



工程指示 / 要求簡箋(E.I.)

工程指示編號：EI/ 0640 119 修改版次：
 工程編號：J836 工程名稱：日出康城7期平台
 工程項目：預留碼花枝鐵拉力測試
 收件人：Maggie Lor 發件人：李耀鵬 日期：2019/5/28

要求提供 / 確認 事項：

- | | | |
|------------------------------------|-------------------------------------|-------------------------------|
| <input type="checkbox"/> 初步鋁料 B.M. | <input type="checkbox"/> 加工拆圖，然後生產 | <input type="checkbox"/> 尺寸表 |
| <input type="checkbox"/> 正式鋁料 B.M. | <input type="checkbox"/> 技術上資料 / 指示 | <input type="checkbox"/> 報價 |
| <input type="checkbox"/> 配件 B.M. | <input type="checkbox"/> 樣辦或貨品說明書 | <input type="checkbox"/> 分判合約 |
| <input type="checkbox"/> 其他：_____ | | |

內容：

跟據 B.D 批則要求，因此工程部分預留碼有用到花枝鐵製成，相關
 拉力測試需做回。煩請訂購 $\phi 16$ 及 $\phi 20$ 花枝各 5 條供測試用
 (600 mm 長) Grade 500 B

測試跟據 CS2:2012 指示進行。

先找 HOKLAS Lab 報價再安排 Test.

請在 2019/6/17 前完成上列要求。

附有關圖紙 / 文件：

4 頁

以上項目為：

- 原合約工程包 原合約工程加 / 減賬 新工程報價

原因：-

分發東莞各部門：

- () 生產技術總監 連附件 () 技術部 連附件 () 生產部 連附件 () 機械設計部 連附件
 () 採購部 連附件 () 生產統籌部 連附件
 () 質檢部 連附件 () 會計部 連附件 () 報關組 連附件 () 其他 _____ 連附件

分發香港各部門：

- () 行政部 連附件 () 會計部 連附件 () 統籌部 連附件 () 工程部地盤科文 連附件
 () 採購部 連附件 () QS 部 連附件 () 維修部 連附件 () 其他 _____ 連附件

傳遞編號：

發件人簽署：

項目經理簽署：

Ref: BD 3/7192/97/4(C1) Pt. VI

Address: Tseung Kwan O Area 86, Site C1, Tseung Kwan O, N.T. - TKOTL 70RP

Appendix I to approval dated 15 December 2017

BD 批則

Reinforcing Bar Works

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

- (a) Sampling and testing of steel reinforcing bars should be carried out in accordance with CS2:2012. Testing should be carried out by a laboratory* accredited under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for the particular test concerned. Test results[®] should be submitted within 60 days of the delivery of the steel reinforcing bars to the site[^]. The test reports should be appended with a statement signed by the Registered Structural Engineer to confirm the following:
 - (i) All steel reinforcing bars used for the construction and the test specimens covered by the test reports are in accordance with the types and grades of steel shown in the approved plans.
 - (ii) Sampling and testing of steel reinforcing bars used have been carried out in accordance with CS2:2012.
 - (iii) The acceptance criteria appropriate to each type and grade of steel reinforcing bars used have been complied with.
 - (iv) All steel reinforcing bars tests have been carried out by a laboratory* accredited under the HOKLAS.

2. The following conditions in respect of qualified supervision of works are imposed under item 6 in section 17(1) of the Buildings Ordinance:

- (a) Qualified site supervision of sampling of steel reinforcing bars, by experienced and competent persons as defined in 2(b) and 2(c), should be provided to ensure that the works are carried out in accordance with the plans approved and that the required standards are complied with.
- (b) The Registered Structural Engineer 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 under the Registered Structural Engineer's stream, as stipulated in the Code of Practice for Site Supervision 2009.
- (c) The Registered General Building Contractor/Registered Specialist Contractor should assign a quality control co-ordinator to provide full time on site

SECTION 6

METHODS OF TESTING

6.1 CONDITIONS OF TEST SPECIMENS

The determination of mass per metre, chemical analysis, tensile test, rebend test, fatigue test and the determination of bond property shall be carried out on weldable steel reinforcing bars used for the reinforcement of concrete structures in the delivery condition. The test specimens shall be tested at a room temperature between 5°C and 35°C unless otherwise specified.

The length of the test specimen for rebend test shall be adjusted to suit the type of test machine in use and must be sufficient for the test specimen to be bent to such extents that comply with the requirements of Cl. 6.5.

The length of the test specimen for the tensile test shall be 1 metre long.

6.2 DETERMINATION OF MASS PER METRE

The determination of the deviation from nominal mass per metre shall be carried out on a test specimen which shall have square cut ends. The length and mass of the test specimen shall be measured to an accuracy of at least $\pm 0.5\%$. The percentage deviation from nominal mass per metre of the test specimen shall be determined from the difference between the actual mass per metre of the test specimen deduced from its mass and length and nominal mass per metre as given in Table 2.

6.3 CHEMICAL ANALYSIS

The chemical composition (product analysis) shall be determined by spectrometric methods or an appropriate method specified in the International Standards listed in the bibliography of BS EN ISO 15630-1:2010.

