISO 148-1:2010)</p> <p>BS EN ISO 148-1:2010 Metallic materials - Charpy Pendulum impact test. Part 1: Test method</p> <p>BS EN ISO 6892-1:2009 Metallic materials - Tensile testing. Part 1: Method of test at ambient temperature</p> <p>ASTM E8/E8M-09 Standard Test Methods for Tension Testing of Metallic Materials</p> <p>ASTM E23-07ae1 Standard Test Methods for Notched Bar Impact Testing of Metallic Materials</p> <p>ASTM A770/A770M-03 (R2007) Standard Specification for Through-Thickness Tension Testing of Steel Plates for Special Applications</p> <p>JIS G 3199:2009 Specification for through-thickness characteristics of steel plate, wide flat and sections</p> <p>AS/NZS 3678:2011 Structural steel – Hot-rolled plates, floorplates and slabs</p> <p>GB 5313:2000-T Specification for through-thickness characteristics of steel plate, wide flat and sections</p>	<p>A1.1.6 Standards for destructive tests</p> <p></p> <p>BS EN ISO 148-1: 2016 Metallic materials - Charpy Pendulum impact test. Part 1: Test method</p> <p>BS EN ISO 6892-1: 2019 Metallic materials - Tensile testing. Part 1: Method of test at ambient temperature</p> <p>ASTM E8/E8M-21 Standard Test Methods for Tension Testing of Metallic Materials</p> <p>ASTM E23-18 Standard Test Methods for Notched Bar Impact Testing of Metallic Materials</p> <p>ASTM A770/A770M-03 (R2007) Standard Specification for Through-Thickness Tension Testing of Steel Plates for Special Applications</p> <p>JIS G 3199: 2021 Specification for through-thickness characteristics of steel plate, wide flat and sections</p> <p>AS/NZS 3678: 2016 Structural steel – Hot-rolled plates, floorplates and slabs</p> <p>GB 5313:2010 Steel plate with through thickness characteristics</p>

⁹⁷ Revision of updated standards.

Item	Current version	Amendments
98. Annex A1.2.2 ⁹⁸	<p><i>A1.2.2 American standards</i></p> <p>ASTM A27/A27M-10 Standard Specification for Steel Castings, Carbon, for General Application</p> <p>ASTM A148/A148M-08 Standard specification for steel castings, high strength, for structural purposes</p> <p>ASTM A488/A488M -10 Standard Practice for Steel Castings, Welding Qualifications of Procedures and Personnel</p> <p>ASTM A781/A781M -11 Standard Specification for Castings, Steel and Alloy, Common Requirements, for General Industrial Use</p> <p>ASTM A957/A957M -11 Standard Specification for Investment Castings, Steel and Alloy, Common Requirements, for General Industrial Use</p>	<p><i>A1.2.2 American standards</i></p> <p>ASTM A27/A27M-20 Standard Specification for Steel Castings, Carbon, for General Application</p> <p>ASTM A148/A148M-20e1 Standard specification for steel castings, high strength, for structural purposes</p> <p>ASTM A488/A488M -10e2 Standard Practice for Steel Castings, Welding Qualifications of Procedures and Personnel</p> <p>ASTM A781/A781M -21 Standard Specification for Castings, Steel and Alloy, Common Requirements, for General Industrial Use</p> <p>ASTM A957/A957M -21 Standard Specification for Investment Castings, Steel and Alloy, Common Requirements, for General Industrial Use</p>
99. Annex A1.2.3 ⁹⁹	<p><i>A1.2.3 Chinese standards</i></p> <p>GB50017 – 2003 Code for design of steel structures</p>	<p><i>A1.2.3 Chinese standards</i></p> <p>GB50017 – 2017 Code for design of steel structures</p>

⁹⁸ Revision of updated standards.

⁹⁹ Revision of updated standards.

Item	Current version	Amendments
100. Annex A1.2.5 ¹⁰⁰	<p><i>A1.2.5 UK and European standards</i></p> <p>BS 29: 1976 Specification for carbon steel forgings above 150mm ruling section (Withdrawn in the UK, replaced by BS EN 10250-2: 2000)</p> <p>BS 3100: 1991 Specification for steel castings for general engineering purposes (Withdrawn in the UK, replaced by BS EN 10293: 2005)</p> <p>BS EN 10250-2: 2000 Open steel die forgings for general engineering purposes - Part 2: Non-alloy quality and special steels</p> <p>BS EN 10293: 2005 Steel castings for general engineering uses</p> <p>DIN 1681: 1990 Cast steel for general engineering purposes: technical delivery conditions</p>	<p><i>A1.2.5 UK and European standards</i></p> <p>BS 29: 1976 Specification for carbon steel forgings above 150mm ruling section (Withdrawn in the UK, replaced by BS EN 10250-2: 2000)</p> <p>BS 3100: 1991 Specification for steel castings for general engineering purposes (Withdrawn in the UK, replaced by BS EN 10293: 2005)</p> <p>BS EN 10250-2: 2000 Open steel die forgings for general engineering purposes - Part 2: Non-alloy quality and special steels</p> <p>BS EN 10293: 2015 Steel castings for general engineering uses</p> <p>DIN 1681: 1990 Cast steel for general engineering purposes: technical delivery conditions</p>
101. Annex A1.3.1 ¹⁰¹	<p><i>A1.3.1 Australian and New Zealand standards</i></p> <p>AS 1110.1: 2000 ISO metric hexagon bolts and grades A and B - Bolts</p> <p>AS 1110.2: 2000 ISO metric hexagon bolts and grades A and B - Screws</p> <p>AS 1111.1: 2000 ISO metric hexagon bolts and grade C - Bolts</p> <p>AS 1111.2: 2000 ISO metric hexagon bolts and grade C - Screws</p> <p>AS 1112.1: 2000 ISO metric hexagon nuts - Style 1 - Product grades A and B</p> <p>AS 1112.2: 2000 ISO metric hexagon nuts - Style 2 - Product grades A and B</p> <p>AS 1112.3: 2000 ISO metric hexagon nuts - Product grade C</p> <p>AS 1112.4: 2000 ISO metric hexagon nuts - Chamfered thin nuts - Product grades A and B</p> <p>AS/NZS 1252: 1996 High strength steel bolts with associated nuts and washers for structural engineering</p> <p>AS/NZS 1559: 1997 Hot-dip galvanized steel bolts with associated nuts and washers for tower construction</p>	<p><i>A1.3.1 Australian and New Zealand standards</i></p> <p>AS 1110.1: 2015 ISO metric hexagon bolts and screws - Product grades A and B - Bolts</p> <p>AS 1110.2: 2015 ISO metric hexagon bolts and screws - Product grades A and B - Screws</p> <p>AS 1111.1: 2015 ISO metric hexagon bolts and screws - Product grade C - Bolts</p> <p>AS 1111.2: 2015 ISO metric hexagon bolts and screws - Product grade C - Screws</p> <p>AS 1112.1: 2015 ISO metric hexagon nuts - Style 1 - Product grades A and B</p> <p>AS 1112.2: 2015 ISO metric hexagon nuts - Style 2 - Product grades A and B</p> <p>AS 1112.3: 2015 ISO metric hexagon nuts - Product grade C</p> <p>AS 1112.4: 2015 ISO metric hexagon nuts - Chamfered thin nuts - Product grades A and B</p> <p>AS/NZS 1252: 2016 High strength steel bolts with associated nuts and washers for structural engineering</p> <p>AS/NZS 1559: 2018 Hot-dip galvanized steel bolts with associated nuts and washers for tower construction</p>

¹⁰⁰ Revision of updated standards.

¹⁰¹ Revision of updated standards.

