

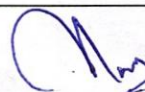
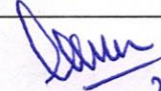
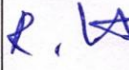
 Ranipet	Technical Delivery Condition (TDC) for Corrosion Resistant Coils / Sheets / Plates	Doc Ref:	TDC:RTA:404
		Rev .No.	10
		Date:	27.04.2021
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TECHNICAL DELIVERY CONDITIONS FOR CORROSION RESISTANT COILS / SHEETS / PLATES

PREPARED BY

DEPARTMENT	NAME & DESIGNATION S/Shri	SIGNATURE
QA	Renjith K Manager, QA	 27/04/2021

REVIEWED BY

DEPARTMENT	NAME & DESIGNATION S/Shri	SIGNATURE
ENGG (APH)	K. Thanikachalam SDGM/ APH	 27/4/2021
MATERIAL PLANNING	P. Annamalai SM/ MPLG	 27/4/21
QC (Proc)	R. Kesavan DGM / QC- Proc	 27/4/2021
QA	R. Aruchachalam DGM/ QA & QC-OLI	 27/4/2021

APPROVED AND ISSUED BY

DEPARTMENT	NAME & DESIGNATION S/Shri	SIGNATURE
QC-Shop, QA & BE	K. Saketharaman AGM/ QC-Shop, QA & BE	 27/4/2021

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1.0 SCOPE

- 1.1 This TDC specifies the requirements of corrosion resistant coils, sheets of CORTEN A / ASTM A 606 Type 4 and equivalent material specification & plates of CORTEN A / ASTM A242 and equivalent material specification & Plates of CORTEN B / ASTM A 588 GR A and equivalent material specification used in APH. Steel shall be in fully killed condition.

2.0 CHEMICAL & MECHANICAL PROPERTIES

2.1 Chemical (melt wise)

Specification	C	Mn	Si	P	S	Cu	Cr	Ni	V
CORTEN A / ASTM A242 & EQUIVALENT	0.12 Max	0.20- 0.50	0.25- 0.75	0.07- 0.15	0.05 Max	0.25- 0.55	0.50- 1.25	0.65 Max	--
CORTEN B / ASTM A588 GR A & EQUIVALENT	0.19 Max	0.80- 1.25	0.30- 0.65	0.04 Max	0.05 Max	0.25- 0.40	0.40- 0.65	0.40 Max	0.02- 0.10
ASTM A606 TYPE 4	0.12 Max	0.20- 0.50	0.25- 0.75	0.07- 0.15	0.04 Max	0.25- 0.55	0.50- 1.25	0.65 Max	--

2.2 Mechanical Properties

Specification	Yield point (MPa) (Min)	Tensile Strength (MPa) (Min)	% of Elongation (Min) 5.65 $\sqrt{S_0}$
CORTEN A / ASTM A242 & EQUIVALENT	345	485	22
CORTEN B / ASTM A588 GR A & EQUIVALENT	≤ 16 thick 355 > 16 thick 345	490-630	20
ASTM A606 TYPE 4	345	485	22

- 2.3 Bend test shall be conducted for coils as per JIS 3125 SPA-C

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3.0 SUPPLY CONDITION (COILS)

- 3.1 The coils shall be free from slit edges, scales and rust etc.
- 3.2 The tolerance thickness and width shall be as follows:
On width: Plus 0.00 to Minus 1.5 mm.
On thickness: Plus 0.07 mm to minus 0.00 mm
- 3.3 The camber, out of flatness, bend shall be permitted only to the extent specified in the applicable standard.
- 3.4 The ID of the coil shall be 500 mm $\pm$ 20 mm, OD of the coil shall be 1500 mm (max). **Coil Weight:** 2 to 5 MT for coil width of $\leq$ 503 mm and 5 to 10 MT for coil width $>$ 503 mm.
- 3.5 Surface condition shall be cold rolled with matt finish or Ra value in the range of 0.4 to 1.0 micron with an oil coat to protect from rusting.

4.0 SUPPLY CONDITION (PLATE AND SHEETS)

- 4.1 Tolerance for the plates is as per ASTM A6.
- 4.2 Tolerance for sheet on thickness is plus 0.15 mm to minus 0.00 mm
- 4.3 The plates / sheets shall be free from scales and rust.
- 4.4 Plate thickness 12 mm and above shall be ultrasonically tested and accepted as per ASTM A 435.

