

Ref : BD _____

Address : _____

Appendix _____ to approval dated _____

Type 2 Mechanical Couplers for Steel Reinforcing Bars ^a
Mechanical Couplers for Steel Reinforcing Bars with Ductility Requirement ^b

In giving this approval of plans, I hereby impose the following conditions under item 6 in section 17(1) of the Buildings Ordinance:

- (a) Qualified site supervision of the mechanical splice works by experienced and competent persons shall be provided to ensure that the works are carried out in accordance with the plans approved and that the required quality standards are complied with.
- (b) The Registered Structural Engineer (RSE) should assign a quality control supervisor to supervise the works, determine the necessary frequency of inspection by the quality control supervisor which should not be less than once a week, and devise inspection check lists. The minimum qualifications and experience of the quality control supervisor is to be the same as the Technically Competent Person of grade T3, as stipulated in the Code of Practice for Site Supervision 2009.
- (c) The Registered General Building Contractor/Registered Specialist Contractor (RGBC/RSC) should assign a quality control co-ordinator to provide full time on site supervision of the works and devise inspection check lists. The minimum qualifications and experience of the quality control co-ordinator is to be the same as the Technically Competent Person of grade T3, as stipulated in the Code of Practice for Site Supervision 2009.
- (d) The names and qualifications of the supervisory personnel representing the RSE and the RGBC/RSC respectively should be recorded in an inspection log book. The date, time, items inspected and inspection results should be clearly recorded in the log book. The log book should be kept at the site office and, when required, produced to the Building Authority for inspection.
- (e) After delivery of the mechanical splices to site, strength tests on a representative number of the mechanical splices, as directed by the RSE, are required to be carried out in accordance with the test criteria specified in paragraph 5 below. The tests should be carried out by a laboratory* accredited under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) or by other laboratory accreditation bodies which have reached mutual recognition agreements/arrangements with the HOKLAS for the particular tests concerned. All results of the strength tests[@] should be submitted within 60 days of the delivery of the mechanical splices to the site and appended with a statement signed by the RSE to confirm that the acceptance criteria appropriate to the tests have been complied with.

2. Under Building (Administration) Regulation 10, a copy of quality assurance scheme of the manufacturer is required to be submitted prior to the application for consent to the commencement of the mechanical coupler works. The quality assurance scheme should include the following details:

- (a)^ Quality control documentation relating to the production of the couplers.
- (b)^ Sample mill certificates of the constituent materials used to produce the couplers.
- (c) Detailed description of the process of strength hardening and threading the connecting ends of the steel reinforcing bars and the relevant specifications from the manufacturer.
- (d) Description of the method of identification for the splicing assemblies from others, if any, without ductility requirement. In this connection, the method of identification should allow physical evidence of the strength hardening process to be observable after the threading of the steel reinforcing bars. Therefore, methods of only colour coding are not acceptable.
- (e) Description of the method of installing the steel reinforcing bars to the couplers. This should include description of any special equipment involved, its frequency of calibration and any special training provided to the site fabricators and the inspection required.
- (f) Documents to prove that manufacturing of the couplers and the process of strength hardening and threading of the connecting ends of steel reinforcing bars are by a factory or factories with ISO 9001 quality assurance certification.
- (g) Test results[@] to establish that the criteria as specified in paragraph 5 below are complied with.

3. Under Building (Administration) Regulation 10, a quality supervision plan of the RSE and the RGBC/RSC is required to be submitted to this Department prior to the application for consent to the commencement of the mechanical coupler works. The quality supervision plan should include the following details:

- (a) Assignments of quality control supervisor of the RSE and quality control co-ordinator of the RGBC/RSC to supervise the manufacturing process of the connecting ends of the steel reinforcing bars, and the installation of steel reinforcing bars to the couplers.
- (b) Frequency of quality supervision, which should be at least 20% of the splicing assemblies by the quality control supervisor of the RSE and full time continuous supervision by the quality control co-ordinator of the RGBC/RSC of the mechanical couplers works.
- (c) For couplers to be used at the top of pile cap and transfer plate, the frequency of quality supervision should be at least 50% of the splicing assemblies by the

quality control supervisor of the RSE and full time continuous supervision by the quality control co-ordinator of the RGBC/RSC.