Item	Current version	Amendments
102. Annex A1.3.2 ¹⁰²	<p><i>A1.3.2 American standards</i></p> <p>ASTM A194/A194M-10a Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature, or Both</p> <p>ASTM A307-10 Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength</p> <p>ASTM A325-10 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength</p> <p>ASTM A325M-09 Standard Specification for Structural Bolts, Steel, Heat Treated, 830 MPa Minimum Tensile Strength (Metric)</p> <p>ASTM A490-10a¹ Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength</p> <p>ASTM A490M-10 Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric)</p> <p>ASTM A563-07a Standard Specification for Carbons and Alloy Steel Nuts</p> <p>ASTM F436-11 Standard Specification for Hardened Steel Washers</p> <p>ASTM F436M-10 Standard Specification for Hardened Steel Washers (Metric)</p> <p>ASTM F1852-08 Standard Specification for "Twist Off" Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength</p>	<p><i>A1.3.2 American standards</i></p> <p>ASTM A193-2014 Standard Specification for Alloy-steel and Stainless Steel Bolting Materials for High Temperature Service</p> <p>ASTM A194/A194M-20a Standard Specification for Carbon Steel, Alloy Steel and Stainless Steel Nuts for Bolts for High Pressure or High Temperature, or Both</p> <p>ASTM A307-21 Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength</p> <p>ASTM A325-2014 (Withdrawn) Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength</p> <p>ASTM A325M-2014 (Withdrawn) Standard Specification for Structural Bolts, Steel, Heat Treated, 830 MPa Minimum Tensile Strength (Metric)</p> <p>ASTM A490-14a (Withdrawn) Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength</p> <p>ASTM A490M-14a (Withdrawn) Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric)</p> <p>ASTM A563/A563M-21a Standard Specification for Carbons and Alloy Steel Nuts</p> <p>ASTM F436-19 Standard Specification for Hardened Steel Washers</p> <p>ASTM F436M-19 Standard Specification for Hardened Steel Washers (Metric)</p> <p>ASTM F1852-14 (Withdrawn) Standard Specification for "Twist Off" Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength</p> <p>ASTM F3125/F3125M-21 Standard Specification for High Strength Structural Bolts and Assemblies Steel and Alloy Steel, Heat Treated, Inch Dimensions 120ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength</p> <p>ASTM F3148-17a Standard Specification for High Strength Structural Bolt Assemblies, Steel and Alloy Steel, Heat Treated, 144ksi Minimum Tensile Strength, Inch Dimensions</p>

¹⁰² Revision of updated standards.

Item	Current version	Amendments
103. Annex A1.3.5 ¹⁰³	<p><i>A1.3.5 UK, European and ISO standards</i></p> <p>BS 3692: 2001 ISO metric precision hexagon bolts, screws and nuts, Specification</p> <p>BS 4190: 2001 ISO metric black hexagon bolts, screws and nuts, Specification</p> <p>BS 4320: 1968 Specification for metal washers for general engineering purposes. Metric series</p> <p>BS 4395-1: 1969 Specification for high strength friction grip bolts and associated nuts and washers for structural engineering - Part 1: General grade</p> <p>BS 4395-2: 1969 Specification for high strength friction grip bolts and associated nuts and washers for structural engineering - Part 2: Higher grade bolts and nuts and general grade washers</p> <p>BS 4604-1: 1970 Specification for the use of high strength friction grip bolts in structural steelwork - Metric series - Part 1: General grade (Withdrawn in the UK, replaced by BS EN 1993-1.8: 2005)</p> <p>BS 4604-2: 1970 Specification for the use of high strength friction grip bolts in structural steelwork - Metric series - Part 2: Higher grade (parallel shank) (Withdrawn in the UK, replaced by BS EN 1993-1-8: 2005)</p> <p>BS EN 1993-1-8: 2005 Eurocode 3 ; Design of steel structure. Design of joints</p> <p>BS 4933: 2010 Specification for ISO metric black cup and countersunk head bolts and screws with hexagon nuts</p> <p>BS 7419: 1991 Specification for holding down bolts</p> <p>BS 7644-1: 1993 Direct tension indicators - Part 1: Specification for compressible washers (Replaced by BS EN 14399-9: 2009 but remains current)</p> <p>BS 7644-2: 1993 Direct tension indicators - Part 2: Specification for nut face and bolt face washers (Replaced by BS EN 14399-9: 2009 but remains current)</p>	<p><i>A1.3.5 UK, European and ISO standards</i></p> <p>BS 3692: 2014 ISO metric precision hexagon bolts, screws and nuts, Specification</p> <p>BS 4190: 2014 ISO metric black hexagon bolts, screws and nuts, Specification</p> <p>BS 4320: 1968 Specification for metal washers for general engineering purposes. Metric series (Withdrawn, and replaced by BS EN ISO 898-3:2018, BS EN ISO 7091:2000, BS EN ISO 7092:2000, BS EN ISO 7093:2000, and BS EN ISO 7094:2000)</p> <p>BS 4395-1: 1969 Specification for high strength friction grip bolts and associated nuts and washers for structural engineering - Part 1: General grade (Withdrawn, and replaced by BS EN 14399-1: 2015, BS EN 14399-2: 2015, BS EN 14399-3: 2015, BS EN 14399-4: 2015, BS EN 14399-5: 2015, BS EN 14399-6: 2015, BS EN 14399-7: 2018, and BS EN 14399-8: 2018)</p> <p>BS 4395-2: 1969 Specification for high strength friction grip bolts and associated nuts and washers for structural engineering - Part 2: Higher grade bolts and nuts and general grade washers (Withdrawn, and replaced by BS EN 14399-1: 2015, BS EN 14399-2: 2015, BS EN 14399-3: 2015, BS EN 14399-4: 2015, BS EN 14399-5: 2015, BS EN 14399-6: 2015, BS EN 14399-7: 2018, and BS EN 14399-8: 2018)</p> <p>BS 4604-1: 1970 Specification for the use of high strength friction grip bolts in structural steelwork - Metric series - Part 1: General grade (Withdrawn in the UK, replaced by BS EN 1993-1-8: 2005)</p> <p>BS 4604-2: 1970 Specification for the use of high strength friction grip bolts in structural steelwork - Metric series - Part 2: Higher grade (parallel shank) (Withdrawn in the UK, replaced by BS EN 1993-1-8: 2005)</p> <p>BS EN 1993-1-8: 2005 Eurocode 3 ; Design of steel structure. Design of joints</p> <p>BS 4933: 2010 Specification for ISO metric black cup and countersunk head bolts and screws with hexagon nuts</p> <p>BS 7419: 1991 Specification for holding down bolts</p> <p>BS 7644-1: 1993 Direct tension indicators - Part 1: Specification for compressible washers (Replaced by BS EN 14399-9: 2009 but remains current)</p> <p>BS 7644-2: 1993 Direct tension indicators - Part 2: Specification for nut face and bolt face washers (Replaced by BS EN 14399-9: 2009 but remains current)</p>

¹⁰³ Revision of updated standards.

