

Testing of Reinforcement for Concrete

Section 17(1)6 of the Buildings Ordinance (BO) empowers the Building Authority to impose requirements for testing of steel reinforcing bars (rebars) when approving structural plans or granting consent to the commencement of building works. The purpose of such testing is to verify the specified properties of steel rebars delivered to site and/or the prefabrication factory. These verification tests are additional to the routine testing carried out by the manufacturer at the rolling mill. Authorized persons (AP) and registered structural engineers (RSE) should ensure that specimens are selected at random from every batch of steel rebars delivered to site and/or the prefabrication factory. Buildings Department (BD) adopts Construction Standard CS2:2012¹ (CS2) as an acceptable standard for compliance with such requirements.

Construction Standard CS2:2012

2. Under CS2, rebars include straight bars, coil and decoiled products except cold worked rebars. It provides material specifications for grade 250 (for rebars up to 12 mm diameter), grade 500B and grade 500C rebars, including requirements on mass per metre, chemical composition, mechanical properties and bond property. CS2 also specifies requirements for certification of Quality Assured (QA) Stockists and QA Coil Processors, and the purchaser's testing.

Verification Tests

3. The verification tests imposed under section 17(1)6 of the BO should be the purchaser's tests referred to in CS2 and should be performed by a laboratory accredited by Hong Kong Accreditation Service under the Hong Kong Laboratory Accreditation Scheme (HOKLAS).

4. The test report should include the following information:

- (a) Classification and certification by QA Stockists for Class 1 and Class 2 rebars;
- (b) Full description of test specimens including name of steel manufacturer, country of origin, grade and size as stated by the person submitting them for testing;
- (c) Sketch of pattern of deformation and mill marks;

/(d) ...

¹ Available in Civil Engineering and Development Department (CEDD) website (www.cedd.gov.hk) under the "Standards, BIM Objects, Specifications, Handbooks, Tender Price and Cost Indices" page of "Publications" section.

- (d) Identification of the batch and date of delivery to the site/the prefabrication factory to which the test specimens relate;
- (e) Measured mass per metre; and
- (f) Results of chemical composition (product analysis), tensile properties, bend performance and bond property tests if required.

Coils and Decoiled Products

5. Amendment No. 2/2018 to CS2² and Technical Note No. 5 on CS2² issued on 26 September 2018 cover the technical, inspection and testing requirements on coils and decoiled products, requirements on all coil processors to be QA Coil Processors, recognition of off-site steel rebar prefabrication yards approved under Technical Circular (Works) No. 10/2018³ (Approved Yards) as QA Coil Processors, and transitional arrangement for the required delivery information/documentation of coils and decoiled products.

Off-site Prefabricated Rebar Products

6. Technical Circular (Works) No. 10/2018 promulgates, among others, the quality assurance requirements for admission and retention in the List of Approved Steel Reinforcing Bar Prefabrication Yards⁴ maintained by CEDD and engagement of an Independent Audit Team (IAT) by CEDD to monitor and audit the quality management system (QMS) of the Approved Yard as well as providing quality supervision for centralised batch sampling and testing of rebars for public works projects and housing projects in accordance with CS2.

7. Prefabricated rebar products from Approved Yards within their approved scope (such as cutting and bending rebars, fabrication of reinforcement cages and threading of rebars/coupling with reinforcement connectors) are considered as conforming to the Code of Practice for Structural Use of Concrete 2013 (2020 Edition), provided that qualified supervision to the rebar prefabrication works is carried out in accordance with the provisions of the BO and its subsidiary regulations.

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² Both available in CEDD website (www.cedd.gov.hk) under the “Standing Committee on Concrete Technology Publications” page of “Publications” section.

³ Available in the Development Bureau website (www.devb.gov.hk) under the “Technical Circulars” page of “Publication and Press Releases” section.

⁴ The list with the approved scope for the Approved Yards available in CEDD website (www.cedd.gov.hk) under the “Off-site Prefabricated Steel Reinforcing Bar Products” of “Public Services & Forms” section.

Qualified Supervision of Sampling and Testing of Rebars

8. Approval of structural plans involving reinforced concrete construction will be imposed with a condition under item 6 in section 17(1) of the BO to specify that qualified site supervision is to be provided by the RSE and the registered general building contractor (RGBC)/registered specialist contractor (RSC), including, inter alia, sampling and testing of rebars.

9. Batch sampling of rebars conducted in accordance with the QMS of the Approved Yard and witnessed by the IAT is accepted as satisfying the requirement of qualified site supervision in respect of sampling of rebar in accordance with the purchaser's testing requirement stipulated in Section 5 of CS2. To ensure compliance with CS2, RSE and RGBC/RSC opting for this streamlined arrangement should check the Approved Yard's sampling records and IAT's witness records, and the test reports of rebars certified by a HOKLAS accredited laboratory covering their particular project which are kept by the Approved Yard. Upon delivery of the prefabricated rebar products to the project site, a copy of the sampling records, witness records and test reports of the products should be kept on site for inspection by representatives of BD. The list of prefabricated rebar products used in the project site, together with a statement signed by the RSE to confirm the rebars in compliance with the BO and its subsidiary regulations, should be submitted to BD within 21 days of the delivery of the prefabricated rebar products to the project site.

10. Alternatively, RSE and RGBC/RSC may make their own arrangements with the Approved Yards on the supervision of the sampling of rebars, delivery of samples to their appointed HOKLAS accredited laboratory, and testing of samples in accordance with CS2 by their appointed quality control supervisor and quality control coordinator respectively.

11. A similar practice note has been issued to AP, RSE and registered geotechnical engineers.

(YU Po-mei, Clarice)
Building Authority

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