5.0 PACKING AND PRESERVATION (FOR COILS)

- 5.1 Before packing, the coils shall be given a sufficient coat of rust preventive fluid on the outer part to prevent rusting.
- 5.2 Three binding strips through eye of the coil at equal spacing shall tightly be secured.
- 5.3 Polythene sheet (thickness more than 20 microns) shall be wrapped over the coil.
- 5.4 Subsequently coil shall be wrapped with Hessian cloth.
- 5.5 ID rings shall be provided at both the sides of the coil to protect the coil edges.
- 5.6 Entire circumference of the coil shall be covered with GI sheet / painted sheet. Subsequently, both the faces shall be protected with metal sheets i.e full coil is to be covered.
- 5.7 Three cross strapping shall be tightly secured through the ID of the coil at equal spacing.
- 5.8 Two more strapping along the periphery shall be provided ensuring tight strapping. The outer label containing details as in 7.1 shall be pasted on the packed OD of the coil.
- 5.9 A metal label containing the detail as in 7.1 shall be secured at once of the outer cross strapping.

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6.0 PACKING AND PRESERVATION (FOR SHEETS / PLATES)

- 6.1 **The Sheets** shall be coated with a coat of rust preventive fluid on both sides and polythene sheets (thickness more than 20 microns) shall be wrapped over the sheet bundle, subsequently sheets shall be wrapped with Hessian cloth and suitable metal belt.
- 6.2 **The plates** shall be suitably bundled for withstanding the handlings during loading & unloading.

7.0 IDENTIFICATION

- 7.1 **For coils** the following details shall be stenciled with paint / pasted with sticker on the ID of the coil and **for sheets** on the bundle.
- Vendors Name
 - Purchase Order Number
 - Coil Number / Sheet Number / Plate Number
 - Specification & Grade
 - Net Weight

For plates, the details a, c, d in clause 7.1 are to be hard stamped and bordered with paint and b & e are to be painted.

- 7.2 For coils, two more labels containing all the details as in 7.1, shall be pasted, one on the eye and another on the outer surface of the packed coil.

8.0 TEST CERTIFICATE

- 8.1 The TC shall be in English and containing the following details
- Purchase Order Number
 - Specification and Grade
 - Coil Number
 - Nominal thickness and width
 - Chemical composition – melt wise.
 - Mechanical properties – melt wise / HT batch wise
 - Gross and net weight

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RECORD OF REVISIONS

Rev No	Date	Revision details
00	20.05.1996	TDC RTA 004/00 is revised and re-numbered as RTA 404 Rev. 00
01	18.07.1996	1. Clause 2.3 table and sketch modified 2. Clause 6.2, Clause 7.9, Clause 9.1 modified 3. Clause 9.5 deleted.
02	27.11.1996	1. Clause 8.0 deleted 2. Clause 9.0 re-numbered as 8.0
03	28.09.1998	1. Clause 2.2 minimum yield strength changed to 310 MPa in line with Corten coil specification.
04	22.06.1998	Scope of sheets taken out of the purview of the TDC. Please see TDC:RTA:425/001 dated 22.06.98 for corten sheets.
05	10.05.2002	TDC totally reviewed and revised. Requirements of TDC RTA 405 (corrosion resistant plate) TDC RTA 425 (Corrosion resistance sheets) are merged to form this TDC:RTA:405, 425 deleted.
06	07.02.2003	Clause 2.1 Chemistry details revised and Clause 3.2 modified. Clause 2.2 gauge length specified for % of elongation. Clause 3.4 revised based on supplier feedback. Clause 7.1 modified for better clarity.
07	26.11.2011	Clause 1.1, 2.1 and 2.2: ASTM A242 and ASTM A588 Gr. A included.
08	09.01.2020	ASTM A606 added based on engineering feedback (Email dated 16.12.2019 and supplier confirmation through purchase email dated 08.01.2020)
09	07.10.2020	Clause No. 2.1 (minimum Chromium Value 0.35 change for Corten A and ASTM A606 Type 4), Clause 3.5 (Ra values added) revised based on Engineering feedback.
10	27.04.2021	Mechanical properties of Corten-A / ASTM A242 & Equivalent changed based on MOM dated 24.04.2021 (Meeting with Engineering, M&S, Purchase, Material Planning, Marketing, QA and QC-Procurement)