Item	Current version	Amendments
Annex A1.3.5 (Cont'd)	<p>BS EN 14399-9: 2009 High strength structural bolting for preloading. System HR or HV. Part 9: Direct tension indicators for bolts and nuts assemblies</p> <p>BS EN ISO 4014: 2011 Hexagon head bolts: Product grades A and B</p> <p>BS EN ISO 4016: 2011 Hexagon head bolts: Product grade C</p> <p>BS EN ISO 4017: 2011 Hexagon head screws: Product grades A and B</p> <p>BS EN ISO 4018: 2011 Hexagon head screws: Product grade C</p> <p>BS EN ISO 4032: 2001 Hexagon nuts, style 1: Product grades A and B</p> <p>BS EN ISO 4033: 2001 Hexagon nuts, style 2: Product grades A and B</p> <p>BS EN ISO 4034: 2001 Hexagon nuts: Product grade C</p> <p>BS EN ISO 7091: 2000 Plain washers: Normal series, Product grade C</p>	<p>BS EN 14399-1: 2015 High-strength structural bolting assemblies for preloading. General requirements.</p> <p>BS EN 14399-2: 2015 High-strength structural bolting assemblies for preloading. Suitability for preloading.</p> <p>BS EN 14399-3: 2015 High-strength structural bolting assemblies for preloading. System HR. Hexagon bolt and nut assemblies.</p> <p>BS EN 14399-4: 2015 High-strength structural bolting assemblies for preloading. System HV. Hexagon bolt and nut assemblies.</p> <p>BS EN 14399-5: 2015 High-strength structural bolting assemblies for preloading. Plain washers.</p> <p>BS EN 14399-6: 2015 High-strength structural bolting assemblies for preloading. Plain chamfered washers.</p> <p>BS EN 14399-7: 2018 High-strength structural bolting assemblies for preloading. System HR. Countersunk head bolt and nut assemblies.</p> <p>BS EN 14399-8: 2018 High-strength structural bolting assemblies for preloading. System HV. Hexagon fit bolt and nut assemblies.</p> <p>BS EN 14399-9: 2018 High strength structural bolting for preloading. System HR or HV. Part 9: Direct tension indicators for bolts and nuts assemblies.</p> <p>BS EN ISO 898-1:2013 Mechanical properties of fasteners made of carbon steel and alloy steel. Bolts, screws and studs with specified property classes. Coarse thread and fine pitch thread.</p> <p>BS EN ISO 898-2:2012 Mechanical properties of fasteners made of carbon steel and alloy steel. Nuts with specified property classes. Coarse thread and fine pitch thread.</p> <p>BS EN ISO 898-3:2018+A1:21 Fasteners. Mechanical properties of fasteners made of carbon steel and alloy steel. Flat washers with specified property classes. <i>View details.</i></p> <p>BS EN ISO 4014: 2011 Hexagon head bolts: Product grades A and B.</p> <p>BS EN ISO 4016: 2011 Hexagon head bolts: Product grade C.</p> <p>BS EN ISO 4017: 2011 Hexagon head screws: Product grades A and B.</p> <p>BS EN ISO 4018: 2011 Hexagon head screws: Product grade C.</p> <p>BS EN ISO 4032: 2001 Hexagon nuts, style 1: Product grades A and B.</p> <p>BS EN ISO 4033: 2001 Hexagon nuts, style 2: Product grades A and B.</p> <p>BS EN ISO 4034: 2001 Hexagon nuts: Product grade C.</p> <p>BS EN ISO 7091: 2000 Plain washers: Normal series, Product grade C.</p>

Item	Current version	Amendments
104. Annex A1.4.1.1 ¹⁰⁴	<p>A1.4.1.1 American standards</p> <p>AWS D1.1/D1.1M: 2010 Structural Welding Code - Steel</p> <p>AWS D1.3/D1.3M: 2008 Structural Welding Code - Sheet Steel</p>	<p>A1.4.1.1 American standards</p> <p>AWS D1.1/D1.1M: 2010 Structural Welding Code - Steel</p> <p>AWS D1.3/D1.3M: 2008 Structural Welding Code - Sheet Steel</p> <p>AWS A5.5/A5.5M: 2014 Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding</p> <p>AWS A5.23/A5.23M: 2021 Specification for Low-Alloy and High Manganese Steel Electrodes and Fluxes for Submerged Arc Welding</p> <p>AWS A5.28/A5.28M: 2005 Specification for Low-Alloy Steel Electrodes and Rods for Gas Shielded Arc Welding</p> <p>AWS A5.29/A5.29M: 2010 Specification for Low-Alloy Steel Electrodes for Flux Cored Arc Welding</p>

¹⁰⁴ Revision of updated standards.

Item	Current version		Amendments	
105. Annex A1.4.1.2 ¹⁰⁵	BS EN 758: 1997	Welding consumables. Tubular cored electrodes for metal arc welding with and without a gas shield of non-alloy and fine grain steels. Classification (Withdrawn in the UK, replaced by BS EN ISO 17632: 2008)	BS EN 758: 1997	Welding consumables. Tubular cored electrodes for metal arc welding with and without a gas shield of non-alloy and fine grain steels. Classification (Withdrawn in the UK, replaced by BS EN ISO 17632: 2008)
	BS EN ISO 17632: 2008	Welding consumables. Tubular cored electrodes for gas shielded and non-gas shielded metal arc welding of non-alloy and fine grain steel. Classification	BS EN ISO 17632: 2008	Welding consumables. Tubular cored electrodes for gas shielded and non-gas shielded metal arc welding of non-alloy and fine grain steel. Classification
	BS EN 1011-1: 2009	Welding - Recommendations for welding of metallic materials. Part 1: General guidance for arc welding	BS EN 1011-1: 2009	Welding - Recommendations for welding of metallic materials. Part 1: General guidance for arc welding
	BS EN 1011-2: 2001	Welding - Recommendations for welding of metallic materials. Part 2: Arc welding of ferritic steels	BS EN 1011-2: 2001	Welding - Recommendations for welding of metallic materials. Part 2: Arc welding of ferritic steels
	BS EN 22553: 1995	Welded, brazed and soldered joints - Symbolic representation on drawings	BS EN 22553: 1995	Welded, brazed and soldered joints - Symbolic representation on drawings
			BS EN ISO 14174: 2018	Welding consumables. Fluxes for submerged arc welding and electroslag welding. Classification
			BS EN ISO 18275: 2018	Welding consumables - Covered electrodes for manual metal arc welding of high-strength steels - Classification
			BS EN ISO 18276: 2017	Welding consumables - Tubular cored electrodes for gas-shielded and non-gas-shielded metal arc welding of high-strength steels - Classification
			BS EN ISO 16334: 2012	Welding consumables - Wire electrodes, wires, rods and deposits for gas shielded arc welding of high-strength steels - Classification
			BS EN ISO 26304: 2018	Welding consumables - Solid wire electrodes, tubular cored electrodes and electrode-flux combinations for submerged arc welding of high strength steels - Classification (ISO 26304:2017)

¹⁰⁵ Revision of updated standards.

Item	Current version	Amendments
106. Annex A1.4.2.2 ¹⁰⁶	<p>A1.4.2.2 <i>UK European and ISO standards</i></p> <p>BS EN 288-3: 1992 Specification and approval of welding procedures for metallic materials. Part 3: Welding procedure tests for the arc welding of steels (Withdrawn in the UK, replaced by BS EN ISO 15614-1: 2004+A1: 2008)</p> <p>BS EN ISO 15614-1: 2004+A1: 2008 Specification and qualification of welding procedure for metallic materials. Welding procedure test. Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys</p> <p>BS EN ISO 15614-8:2002 Specification and qualification of welding procedures for metallic materials – welding procedure test. Part 8: Welding of tubes to tube-plate joints</p>	<p>A1.4.2.2 <i>UK European and ISO standards</i></p> <p>BS EN 288-3: 1992 Specification and approval of welding procedures for metallic materials. Part 3: Welding procedure tests for the arc welding of steels (Withdrawn in the UK, replaced by BS EN ISO 15614-1: 2017+A1: 2019)</p> <p>BS EN ISO 15607:2019 Specification and qualification of welding procedures for metallic materials – General rules</p> <p>BS EN ISO 15609-1:2019(E) Specification and qualification of welding procedures for metallic materials – Welding procedures specification – Part 1: Arc welding</p> <p>BS EN ISO 15614-1: 2017+A1: 2019 Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys</p> <p>BS EN ISO 15614-8:2016 Specification and qualification of welding procedures for metallic materials – Welding procedure test - Part 8: Welding of tubes to tube-plate joints</p>
107. Annex A1.4.3.2 ¹⁰⁷	<p>A1.4.3.2 <i>UK European and ISO standards</i></p> <p>BS EN 287-1: 2004 Qualification test of welders. Fusion welding. Part 1: Steels</p> <p>ISO 9606-1: 1994 Approval testing of welders. Fusion welding. Part 1: Steels</p> <p>BS EN 1418:1998 Welding personnel. Approved testing of welding operators for fusion welding and resistance weld setters for fully mechanized and automatic welding of metallic materials</p> <p>BS 4871-3:1985 Specification for approval testing of welders to approved welding procedure. Part 3: Arc welding of tube to tube-plate joints in metallic materials</p> <p>BS 4872-1:1982 Specification for approval testing of welders to welding procedure approval is not required. Part 1: Fusion welding of steel</p>	<p>A1.4.3.2 <i>UK European and ISO standards</i></p> <p>BS EN 287-1: 2011 Qualification test of welders. Fusion welding. Part 1: Steels (Withdrawn, and replaced by BS EN ISO 9606-1:2017)</p> <p>ISO 9606-1: 2017 Qualification testing of welders. Fusion welding. Steels</p> <p>BS EN 1418:1998 Welding personnel. Approved testing of welding operators for fusion welding and resistance weld setters for fully mechanized and automatic welding of metallic materials (Withdrawn, and replaced by BS EN ISO 14732:2013)</p> <p>BS 4871-3:1985 Specification for approval testing of welders to approved welding procedure. Part 3: Arc welding of tube to tube-plate joints in metallic materials</p> <p>BS 4872-1:1982 Specification for approval testing of welders to welding procedure approval is not required. Part 1: Fusion welding of steel</p> <p>BS EN 14732:2013 Welding personnel. Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials</p>

¹⁰⁶ Revision of updated standards.