- (d) A description of the sampling procedures including the arrangement from collecting samples on site to delivery of samples direct to laboratory for testing the quality of the mechanical splice assemblies.

4. Under Building (Administration) Regulation 10, the following documents are required to be submitted, which should include:

- (a) A quality supervision report signed by the RSE, which should be submitted within 21 days upon completion of the mechanical splice works to confirm that the quality supervision has been adequately provided with, the inspection log book of the quality control supervisors representing the RSE and the RGBC/RSC for the mechanical couplers works.
- (b) A copy of mill certificates of the constituent materials used to produce the couplers, which should be submitted within 60 days of the delivery of the mechanical couplers to the site.

5. Strength tests of the mechanical splice should satisfy the following criteria:

Application under the Code of Practice for Structural Use of Concrete 2013^a

- (a) Clause 3.2.8.4 of the Code of Practice (CoP) for Structural Use of Concrete 2013.
- (b) The rate of sampling for testing depends on the size of the batch, i.e. the quantity of couplers of the same type, size, mill and testing certificates. Each batch means a delivery to site at any one time and shall be as follows:

Size of batch (Nos.)	Minimum number of specimens per batch	
	Tests as per clause 3.2.8.4 (b), (c) & (d) of the CoP for Structural Use of Concrete 2013 (per test)	Test as per clause 3.2.8.4(a) of the CoP for Structural Use of Concrete 2013
Less than 100	5	3
100-500	6	6
Exceeding 500	9	9

Application under the Code of Practice for Structural Use of Concrete 2004^b

- (a) Permanent elongation of the splicing assemblies after loading to $0.6 f_y$ (i.e. 0.6 specified characteristic strength) should not exceed 0.1 mm in accordance with the requirements stated in Clause 3.2.8.2 of Code of Practice for Structural Use of Concrete 2004.
- (b) Static tension test: The splicing assemblies must develop in tension the greater of 100 percent of the tensile strength of the bar (i.e. 287.5 N/mm² for

grade 250 and 529 N/mm² for grade 460), and 125 percent of the specified characteristic strength of the bar.

- (c) Static compression test: The splicing assemblies must develop in compression 125 percent of the specified characteristic strength of the bar.
- (d) Cyclic tension-and-compression test: The splicing assemblies shall be tested in four stages as given in Table below, and must sustain Stage 1 through Stage 3 without failure. If the conditions of acceptance for the static tension test are complied with in Stage 4, the static tension test may be omitted.

Stage	Tension	Compression	Cycles
1	0.95f _y	0.5f _y	20
2	2ε _y	0.5f _y	4
3	5ε _y	0.5f _y	4
4	Load in tension to failure		

Notes:

1. f_y is the specified characteristic strength of the reinforcing bar.
2. ε_y is the strain of reinforcing bar at actual yield stress.

- (e) The rate of sampling for testing shall be dependent on the size of the batch which is the quantity of the couplers of the same type, size, covered by the same mill and testing certificates and delivered to the site at any one time, and shall be as follows:

Size of batch (Nos.)	Minimum number of specimens per batch	
	Test as per paragraphs 5(b), (c) & (d) above (per test)	Test as per paragraph 5(a) above
Less than 100	5	3
100-500	6	6
Exceeding 500	9	9

- * A Directory of Accredited Laboratories in Hong Kong is obtainable from the Hong Kong Accreditation Service (HKAS) Executive, Innovation and Technology Commission.

A laboratory's accreditation for an individual test or calibration may be granted, modified or withdrawn at any time. Up-to-date information on accredited laboratories and their scopes of accreditation are available on the internet at the HKAS website at <http://www.info.gov.hk/itc/hkas/>.

- @ The test carried out by an accredited laboratory should be within its scope of accreditation. Test results should be reported on a HOKLAS Endorsed Certificate or equivalent Certificate/Report issued from other laboratory accreditation bodies which have reached mutual recognition agreements/arrangements with the HOKLAS.

- [^] Not required if the mechanical coupler is one of the types listed in Central Data Bank
- ^a Delete when the design is to the CoP for Structural Use of Concrete 2004
- ^b Delete when the design is to the CoP for Structural Use of Concrete 2013
- [#] Delete wherever inapplicable