

CERTIFICATE OF PRODUCT CONFORMITY



Dubai Central Laboratory Department (DCLD) of Dubai Municipality
hereby attests that the product(s)

WELDABLE ES 600 (Ultra High Strength Steel Bars for the Reinforcement of Concrete): Grade 600 – 10 to 32 mm diameters

(Details as per the attached Scope of Certification)

manufactured by:
EMIRATES STEEL INDUSTRIES CO. PJSC
ICAD 1, Musaffah, Abu Dhabi, United Arab Emirates

have been assessed in accordance with DCLD Document Ref. No. DM-DCLD-RD-DP21-2001 (IC) "General Rules for DM Third Party Product Certification Scheme Through Factory Assessment" and were found in conformity with the Technical Approval Requirements

TARR 178

*Accordingly, DCLD hereby authorizes the above manufacturer
to affix the DCL Product Conformity Mark to the above-mentioned product(s).*

for / **ENGR. AMIN AHMED AMIN**

Director, Dubai Central Laboratory Department
Dubai Municipality

Certificate No: TAC19080178
Valid Until: 04 December 2021



Current Issue Date: 05 December 2020
Original Issue Date: 05 December 2019



*The attached Scope of Certification bearing the same Certificate No. forms an integral part of this Certificate.
This Certificate is an electronic document, subject to the Terms and Conditions of the Product Certification System and shall not be reproduced except in full.*

DM-DCLD-F-IC-8003 REV 04

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	Doc Ref.	DM-DCLD-F-IC-8007	رقم الوثيقة:	

TECHNICAL APPROVAL CERTIFICATE NO. TAC19080178

1 The Company

EMIRATES STEEL INDUSTRIES CO. PJSC
ICAD 1, Musaffah, Abu Dhabi, United Arab Emirates

2 Product trade name

Weldable ES 600 (Ultra High Strength Steel Bars for the Reinforcement of Concrete)

3 Manufacturer

EMIRATES STEEL INDUSTRIES CO. PJSC

4 Scope of approval

- This scope of approval covers Weldable ES 600 (Ultra High Strength Steel Bars for the Reinforcement of Concrete)
- Reinforcing Steel, manufactured in straight bar, is a steel product with a circular or practically circular cross-section which is suitable for the reinforcement of concrete.
- Grades and Sizes:
 - Grade 600 Weldable Ultra high strength steel bars for the reinforcement of concrete
 - 10 to 32 mm diameters for bars
 - The nominal length of bars shall be agreed at the time of enquiry and order (typical 12 Meters)
- Product Intended Use:** The product is intended to be used as concrete reinforcement in construction, particularly in super structure.

Exclusions:

- This approval does not cover grades other than 600 and sizes not mentioned above for Weldable Ultra high strength steel bars for the reinforcement of concrete shall not be covered in the scope of this approval.*
- DM shall have no responsibilities what so ever regarding the design and/or the way the product is fabricated / installed.*

Approved by HOU	Authorized by PCASM
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5 Product characteristics

Product characteristic are as shown in the below tables.

Table 1: Chemical composition (maximum % by mass)

	Carbon	Sulphur	Phosphorus	Nitrogen	Copper	Carbon equivalent
Cast analysis	0.24	0.040	0.040	0.010	0.08	0.52 max
Product analysis	0.27	...	0.040	0.011	0.08	0.54 max

Table 2: Mechanical Properties

ES – 600	Yield strength, Re MPa (min)	Tensile/yield strength ratio, <i>Rm/Re (min)</i>	Total elongation at maximum force, <i>Agt</i>
	600	1.08	6.0

Fatigue Strength - Reinforcing bars, shall be subject to fatigue testing. When submitted to axial force-controlled fatigue testing, using a stress ratio ($\delta_{min} / \delta_{max}$) of 0.2, and stress range as given in table 3. The test samples shall survive two million stress cycles.