¹⁰⁷ Revision of updated standards.

<p>108. Annex 1.4.4.2¹⁰⁸</p>	<p>A1.4.4.2 UK European and ISO standards</p> <p>BS 3923: Part 1: 1986 Methods for ultrasonic examination of welds. Part 1: Methods for manual examination of fusion welds in ferritic steels (Withdrawn in the UK, replaced by BS EN 1714: 1998)</p> <p>BS EN 1714: 1998 Non-destructive testing of welded joints. Ultrasonic examination of welded joints (Withdrawn in the UK, replaced by BS EN ISO 17640: 2010)</p> <p>BS EN ISO 17640: 2010 Non-destructive testing of welds. Ultrasonic testing. Techniques, testing levels and assessment</p> <p>BS EN 571-1: 1997 Non-destructive testing. Penetrant testing. Part 1: General principles</p> <p>BS EN 970: 1997 Non-destructive examination of fusion welds. Visual examination (Withdrawn in the UK, replaced by BS EN ISO 17637: 2011)</p> <p>BS EN ISO 17637: 2011 Non-destructive testing of welds. Visual testing of fusion welded joints</p> <p>BS EN 1290: 1998 Non-destructive examination of welds. Magnetic particle examination of welds (Withdrawn in the UK, replaced by BS EN ISO 17638: 2009)</p> <p>BS EN ISO 17638: 2009 Non-destructive testing of welds. Magnetic particle testing</p> <p>BS EN 1435: 1997 Non-destructive examination of welds. Radiographic examination of welded joints</p> <p>BS EN ISO 9934-1: 2001 Non-destructive testing. Magnetic particle testing. Part 1: General Principles</p> <p>The abstracted essentials for typically used welding symbols are given in Annex C.</p>	<p>A1.4.4.2 UK European and ISO standards</p> <p>BS 3923: Part 1: 1986 Methods for ultrasonic examination of welds. Part 1: Methods for manual examination of fusion welds in ferritic steels (Withdrawn in the UK, replaced by BS EN 1714: 1998)</p> <p>BS EN 1714: 1998 Non-destructive testing of welded joints. Ultrasonic examination of welded joints (Withdrawn in the UK, replaced by BS EN ISO 17640: 2010)</p> <p>BS EN ISO 17640: 2010 Non-destructive testing of welds. Ultrasonic testing. Techniques, testing levels and assessment</p> <p>BS EN 571-1: 1997 Non-destructive testing. Penetrant testing. Part 1: General principles (Withdrawn and replaced by BS EN ISO 34521-1:2021)</p> <p>BS EN ISO 3452-1:2021 Non-destructive testing. Penetrant testing. General principles</p> <p>BS EN 970: 1997 Non-destructive examination of fusion welds. Visual examination (Withdrawn in the UK, replaced by BS EN ISO 17637: 2011)</p> <p>BS EN 1290: 1998 Non-destructive examination of welds. Magnetic particle examination of welds (Withdrawn in the UK, replaced by BS EN ISO 17638: 2010)</p> <p>BS EN ISO 17637: 2011 Non-destructive testing of welds. Visual testing of fusion welded joints</p> <p>BS EN ISO 17638: 2010 Non-destructive testing of welds. Magnetic particle testing</p> <p>BS EN ISO 17638: 2022 Destructive tests on welds in metallic materials. Macroscopic and microscopic examination of welds</p> <p>BS EN 1435: 1997 Non-destructive examination of welds. Radiographic examination of welded joints (Withdrawn, and replaced by BS EN ISO 17636-1:2013, and BS EN ISO 17530-2:2013)</p> <p>BS EN ISO 9934-1: 2010 Non-destructive testing. Magnetic particle testing. Part 1: General Principles</p> <p>BS EN ISO 17636-1:2013 Non-destructive testing of welds. Radiographic testing. X- and gamma-ray techniques with film</p> <p>BS EN ISO 17636-2:2013 Non-destructive testing of welds. Radiographic testing. X- and gamma-ray techniques with film</p>
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¹⁰⁸ Revision of updated standards.

Item	Current version	Amendments
		<p>BS EN ISO 10883-2:2011 + A1:2020 Non-destructive testing of steel tubes. Automated eddy current testing of seamless and welded (except submerged arc-welded) steel tubes for the detection of imperfections</p> <p>BS EN ISO 10883-3:2011 + A1:2020 Non-destructive testing of steel tubes. Automated full peripheral flux leakage testing of seamless and welded (except submerged arc-welded) ferromagnetic steel tubes for the detection of longitudinal and/or transverse imperfections BS EN ISO 10883-8:2011 + A1:2020 Non-destructive testing of steel tubes. Automated ultrasonic testing of seamless and welded steel tubes for the detection of laminar imperfections</p> <p>BS EN ISO 10883-9:2011 + A1:2020 Non-destructive testing of steel tubes. Automated ultrasonic testing for the detection of laminar imperfections in strip/plate used for the manufacture of welded steel tubes</p> <p>BS EN ISO 10883-10:2011 + A1:2020 Non-destructive testing of steel tubes. Automated full peripheral ultrasonic testing of seamless and welded (except submerged arc-welded) steel tubes for the detection of longitudinal and/or transverse imperfections</p>

