



工程指示 / 要求簡箋(E.I.)

工程指示編號：EI / 6045 / 23

修改版次：A

工程編號：J - 858

工程名稱：將軍澳日出康城 11

工程項目：幕牆 廠用螺絲拉力 驗收標準

收件人：生統 / 王良

發件人：Paul Wong

日期：02/05/2023

內容：

A 版: 按 BD Steel Code P. 309 修改 Grade 8.8 的扭力標準。

按計力工程師提供資料和計算方法，使用此標準，驗收螺絲拉力。

因廠內有 M16 螺絲，而廠未有工具能夠拉到 147Nm 扭力。

請安排購買扭力儀器供顧問一同驗收。

儀器需要証書

請在 2023.04.21 前完成上列要求。

附：頁

原合約工程包

原合約工程加 / 減賬

新工程報價

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 (✓) 小羅&清  連附件

(✓) 質檢部  連附件 ( ) 會計部  連附件 ( ) 報關組  連附件 ( ) 其他 楊榮輝  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 積哥

( ) 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：

HK 0919/23

發件人簽署：

項目經理簽署：

<h1>质量检验要求内容</h1>	工序		不锈钢、碳钢螺栓紧固扭矩	
	編製	王良	页碼	第 1 页 共 1 页

不锈钢螺栓、碳钢螺栓紧固扭矩测试质量控制

依照 BS EN ISO3506-1, 不锈钢螺栓、碳钢螺栓推荐紧固扭矩:

不锈钢螺栓 (A2/A4)			碳钢螺栓		
规格	等级	紧固扭矩 Nm	规格	等级	紧固扭矩 Nm
M10	70	33.9	M10	4.6/4.8	不適用
	80	45.2		8.8	不適用
M12	70	59.2	M12	4.6/4.8	不適用
	80	78.9		8.8	不適用
M16	70	147	M16	4.6/4.8	不適用
	80	195.9		8.8	55
M20	70	286.7	M20	4.6/4.8	不適用
	80	382.2		8.8	100
M24	70	495.6	M24	4.6/4.8	不適用
	80	660.8		8.8	120
M30	50	不適用	M30	4.6/4.8	不適用
	70	984.6		8.8	150

**CODE OF PRACTICE  
FOR THE  
STRUCTURAL USE OF STEEL  
2011**



#### 14.4.2.6 *Taper washers*

When the bolt head or nut is in contact with a surface which is inclined at more than 3° from a plane at right angles to the bolt axis, a taper washer shall be placed to achieve satisfactory bearing.

#### 14.4.2.7 *Nuts*

Nuts shall be checked after being galvanized or sheradized for free running on the bolt and re-tapped if necessary to ensure a satisfactory tightening performance. Nuts of grade 8 or lower may be galvanized or sheradized while nuts of grade 10 or higher should only be sheradized.

#### 14.4.2.8 *Tightening of assemblies with non-preloaded bolts*

The connected components shall be drawn together such that they achieve firm contact. Shims may be used to adjust the fit. For thicker gauge material ( $t \geq 4$  mm for plates and  $t \geq 8$  mm for sections), residual gaps up to 2 mm may be left between contact faces unless full contact bearing is specified.

During this process, each bolt assembly shall be brought into a snug-tight condition without overloading the bolts. In large bolt groups, this process shall be carried out progressively from the middle of the group to the outside. Additional cycles of tightening shall be carried out, if necessary, to achieve a uniform snug-tight condition. Sufficient precautions shall be taken so as not to overload short bolts (i.e. of length less than 3 times the diameter) and M12 or smaller bolts during tightening.

Note: the term snug-tight can generally be identified as that achievable by the effort of one man using a normal sized spanner without any extension arm, and can be set as the point at which a percussion drill starts hammering.