Table 3: Fatigue test conditions

Bar size (mm)	Stress range MPa
≤ 16	200
$>16, \leq 20$	185
$> 20, \leq 25$	170
$> 25, \leq 32$	160
> 32	150

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Bend Test - The test piece shall be bent to an angle between 160° and 180° over a mandrel of the diameter specified in table 4.

After the test, the specimen shall show no sign of fracture or cracks visible to a person of normal or corrected vision.

The mandrel diameter for intermediate sizes shall be that of the next lower size in table 4.

Table 4: Mandrel diameters for the bend test

Nominal diameter d mm	Maximum mandrel diameter
≤ 16	3d
>16	6d

Re bend Test - Bend the test pieces through an angle of 90°, around a mandrel with a diameter specified in Table 5, age (@ 100° C for 1 hr) the test piece and then bend back by at least 20°.

After the test, the specimen shall show no sign of fracture or cracks visible to a person of normal or corrected vision or with magnification of 5x

Table 5: Mandrel diameters for the re bend test

Nominal diameter d mm	Maximum mandrel diameter
≤ 16	4d
>16	7d

Dimensions, Mass per meter and Tolerances - The values for the nominal cross-sectional area and mass per meter of preferred diameters shall be as given in Table 6.

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The permissible deviation from nominal mass per meter shall be not more than $\pm 4.5\%$ on nominal diameters greater than 8 mm.

NOTE 1 – The values for the nominal mass per meter are calculated from the values of the nominal cross-sectional area on the basis that steels have a mass of 0.00785 kg/mm² per meter run.

Table 6: Nominal cross-sectional area and mass per meter

Nominal diameter (mm)	Cross-sectional area (mm ²)	Mass per meter (kg/m ³)
10	78.5	0.617
12	113	0.888
13	133	1.04
14	153.9	1.208
16	201	1.58
18	254.5	1.998
20	314	2.47
22	380	2.98
25	491	3.85
28	616	4.83
32	804	6.31

Surface Geometry

Table 7: Ranges for the rib parameters

Rib height, h	Rib spacing, c	Rib inclination, β
0.03d to 0.15d	0.4d to 1.2d	35° to 75°

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Rib Area

Table 8: Characteristic relative rib area

Nominal bar size, d mm	Relative rib area, fR
$d \leq 16$	0.035
$6 < d \leq 12$	0.040
$d > 12$	0.056

Transverse Ribs - The projection of the transverse ribs shall extend over at least 75 % of the circumference of the product, which shall be calculated from the nominal diameter.

The transverse rib flank inclination shall be greater than or equal to 45° and the transition from rib to core shall be radiused.

Longitudinal Ribs - Where longitudinal ribs are present, their height shall not exceed $0.10d$, where d is the nominal diameter of the product.

6 Identification/Labeling/Marking

Each product item as well as the packing containers shall be identified / labeled / marked to show the required basic information (manufacturer name, product name, DCL Technical Approval mark) in Arabic and/or English language.

Each bundle of reinforcing steel bars shall be secure with the tags on both ends and shall have the following minimum contents:

- Manufacturer
- Specification (ES600) / Grade 600
- Heat No.
- Size (mm)
- Bundle No.

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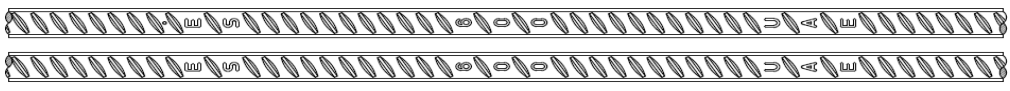
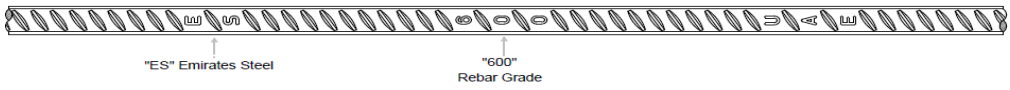
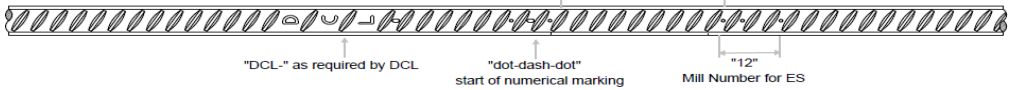
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- Length in meters
- No. of Bars
- Bundle Weight