Item	Current version	Amendments
109. Annex 1.4.5 ¹⁰⁹	<p>A1.4.5 Destructive test methods for welds</p> <p>BS EN 875:1995 Destructive tests on welds in metallic materials. Impact tests. Test specimen location, notch orientation and examination (Withdrawn in the UK, replaced by BS EN ISO 9018: 2011)</p> <p>BS EN ISO 9018: 2011 Destructive tests on welds in metallic materials. Impact tests. Test specimen location, notch orientation and examination</p> <p>BS EN 876:1995 Destructive tests on welds in metallic materials. Longitudinal tensile tests on weld metal in fusion welded joints (Withdrawn in the UK, replaced by BS EN ISO 5178: 2011)</p> <p>BS EN ISO 5178: 2011 Destructive tests on welds in metallic materials. Longitudinal tensile tests on weld metal in fusion welded joints</p> <p>BS EN 895:1995 Destructive tests on welds in metallic materials. Transverse tensile test (Withdrawn in the UK, replaced by BS EN ISO 4136: 2011)</p> <p>BS EN ISO 4136: 2011 Destructive tests on welds in metallic materials. Transverse tensile test</p> <p>BS EN 910:1996 Destructive tests on welds in metallic materials. Bend tests (Withdrawn in the UK, replaced by BS EN ISO 5173: 2010)</p> <p>BS EN ISO 5173: 2010 Destructive tests on welds in metallic materials. Bend tests</p> <p>BS EN 1043-1:1996 Destructive tests on welds in metallic materials. Hardness testing hardness test on arc welded joints (Withdrawn in the UK, replaced by BS EN ISO 9015: 2011)</p> <p>BS EN ISO 9015: 2011 Destructive tests on welds in metallic materials. Hardness testing hardness test on arc welded joints</p> <p>BS EN 1320:1997 Destructive tests on welds in metallic materials. Fracture tests</p> <p>BS EN 1321:1997 Destructive tests on welds in metallic materials. Macroscopic and microscopic examination of welds</p> <p>BS EN ISO 6505:1-3: 2005 Metallic materials. Brinell hardness test</p> <p>BS EN ISO 6507:1-3: 2005 Metallic materials. Vickers hardness test</p>	<p>A1.4.5 Destructive test methods for welds</p> <p>BS EN 875:1995 Destructive tests on welds in metallic materials. Impact tests. Test specimen location, notch orientation and examination (Withdrawn in the UK, replaced by BS EN ISO 9018: 2022)</p> <p>BS EN ISO 9018: 2022 Destructive tests on welds in metallic materials. Impact tests. Test specimen location, notch orientation and examination</p> <p>BS EN 876:1995 Destructive tests on welds in metallic materials. Longitudinal tensile tests on weld metal in fusion welded joints (Withdrawn in the UK, replaced by BS EN ISO 5178: 2019)</p> <p>BS EN ISO 5178: 2019 Destructive tests on welds in metallic materials. Longitudinal tensile tests on weld metal in fusion welded joints</p> <p>BS EN 895:1995 Destructive tests on welds in metallic materials. Transverse tensile test (Withdrawn in the UK, replaced by BS EN ISO 4136: 2022)</p> <p>BS EN ISO 4136: 2022 Destructive tests on welds in metallic materials. Transverse tensile test</p> <p>BS EN 910:1996 Destructive tests on welds in metallic materials. Bend tests (Withdrawn in the UK, replaced by BS EN ISO 5173: 2010)</p> <p>BS EN ISO 5173: 2010 Destructive tests on welds in metallic materials. Bend tests</p> <p>BS EN 1043-1:1996 Destructive tests on welds in metallic materials. Hardness testing hardness test on arc welded joints (Withdrawn in the UK, replaced by BS EN ISO 9015: 2016)</p> <p>BS EN ISO 9015: 2016 Destructive tests on welds in metallic materials. Hardness testing hardness test on arc welded joints</p> <p>BS EN 1320:1997 Destructive tests on welds in metallic materials. Fracture tests (Withdrawn and replaced by BS EN ISO 9017:2018)</p> <p>BS EN ISO 9017:2018 Destructive tests on welds in metallic materials. Fracture test</p> <p>BS EN 1321:1997 Destructive tests on welds in metallic materials. Macroscopic and microscopic examination of welds (Withdrawn and replaced by BS EN ISO 17839:2022)</p> <p>BS EN ISO 17839:2022 Destructive tests on welds in metallic materials. Macroscopic and microscopic examination of welds</p> <p>BS EN ISO 6505:1-3: 2005 Metallic materials. Brinell hardness test</p> <p>BS EN ISO 6507:1-3: 2005 Metallic materials. Vickers hardness test</p>

Item	Current version	Amendments
110. Annex A1.7.5 ¹¹⁰	<p><i>A1.7.5 UK, European and ISO standards</i></p> <p>BS 5950-7: 1992 Structural use of steelwork in building. Specification for materials and workmanship: cold formed sections</p> <p>BS EN 10149-1: 1996 Specification for hot-rolled flat products made of high yield strength steels for cold forming. Part 1: General delivery conditions</p> <p>BS EN 10149-2: 1996 Specification for hot-rolled flat products made of high yield strength steels for cold forming. Part 2: Delivery conditions for thermomechanically rolled steels</p> <p>BS EN 10149-3: 1996 Specification for hot-rolled flat products made of high yield strength steels for cold forming. Part 3: Delivery conditions for normalized or normalized rolled steels</p> <p>BS EN 10219-1: 2006 Cold formed welded structural hollow sections of non-alloy and fine grain steels. Part 1: Technical delivery requirements</p> <p>BS EN 10249-1: 1996 Cold formed sheet piling of non alloy steels. Part 1: Technical delivery conditions</p> <p>BS EN 10268: 2006 Cold-rolled steel flat products with high yield strength for cold forming – Technical delivery conditions</p>	<p><i>A1.7.5 UK, European and ISO standards</i></p> <p>BS 5950-7: 1992 Structural use of steelwork in building. Specification for materials and workmanship: cold formed sections</p> <p>BS EN 10149-1: 1996 Specification for hot-rolled flat products made of high yield strength steels for cold forming. Part 1: General delivery conditions</p> <p>BS EN 10149-2: 1996 Specification for hot-rolled flat products made of high yield strength steels for cold forming. Part 2: Delivery conditions for thermomechanically rolled steels</p> <p>BS EN 10149-3: 1996 Specification for hot-rolled flat products made of high yield strength steels for cold forming. Part 3: Delivery conditions for normalized or normalized rolled steels</p> <p>BS EN 10219-1: 2006 Cold formed welded structural hollow sections of non-alloy and fine grain steels. Part 1: Technical delivery requirements</p> <p>BS EN 10219-3: 2020 Cold formed welded structural hollow sections. Part 3: Technical delivery conditions for high strength and weather resistant steels</p> <p>BS EN 10249-1: 1996 Cold formed sheet piling of non alloy steels. Part 1: Technical delivery conditions</p> <p>BS EN 10268: 2006 Cold-rolled steel flat products with high yield strength for cold forming – Technical delivery conditions</p>

¹⁰⁹ Revision of updated standards.

¹¹⁰ Revision of updated standards.

Item	Current version	Amendments
111. Annex A2.3 ¹¹¹	<p>A2.3 UK and European Standards BS 5950: Structural use of steelwork in building:</p> <p>Part 1: 2000 Code of practice for design - Rolled and welded sections (Withdrawn in the UK, replaced by group of BS EN 1993-1-1: 2005, BS EN 1993-1-5: 2006, BS EN 1993-1-10: 2005, BS EN 1993-5: 2007, BS EN 1993-6: 2007 & BS EN 1993-1-8: 2005)</p> <p>Part 2: 2001 Specification for materials, fabrication and erection - Rolled and welded sections (Withdrawn in the UK, replaced by BS EN 1090-2: 2008)</p> <p>Part 3: 1990 Design in composite construction - Code of practice for design of simple and continuous composite beams (Withdrawn in the UK, replaced by BS EN 1994-1-1: 2004)</p> <p>Part 4: 1994 Code of practice for design of composite slabs with profiled steel sheeting (Withdrawn in the UK, replaced by BS EN 1994-1-1: 2004)</p> <p>Part 5: 1998 Code of practice for design of cold formed thin gauge sections (Withdrawn in the UK, replaced by BS EN 1993-1-3: 2006)</p> <p>Part 6: 1995 Code of practice for design of light gauge profiled steel sheeting (Withdrawn in the UK, replaced by BS EN 1993-1-3: 2006)</p> <p>Part 7: 1992 Specification for materials and workmanship: cold formed sections</p> <p>Part 8: 2003 Code of practice for fire resistant design (Withdrawn in the UK, replaced by BS EN 1993-1-2: 2005)</p> <p>BS 499-2c: 1999 Welding terms and symbols. Part 2c : European arc welding symbols in chart form</p> <p>BS 5427-1: 1996 Code of practice for the use of profiled sheet for roof and wall cladding on buildings. Part 1: Design</p> <p>BS 7608: 1993 Code of Practice for Fatigue Design and Assessment of Structures</p> <p>BS EN 1090-2: 2008 Execution of steel structures and aluminium structures. Part 2 : Technical requirements for the execution of steel structures</p> <p>BS EN 1991-2: 2003 Eurocode 1: Actions on structures. Part 2: Traffic loads on bridges</p>	<p>A2.3 UK and European Standards BS 5950: Structural use of steelwork in building:</p> <p>Part 1: 2000 Code of practice for design - Rolled and welded sections (Withdrawn in the UK, replaced by group of BS EN 1993-1-1: 2005, BS EN 1993-1-5: 2006, BS EN 1993-1-10: 2005, BS EN 1993-5: 2007, BS EN 1993-6: 2007 & BS EN 1993-1-8: 2005)</p> <p>Part 2: 2001 Specification for materials, fabrication and erection - Rolled and welded sections (Withdrawn in the UK, replaced by BS EN 1090-2: 2008)</p> <p>Part 3: 1990 Design in composite construction - Code of practice for design of simple and continuous composite beams (Withdrawn in the UK, replaced by BS EN 1994-1-1: 2004)</p> <p>Part 4: 1994 Code of practice for design of composite slabs with profiled steel sheeting (Withdrawn in the UK, replaced by BS EN 1994-1-1: 2004)</p> <p>Part 5: 1998 Code of practice for design of cold formed thin gauge sections (Withdrawn in the UK, replaced by BS EN 1993-1-3: 2006)</p> <p>Part 6: 1995 Code of practice for design of light gauge profiled steel sheeting (Withdrawn in the UK, replaced by BS EN 1993-1-3: 2006)</p> <p>Part 7: 1992 Specification for materials and workmanship: cold formed sections</p> <p>Part 8: 2003 Code of practice for fire resistant design (Withdrawn in the UK, replaced by BS EN 1993-1-2: 2005)</p> <p>BS 499-2c: 1999 Welding terms and symbols. Part 2c : European arc welding symbols in chart form</p> <p>BS 5427-1: 1996 Code of practice for the use of profiled sheet for roof and wall cladding on buildings. Part 1: Design</p> <p>BS 7608: 1993 Code of Practice for Fatigue Design and Assessment of Structures</p> <p>BS EN 1090-1: 2009+A1:2011 Execution of steel structures and aluminium structures Part 1: Requirements for conformity assessment of structural components</p> <p>BS EN 1090-2: 2008 Execution of steel structures and aluminium structures. Part 2 : Technical requirements for the execution of steel structures</p> <p>BS EN 1991-2: 2003 Eurocode 1: Actions on structures. Part 2: Traffic loads on bridges</p>