6.4 TENSILE TEST

6.4.1 Test equipment

The force-measuring system of the testing machine shall be calibrated to at least Class 1 in accordance with ISO 7500-1:2004. The extensometer shall be calibrated to at least Class 1 in accordance with ISO 9513:1999 for the determination of $R_{p0.2}$; for the determination of A_{gt} , a Class 2 extensometer (see ISO 9513:1999) can be used.

6.4.2 Test procedure

The tensile test shall be carried out in accordance with Cl. 10 of BS EN ISO 6892-1:2009.

For yield strength of grade 500 steel reinforcing bars, the upper yield strength (R_{eH}), which is the maximum value of stress prior to the first decrease in force, shall apply.

If a yield phenomenon is not present, the yield strength from 0.2% proof strength ($R_{p0.2}$)

shall be determined in accordance with Appendix A. For grade 250 steel reinforcing bars, the yield strength shall be determined from the 0.2% proof strength ($R_{p0.2}$).

For determination of percentage total elongation at maximum force (A_{gt}), test shall be carried out in accordance with Appendix B.

The mechanical properties of the test specimen including upper yield strength (R_{eH}) or 0.2% proof strength ($R_{p0.2}$), tensile strength (R_m) and the percentage total elongation at maximum force (A_{gt}) shall be determined in tensile test. The nominal cross-sectional area (A_n) of the test specimen shall be used for calculating the tensile properties (R_{eH} or $R_{p0.2}$, R_m) unless otherwise specified in the relevant product standards.

6.5 REBEND TEST

The rebend test shall be carried out in such a way as to produce a continuous and uniform bending deformation (curvature) at every section of the bend. The test shall be conducted either:

- (a) on a power bending machine in which the test specimen is adequately supported by plain smooth surfaces or rolls which do not offer resistance to longitudinal movement of the test specimen; or
- (b) on a 3-point hydraulic bending machine.

The test machine shall be serviceable and capable of imparting constant loading to the test specimen and shall be without impact effect. It is recommended that the bending and rebending rate shall be approximately three revolutions per minute.

The test specimen shall be tested according to the following sequence of operations:

- (a) the test specimen shall be bent through an angle of 90° round a mandrel with diameter not exceeding those specified in Table 11;
- (b) ageing shall be performed artificially by placing the test specimen at a temperature of 100°C, maintaining at this temperature $\pm 10^\circ\text{C}$ for a period of 1 hours $^{+15}_0$ min. and then cooling in still air to room temperature; and
- (c) the test specimen shall be bent back towards its original shape (partially re-straightened) by a steadily applied force through at least 20° on the same bending machine as used above.

Table 11 – Rebend test mandrel

Grade	Nominal diameter, d (mm)	Maximum mandrel diameter
250	All sizes	$2d$
500B & 500C	≤ 16 > 16	$4d$ $7d$

where

\bar{x} is the average value of the test results; and

a_1 is the increment for calculation of batch release criteria.

(a_1 is 10 MPa for R_e , zero for R_m/R_e and 0% for A_{gt})

Table 8 – Absolute minimum and maximum values of tensile properties

Performance characteristic	Minimum value			Maximum value		
	250	500B	500C	250	500B	500C
R_e , MPa	243	485	485	N/A	650	650
R_m/R_e	1.13	1.06	1.13	N/A	N/A	1.38
A_{gt} , %	4.0	4.0	6.0	N/A	N/A	N/A

3.1.3.3.2 Where the characteristic value C_v is specified as an upper limit as given in Table 5 (i.e. for R_m/R_e of grade 500C), the results shall be deemed to comply with this Standard if either:

- all individual values of R_m/R_e are equal to or lower than the specified upper value of characteristic value of 1.35; or
- $\bar{x} \leq 1.35$ for R_m/R_e and all individual values for R_m/R_e are equal to or lower than the maximum value of 1.38 as given in Table 8.

3.1.3.3.3 All individual values of R_e for grade 500 steel reinforcing bar shall be equal to or lower than the maximum value of 650 MPa as given in Table 8.

3.1.3.4 Bend performance and bond property

For rebend test, all test specimens shall comply with the requirements of Cl. 1.6.3.

For surface geometry measurement or beam test, all test specimens shall comply with the requirements of Cl. 1.7.2 or Cl. 1.7.3 respectively.

3.1.3.5 Retests

If any test specimen fails to meet the tensile properties, rebend, or bond property requirements, two additional test specimens shall be taken from different bars of the same batch to undergo the required tests. If both additional test specimens pass the retests, the batch shall be deemed to comply with this Standard. If any additional test specimen fails in the retests, the batch shall be deemed not to comply with this Standard.

3.1.4 Chemical composition (product analysis)

If product analysis is carried out and a single sample falls outside the maximum product analysis values given in Table 4 for any element, further samples shall be selected from the remainder of the batch as follows:

- at least two samples from the same heat/cast for a batch with mass up to 5 tonnes;
- at least five samples from the same heat/cast for a batch with mass up to 20 tonnes; and
- at least eight samples for a batch with mass over 20 tonnes.