Each bar shall be mark with the following at an interval of 1.5 meters

- "DCL -"
- Grade of the Bar: 600
- Manufacturer's Code: ES
- Country Code: 9
- Mill No.: 12

Bar Marking Proposal - To be implemented after the issuance of DCL Certifications		
TOP ROLL	TWO-SIT ROLLING	
	SINGLE ROLLING	
BOTTOM ROLL		

- TARR Conformity Mark (see below)



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7 Production quality control

The products shall be manufactured under an approved quality control program as shown in the internal quality inspection and testing plan. The quality control program shall verify continued compliance with requirements shown in **clause 5**.

8 Conditions of Approval

8.1 This approval is granted only to “EMIRATES STEEL INDUSTRIES CO. PJSC”. No other company, firm or person may hold or claim any entitlement to this Technical Approval.

8.2 This Technical Approval will remain valid for the period shown on the Approval Certificate provided that.

- The company complies with the requirements of this Technical Approval,
- The characteristics of the products are unchanged,
- Continue to be checked by DM as per surveillance scheme mentioned hereinafter in this report.

8.3 In granting this Technical Approval, Dubai Municipality makes no representation to:

- The presence or absence of patent or similar rights subsisting in **Weldable ES 600 (Ultra High Strength Steel Bars for the Reinforcement of Concrete)**
- The legal right of “EMIRATES STEEL INDUSTRIES CO. PJSC” to market “ **Weldable ES 600 (Ultra High Strength Steel Bars for the Reinforcement of Concrete)**” *as shown in the scope*, in the Emirate of Dubai.

8.4 The Technical Approval shall not be used in such manner as to bring Dubai Municipality into disrepute and “EMIRATES STEEL INDUSTRIES CO. PJSC” shall not make any statement which Dubai Municipality may consider as misleading.

8.5 Surveillance

• Inspection and testing

Dubai Municipality maintains the right to inspect the factory and products at any time without prior notice and to collect samples from the products available at the client's

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factory, warehouses or at any building site within Dubai Emirate, for the purpose of verification and/or testing.

- Complaints

“EMIRATES STEEL INDUSTRIES CO. PJSC” shall provide Dubai Central Laboratory (DCL) in writing with details of all records of complaints received whenever requested by DCL and shall keep records of such complaints for examination by Dubai Central Laboratory personnel.

- Cost of sampling and testing

“EMIRATES STEEL INDUSTRIES CO. PJSC” shall bear the cost of sampling and testing of the products either at Dubai Central Laboratory (DCL) or at any other DCL approved laboratory. The testing laboratory may be any local, regional or international laboratory.

8.6 Failing to satisfy the conditions of this Technical Approval Certificate may be grounds for terminating the Technical Approval.

NOTE 1: This document forms part of the Certificate of Technical Approval bearing the same Certificate Number.

NOTE 2: The above product shall bear the DCL Conformity Mark (applied on each product or on the packaging).

NOTE 3: Disclaimer:

- The Dubai Municipality - Dubai Central Laboratory Department shall not be held liable for installation the product in the site.
- The Dubai Municipality - Dubai Central Laboratory Department shall not be held liable for any action (legal or otherwise) raised by any party on matters resulting from implementation of the Technical Approval.

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Valid Until : 04 December 2021



ARIF HUSAIN AL MARZOOQI

Products Conformity Assessment Section Manager

Dubai Central Laboratory Department

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