¹¹¹ Revision of updated standards.

Item	Current version	Amendments
112. Page Index of Annex A ¹¹²	<p>ANNEX A REFERENCES..... 341</p> <p>A1 ACCEPTABLE STANDARDS AND REFERENCES..... 341</p> <p>A1.1 <i>Steel materials</i>..... 341</p> <p>A1.2 <i>Castings and forgings</i>..... 343</p> <p>A1.3 <i>Bolts</i>..... 344</p> <p>A1.4 <i>Welding</i>..... 347</p> <p>A1.5 <i>Materials for composite design</i>..... 350</p> <p>A1.6 <i>Shear studs</i>..... 350</p> <p>A1.7 <i>Cold-formed steel materials</i>..... 350</p> <p>A1.8 <i>Dimensions and tolerances of sections</i>..... 351</p> <p>A1.9 <i>Protective treatment</i>..... 353</p> <p>A1.10 <i>Other acceptable references</i>..... 353</p> <p>A2 INFORMATIVE REFERENCES..... 354</p> <p>A2.1 <i>Practice Notes for Authorized Persons and Registered Structural Engineers</i>..... 354</p> <p>A2.2 <i>The Steel Construction Institute, UK</i>..... 354</p> <p>A2.3 <i>UK and European Standards</i>..... 354</p> <p>A2.4 <i>Australian Standards</i>..... 355</p> <p>A2.5 <i>General references</i>..... 355</p>	<p>ANNEX A REFERENCES..... 341</p> <p>A1 ACCEPTABLE STANDARDS AND REFERENCES..... 341</p> <p>A1.1 <i>Steel materials</i>..... 344</p> <p>A1.2 <i>Castings and forgings</i>..... 344</p> <p>A1.3 <i>Bolts</i>..... 345</p> <p>A1.4 <i>Welding</i>..... 349</p> <p>A1.5 <i>Materials for composite design</i>..... 353</p> <p>A1.6 <i>Shear studs</i>..... 353</p> <p>A1.7 <i>Cold-formed steel materials</i>..... 354</p> <p>A1.8 <i>Dimensions and tolerances of sections</i>..... 355</p> <p>A1.9 <i>Protective treatment</i>..... 356</p> <p>A1.10 <i>Other acceptable references</i>..... 356</p> <p>A2 INFORMATIVE REFERENCES..... 357</p> <p>A2.1 <i>Practice Notes for Authorized Persons and Registered Structural Engineers</i>..... 357</p> <p>A2.2 <i>The Steel Construction Institute, UK</i>..... 357</p> <p>A2.3 <i>UK and European Standards</i>..... 357</p> <p>A2.4 <i>Australian Standards</i>..... 359</p> <p>A2.5 <i>General references</i>..... 359</p>
113. Annex D1 ¹¹³	<p>D1 TESTING TO ESTABLISH STEEL CLASS</p> <p>Class 2 steel:</p> <p>Where steel is not supplied in accordance with one of the recognized reference material standards in Annex A1.1 and the supplier has an acceptable quality assurance system, testing should be carried out to establish compliance with one of the five reference material standards in Annex A1.1. Tests shall include tensile strength and ductility, notch toughness and chemical composition. At a minimum one test in each category shall be made for every 20 tonnes of steel or part thereof of the same product form, of the same range of thickness or diameter, and of the same cast. The results of each test and the characteristic value obtained by statistical analysis shall not be less than the value required</p>	<p>D1 TESTING TO ESTABLISH STEEL CLASS</p> <p>Class 1 steel and Class 1H steel:</p> <p>No additional testing is needed as these steels comply with one of the reference material standards in Annex A1.1 and the basic requirements given in clause 3.1.2, and the steels are produced from a manufacturer with an acceptable Quality Assurance system.</p> <p>Class 2 steel:</p> <p>Where steels are not supplied in accordance with one of the recognized reference material standards in Annex A1.1 but are produced from a manufacturer with an acceptable Quality Assurance system, such steels shall be tested to show that they comply with</p>

¹¹² Revision of page index of Annex A.

¹¹³ Addition for Class 1 and Class 1H steel; Revision of Class 2 and Class 3 steel.


Item	Current version	Amendments
	<p>by the standard. Table D1a below lists the essential performance requirements for hot rolled structural steel sections, flats, plates and hot finished and cold formed structural hollow sections. Table D1b lists the essential performance requirements for structural sections of cold formed steel.</p> <p>Class 3 steel:</p> <p>Uncertified steel shall be tested for tensile strength and ductility to demonstrate that it has a yield strength of at least 170N/mm², an elongation of at least 15% and an ultimate tensile strength of at least 300N/mm². One test in each category shall be made for every 20 tonnes of steel or part thereof the same product form, of the same thickness or diameter. If the steel is to be welded, the Responsible Engineer may additionally require tests for weldability as described in Annex D1.1.</p> <p>Quality control of testing</p> <p>The testing shall be carried out to meet the reference material standards given in Annex A1.1 by a HOKLAS accredited laboratory or by other laboratory accreditation bodies which have reached mutual recognition agreements/arrangements with HOKLAS.</p>	<p>one of the [red] reference material standards in Annex A1.1.</p> <p>Tests shall include tensile strength and ductility, notch toughness and chemical [red] compositions.</p> <p>At a minimum one test in each category shall be made for every 20 tonnes of [red] steels or part thereof the same product form, of the same range of [red] sizes and thicknesses, and of the same cast.</p> <p>The results of each test and the characteristic value obtained by statistical analysis shall not be less than the value required by the standard. [red]</p> <p>Class 3 steel:</p> <p>Uncertified [red] steels shall be tested for tensile strength and ductility to demonstrate that [red] they have a yield strength of at least 170N/mm², an elongation of at least 15% and [red] a tensile strength of at least 300N/mm². One test in each category shall be made for every 20 tonnes of [red] steels or part thereof the same product form, of the same [red] range of sizes and thicknesses. If the [red] steels are to be welded, the Responsible Engineer may additionally require tests for weldability as described in Annex D1.1.</p> <p>Quality control of testing</p> <p>The testing shall be carried out to meet the reference material standards [red] listed in Annex A1.1 by a HOKLAS accredited laboratory or by other laboratory accreditation bodies which have reached mutual recognition agreements/arrangements with HOKLAS.</p>