The snug tight tension in the bolt should not exceed the value at which bolt shear capacity reduces. Values of torque recommended by a typical bolt manufacturer to achieve suitable tensions for **grade 8.8 bolts** are as follows:

**Table 14.5 - Recommended tightening torques and approximate bolt tensions for ISO grade 8.8 bolts (Assumes bolts oiled)**

Nominal bolt diameter	Tightening torque (Nm)	Approximate bolt load (kN)
M16	55	17
M20	100	25
M22	110	25
M24	120	25
M27	135	25
M30	150	25
M33	165	25
M36	180	25

#### 14.4.2.9 *Fitted bolts*

Precision bolts may be used as fitted bolts when holes are drilled or reamed after assembly so that the clearance in the hole is not more than 0.3 mm.

#### 14.4.2.10 *Reaming*

Where parts cannot be brought together by drifting without distorting the steelwork, rectification may be made by reaming, provided the design of the connection will allow the use of larger diameter holes and bolts.

### 14.4.3 **Pre-loaded bolt assemblies**

#### 14.4.3.1 *Bolt / nut / washer combinations*

The combination of pre-loaded bolt and nut and washers which may be used shall be from matching acceptable standards as given in Annex A1.3. The hardened washer is to

# Stainless Steel

Hex Bolts Recommended Tightening Torque



A4-70

## STAINLESS HEX BOLTS - RECOMMENDED TIGHTENING TORQUE (Nm)

Nominal Size	Pitch (mm)	Stress Area (mm <sup>2</sup> )	Class 50	Class 70	Class 80
M3	0.50	5.03	0.4	0.9	1.2
M4	0.70	8.78	1.0	2.1	2.7
M5	0.8	14.20	1.9	4.2	5.5
M6	1.00	20.10	3.3	7.1	9.4
M8	1.25	36.60	8.0	17.1	22.8
M10	1.50	58.00	15.8	33.9	45.2
M12	1.75	84.30	27.6	59.2	78.9
M14	2.00	115.00	44.0	94.2	125.6
M16	2.00	157.00	68.6	147.0	195.9
M18	2.50	192.00	94.3	202.2	269.6
M20	2.50	245.00	133.8	286.7	382.2
M22	2.50	303.00	182.0	390.0	519.9
M24	3.00	353.00	231.3	495.6	660.8
M27	3.00	459.00	338.3	725.0	966.7
M30	3.50	561.00	459.5	984.6	1312.7
M33	3.50	694.00	625.2	1339.8	1786.4
M36	4.00	817.00	802.9	1720.6	2294.1
M39	4.00	976.00	1039.1	2226.7	2969.0

Graded 8.8  
560 N/mm<sup>2</sup>  
= 450

k Factor = 0.2

The induced load is calculated at 65% yield stress

### Note:

A k factor of 0.2 has been used which assumes threads are burr free and a good quality lubricant (molybdenum disulphate MoS<sub>2</sub>) is used. Stainless fasteners that are not lubricated or coated often seize and can exhibit k factors in excess of 0.35

(Class 70) yield stress = 450 N/mm<sup>2</sup>

Min. Initial Torque  $T = k \times D \times 0.65 \times \text{yield stress} \times \text{Stress Area}$   
(Nm)

$T = 0.2 \times 12 \times 0.65 \times 450 \times 84.3 / 1000$

$T = 59.2 \text{ Nm}$

A4 - 70 按算式計									
	K	D		0.65 x Yield	Stress Area			Nm	
M10	0.2	10	0.65	450	58	1000		33.9	
M12	0.2	12	0.65	450	84.3	1000		59.2	
M16	0.2	16	0.65	450	157	1000		147.0	
M18	0.2	18	0.65	450	192	1000		202.2	
M20	0.2	20	0.65	450	245	1000		286.7	
M24	0.2	24	0.65	450	353	1000		495.6	
M30	0.2	30	0.65	450	561	1000		984.6	



2013/138726  
MADE IN THE UK



理存啟  
儀器

足秤到 M16  
14-70