Item	Current version	Amendments
114. Annex D1.1 ¹¹⁴	<p>D1.1 Essential requirements</p> <p>Strength: The design strength shall be the minimum yield strength but not greater than the minimum tensile strength divided by a material factor with a minimum value of 1.2.</p> <p>Resistance to brittle fracture: The minimum average Charpy V-notch impact test energy at the required design temperature shall be in accordance with clause 3.2 of the Code in order to provide sufficient notch toughness.</p> <p>Ductility: The elongation on a gauge length of $5.65\sqrt{S_0}$ is not to be less than 15% where S_0 is the cross sectional area of the section.</p> <p>Weldability: The chemical composition and maximum carbon equivalent value for Class 1 steel shall conform to the respective reference materials standard in Annex A1.1.</p> <p>The maximum carbon equivalent value for steels to Class 2 shall not exceed 0.48% on ladle analysis and the carbon content shall not exceed 0.24%. For general applications the maximum sulphur content shall not exceed 0.03% and the maximum phosphorus contents shall not exceed 0.03%. When through thickness quality (Z quality) steel is specified the sulphur content</p>	<p>D1.1 Essential requirements</p> <p>The basic requirements for structural steels are:</p> <ul style="list-style-type: none"> ● Strength ■ ● Resistance to brittle fracture ■ ● Ductility ■ ● Weldability ■ <p>Table D1a lists the essential performance requirements for typical hot rolled sections and plates, and hot finished and cold formed structural hollow sections. Table D1b lists the essential performance requirements for typical cold formed thin gauge steel.</p>

¹¹⁴ Revision of basic requirement of structural steel with simplified description.

Item	Current version	Amendments																																								
	<p>shall not exceed 0.01%. The chemical compositions of various grades of steel shall also conform to the requirements stipulated in the national standards where they are manufactured.</p> <p>If it is required to weld Class 3 steel, then it shall also comply with the above.</p>																																									
115. Table D1a ¹¹⁵	<p>Table D1a - Essential performance requirements for hot rolled and hot finished structural steel and cold formed steel</p> <table border="1"> <thead> <tr> <th>Performance requirement</th> <th>Specified by</th> <th>Additional requirements for steel in structures designed by the plastic theory</th> </tr> </thead> <tbody> <tr> <td>Minimum yield strength</td> <td>Smaller of yield strength (R_{eH}), 0.2% proof strength ($R_{p0.2}$) and stress at 0.5% total elongation ($R_{t0.5}$)</td> <td rowspan="2">$R_{eH}/R_{t0.5} \geq 1.2$ (1.2 is a minimum and a higher value may be required)</td> </tr> <tr> <td>Minimum tensile strength</td> <td>Tensile strength (R_m)</td> </tr> <tr> <td>Notch toughness</td> <td>Minimum average Charpy V-notch impact test energy at specified temperature</td> <td>None</td> </tr> <tr> <td>Ductility</td> <td>Elongation in a specified gauge length Bend test</td> <td>Stress-strain diagram to have a plateau at yield stress extending for at least six times the yield strain. The elongation on a gauge length of $5.65 \sqrt{S_0}$ is not to be less than 15% where S_0 is the cross sectional area of the section</td> </tr> <tr> <td>Weldability</td> <td>Maximum carbon equivalent value, Carbon content, Sulphur and Phosphorus contents</td> <td>None</td> </tr> <tr> <td>Through thickness properties (only for certain situations, see 3.1.5 and 14.3.3.4)</td> <td>Elongation to failure in the through thickness direction</td> <td>None</td> </tr> </tbody> </table>	Performance requirement	Specified by	Additional requirements for steel in structures designed by the plastic theory	Minimum yield strength	Smaller of yield strength (R_{eH}), 0.2% proof strength ($R_{p0.2}$) and stress at 0.5% total elongation ($R_{t0.5}$)	$R_{eH}/R_{t0.5} \geq 1.2$ (1.2 is a minimum and a higher value may be required)	Minimum tensile strength	Tensile strength (R_m)	Notch toughness	Minimum average Charpy V-notch impact test energy at specified temperature	None	Ductility	Elongation in a specified gauge length Bend test	Stress-strain diagram to have a plateau at yield stress extending for at least six times the yield strain. The elongation on a gauge length of $5.65 \sqrt{S_0}$ is not to be less than 15% where S_0 is the cross sectional area of the section	Weldability	Maximum carbon equivalent value, Carbon content, Sulphur and Phosphorus contents	None	Through thickness properties (only for certain situations, see 3.1.5 and 14.3.3.4)	Elongation to failure in the through thickness direction	None	<p>Table D1a - Essential performance requirements for hot rolled and hot finished structural steel and cold formed steel</p> <table border="1"> <thead> <tr> <th>Performance requirement</th> <th>Specified by</th> <th>Additional requirements for steel in structures designed by the plastic theory</th> </tr> </thead> <tbody> <tr> <td>Minimum yield strength</td> <td>Smaller of yield strength (R_{eH}), 0.2% proof strength ($R_{p0.2}$) and stress at 0.5% total elongation ($R_{t0.5}$)</td> <td rowspan="2">$R_{eH}/R_{t0.5} \geq 1.2$ (1.2 is a minimum and a higher value may be required)</td> </tr> <tr> <td>Minimum tensile strength</td> <td>Tensile strength (R_m)</td> </tr> <tr> <td>Notch toughness</td> <td>Minimum average Charpy V-notch impact test energy at specified temperature</td> <td>None</td> </tr> <tr> <td>Ductility</td> <td>Elongation in a specified gauge length Bend test</td> <td>Stress-strain diagram to have a plateau at yield stress extending for at least six times the yield strain. The elongation refers to Clause 3.1.2</td> </tr> <tr> <td>Weldability</td> <td>Maximum carbon equivalent value, Carbon content, Sulphur and Phosphorus contents</td> <td>None</td> </tr> <tr> <td>Through thickness properties (only for certain situations, see 3.1.5 and 14.3.3.4)</td> <td>Elongation to failure in the through thickness direction</td> <td>None</td> </tr> </tbody> </table>	Performance requirement	Specified by	Additional requirements for steel in structures designed by the plastic theory	Minimum yield strength	Smaller of yield strength (R_{eH}), 0.2% proof strength ($R_{p0.2}$) and stress at 0.5% total elongation ($R_{t0.5}$)	$R_{eH}/R_{t0.5} \geq 1.2$ (1.2 is a minimum and a higher value may be required)	Minimum tensile strength	Tensile strength (R_m)	Notch toughness	Minimum average Charpy V-notch impact test energy at specified temperature	None	Ductility	Elongation in a specified gauge length Bend test	Stress-strain diagram to have a plateau at yield stress extending for at least six times the yield strain. The elongation refers to Clause 3.1.2	Weldability	Maximum carbon equivalent value, Carbon content, Sulphur and Phosphorus contents	None	Through thickness properties (only for certain situations, see 3.1.5 and 14.3.3.4)	Elongation to failure in the through thickness direction	None
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¹¹⁵ Revision of ductility performance requirement.

Item	Current version	Amendments
116. Annex D1.2 ¹¹⁶	<p>D1.2 Additional requirements for high strength steels</p> <p>Steel for plates and section with a yield strength greater than 460 N/mm² but not exceeding 690 N/mm² shall comply with the basic requirements given in Table D1a. It shall be produced by a manufacturer in accordance with an acceptable quality assurance system. Data shall be available to show that the specified properties in terms of yield strength, tensile strength, Charpy impact energy and chemical composition are consistently obtained. A minimum of one test in each category shall be made for every 20 tonnes of steel or part thereof the same product form, of the same range of thickness or diameter, and of the same cast. The category, thickness or diameter range should be classified in the same way as the product standard.</p>	

¹¹⁶ Deletion of Annex D1.2.

Item	Current version	Amendments
117. Annex D1.3 ¹¹⁷	<p>D1.3 Design strength for high strength steels</p> <p>High strength steels with yield stresses above 460 N/mm² but not exceeding 690 N/mm² typically obtain their strength through a quench and tempering heat-treatment process and are known as RQT steels. This presents additional constraints in terms of fabrication and design, particularly with welding because heat may affect the strength of the parent steel.</p> <p>Different manufacturers use different manufacturing processes and chemical compositions for steel and therefore the Responsible Engineer should obtain the particular product specification and ensure that it complies with the requirements for design strength, buckling characteristics, ductility, weldability requirements, welding consumable requirements (under matched / matched / over-matched), pre-heat requirements, inter-pass temperature limits, etc.</p>	
118. Annex D1.4 ¹¹⁸	<p>D1.4 Quality control of testing</p> <p>The testing shall be carried out to meet the reference material standards as contained in Annex A1.1 by a HOKLAS accredited laboratory or by other accredited laboratories which have reached mutual recognition agreements/arrangements with HOKLAS.</p>	<p>D1.2 Quality control of testing</p> <p>The testing shall be carried out to meet the reference material standards as contained in Annex A1.1 by a HOKLAS accredited laboratory or by other accredited laboratories which have reached mutual recognition agreements/arrangements with HOKLAS.</p>

¹¹⁷ Deletion of Annex D1.3.

¹¹⁸ Renumbering of Annex D1.4 to D1.2.

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119. Table D2 ¹¹⁹	<p>Table D2 - Minimum material property requirements for various high strength steels</p> <table border="1"> <thead> <tr> <th colspan="2">Steel</th> <th>Source</th> <th>Yield Strength Y_s N/mm²</th> <th>Ultimate Strength U_s N/mm²</th> <th>Elongation</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Bisplate</td> <td>60</td> <td rowspan="3">Australia</td> <td>500</td> <td>590-730</td> <td>20%</td> </tr> <tr> <td>70</td> <td>600</td> <td>690-830</td> <td>20%</td> </tr> <tr> <td>80</td> <td>690</td> <td>790-930</td> <td>18%</td> </tr> <tr> <td>HT690</td> <td>70</td> <td rowspan="2">Japan</td> <td>590</td> <td>690</td> <td>(Min 20% reqd.)</td> </tr> <tr> <td>HT780</td> <td>80</td> <td>685</td> <td>780</td> <td>(Min 20% reqd.)</td> </tr> <tr> <td>RQT</td> <td>601</td> <td rowspan="2">UK</td> <td>620</td> <td>690-850</td> <td>(Min 20% reqd.)</td> </tr> <tr> <td>RQT</td> <td>701</td> <td>690</td> <td>790-930</td> <td>(Min 20% reqd.)</td> </tr> <tr> <td>HPS</td> <td>485W</td> <td rowspan="3">USA</td> <td>485</td> <td>-</td> <td>(Min 20% reqd.)</td> </tr> <tr> <td>ASTM A913</td> <td>70</td> <td>485</td> <td>620</td> <td>16%</td> </tr> <tr> <td>ASTM A514</td> <td>100</td> <td>690</td> <td>760 – 895</td> <td>18%</td> </tr> <tr> <td>S500Q</td> <td></td> <td rowspan="4">Europe</td> <td>440 - 500</td> <td>540 – 590</td> <td>(Min 20% reqd.)</td> </tr> <tr> <td>S550Q</td> <td></td> <td>490 - 550</td> <td>590 - 640</td> <td>(Min 20% reqd.)</td> </tr> <tr> <td>S620Q</td> <td></td> <td>560 - 620</td> <td>650 - 700</td> <td>(Min 20% reqd.)</td> </tr> <tr> <td>S690Q</td> <td></td> <td>630 - 690</td> <td>710 - 770</td> <td>(Min 20% reqd.)</td> </tr> </tbody> </table> <p>Note: The minimum elongation limit is 18% for all steel.</p>	Steel		Source	Yield Strength Y _s N/mm ²	Ultimate Strength U _s N/mm ²	Elongation	Bisplate	60	Australia	500	590-730	20%	70	600	690-830	20%	80	690	790-930	18%	HT690	70	Japan	590	690	(Min 20% reqd.)	HT780	80	685	780	(Min 20% reqd.)	RQT	601	UK	620	690-850	(Min 20% reqd.)	RQT	701	690	790-930	(Min 20% reqd.)	HPS	485W	USA	485	-	(Min 20% reqd.)	ASTM A913	70	485	620	16%	ASTM A514	100	690	760 – 895	18%	S500Q		Europe	440 - 500	540 – 590	(Min 20% reqd.)	S550Q		490 - 550	590 - 640	(Min 20% reqd.)	S620Q		560 - 620	650 - 700	(Min 20% reqd.)	S690Q		630 - 690	710 - 770	(Min 20% reqd.)	<p>Table D2 - Minimum material property requirements for various high strength steels</p> <table border="1"> <thead> <tr> <th colspan="2">Steel</th> <th>Source</th> <th>Yield Strength Y_s N/mm²</th> <th>Ultimate Strength U_s N/mm²</th> <th>Elongation</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Bisplate</td> <td>60</td> <td rowspan="3">Australia</td> <td>500</td> <td>590-730</td> <td>20%</td> </tr> <tr> <td>70</td> <td>600</td> <td>690-830</td> <td>20%</td> </tr> <tr> <td>80</td> <td>690</td> <td>790-930</td> <td>18%</td> </tr> <tr> <td>HT690</td> <td>70</td> <td rowspan="2">Japan</td> <td>590</td> <td>690</td> <td>(Min 20% reqd.)</td> </tr> <tr> <td>HT780</td> <td>80</td> <td>685</td> <td>780</td> <td>(Min 20% reqd.)</td> </tr> <tr> <td>RQT</td> <td>601</td> <td rowspan="2">UK</td> <td>620</td> <td>690-850</td> <td>(Min 20% reqd.)</td> </tr> <tr> <td>RQT</td> <td>701</td> <td>690</td> <td>790-930</td> <td>(Min 20% reqd.)</td> </tr> <tr> <td>HPS</td> <td>485W</td> <td rowspan="3">USA</td> <td>485</td> <td>-</td> <td>(Min 20% reqd.)</td> </tr> <tr> <td>ASTM A913</td> <td>70</td> <td>485</td> <td>620</td> <td>16%</td> </tr> <tr> <td>ASTM A514</td> <td>100</td> <td>690</td> <td>760 – 895</td> <td>18%</td> </tr> <tr> <td>S500Q</td> <td></td> <td rowspan="4">Europe</td> <td>440 - 500</td> <td>540 – 590</td> <td rowspan="4">Refers to Clause 3.1.2</td> </tr> <tr> <td>S550Q</td> <td></td> <td>490 - 550</td> <td>590 - 640</td> </tr> <tr> <td>S620Q</td> <td></td> <td>560 - 620</td> <td>650 - 700</td> </tr> <tr> <td>S690Q</td> <td></td> <td>630 - 690</td> <td>710 - 770</td> </tr> </tbody> </table>	Steel		Source	Yield Strength Y _s N/mm ²	Ultimate Strength U _s N/mm ²	Elongation	Bisplate	60	Australia	500	590-730	20%	70	600	690-830	20%	80	690	790-930	18%	HT690	70	Japan	590	690	(Min 20% reqd.)	HT780	80	685	780	(Min 20% reqd.)	RQT	601	UK	620	690-850	(Min 20% reqd.)	RQT	701	690	790-930	(Min 20% reqd.)	HPS	485W	USA	485	-	(Min 20% reqd.)	ASTM A913	70	485	620	16%	ASTM A514	100	690	760 – 895	18%	S500Q		Europe	440 - 500	540 – 590	Refers to Clause 3.1.2	S550Q		490 - 550	590 - 640	S620Q		560 - 620	650 - 700	S690Q		630 - 690	710 - 770
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ASTM A514	100		690	760 – 895	18%																																																																																																																																																								
S500Q		Europe	440 - 500	540 – 590	Refers to Clause 3.1.2																																																																																																																																																								
S550Q			490 - 550	590 - 640																																																																																																																																																									
S620Q			560 - 620	650 - 700																																																																																																																																																									
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¹¹⁹ Revision of elongation for source of steel from Europe; Deletion of minimum elongation limit.

¹²⁰ Addition of bolt grade ISO 6.8 and 12.9.