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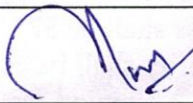
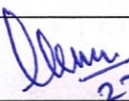
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		Rev .No.	03
		Date:	27.04.2021
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TECHNICAL DELIVERY CONDITIONS FOR COLD ROLLED CARBON SHEET COILS

PREPARED BY

DEPARTMENT	NAME & DESIGNATION S/Shri	SIGNATURE
QA	Renjith K Manager, QA	 27/04/2021

REVIEWED BY

DEPARTMENT	NAME & DESIGNATION S/Shri	SIGNATURE
ENGG (APH)	K. Thanikachalam SDGM/ APH	 27/04/2021
MATERIAL PLANNING	P. Annamalai SM/ MPLG	 27/4/2021
QC (Proc)	R. Kesavan DGM / QC- Proc	 27/4/2021
QA	R. Aruchachalam DGM/ QA & QC-OLI	 27/4/2021

APPROVED AND ISSUED BY

DEPARTMENT	NAME & DESIGNATION S/Shri	SIGNATURE
QC-Shop, QA & BE	K. Saketharaman AGM/ QC-Shop, QA & BE	 27/4/2021

	Technical Delivery Condition (TDC) for Cold rolled carbon sheet coils	Doc Ref:	TDC:RTA:408
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1.0 SCOPE

- 1.1 This TDC specifies the requirements for cold rolled sheets of deep drawing quality to specification IS 513 GR-CR3 / JIS G 3141 SPCD-SD.

2.0 CHEMICAL & MECHANICAL PROPERTIES

2.1 IS 513

1. Chemistry
 2. Hardness
 3. Bend Test
 4. Erich son cupping value shall be as per Figure 1 of IS 513.
- } shall be as per specification

JIS G3141

1. Chemistry shall be as per Table 1 under informative reference of JIS G 3141
2. Hardness shall be 57 HRB MAX
3. Bendability shall be as per table 6 of JIS G 3141
4. Erich son cupping test shall be conducted and the value shall be as per Figure 1 of IS 513.

3.0 SUPPLY CONDITION

- 3.1 The coils shall be free from slit edges, visual scales and rust etc.
- 3.2 The tolerance thickness and width shall be as follows:
On width : Plus 0.00 to Minus 1.5 mm.
On thickness : Plus 0.07 mm to plus 0.00 mm
- 3.3 The camber, out of flatness, bend shall be permitted only to the extent specified in the applicable standard.
- 3.4 The ID of the coil shall be 500 mm $\pm$ 20 mm, OD of the coil shall be 1500 mm (max) and coil weight 5 to 10 MT.
- 3.5 **Surface condition**
- 3.5.1 Cold rolled with matt finish with an oil coat to protect rusting and when ordered as per the Japanese standard, it shall be SPCD-SD that is, skin rolled-dull finished by roll whose surface is made rough mechanically or chemically.

4.0 PACKING

- 4.1 Before packing, the coils shall be given a sufficient coat of rust preventive fluid on the outer part to prevent rusting.

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- 4.2 Three binding strips through eye of the coil at equal spacing shall tightly be secured.
- 4.3 Polythene sheet (thickness more than 20 microns) shall be wrapped over the coil. Subsequently coil shall be wrapped with Hessian cloth.
- 4.4 ID rings shall be provided at both the sides of the coil to protect the coil edges.
- 4.5 Entire circumference of the coil shall be covered with GI sheet / painted sheet. Subsequently, both the faces shall be protected with metal sheets i.e full coil is to be covered.
- 4.6 Three cross strapping shall be tightly secured through the ID of the coil at equal spacing.
- 4.7 Two more strapping along the periphery shall be provided ensuring tight strapping. The outer label containing details as in 5.1 shall be pasted on the packed OD of the coil.
- 4.8 A metal label containing the detail as in 5.1 shall be secured at once of the outer cross strapping.

5.0 IDENTIFICATION

- 5.1 The following details shall be ensured in outer label pasted on the ID of the coil.
 - a. Vendors Name
 - b. Purchase Order Number
 - c. Coil Number
 - d. Specification & Grade
 - e. Net Weight
- 5.2 Two more labels containing all the details as in 5.1, shall be pasted, one on the eye and another on the outer surface of the packed coil.

6.0 TEST CERTIFICATE

- 6.1 The TC shall be in English and containing the following details
 - i. Purchase Order Number
 - ii. Specification and Grade
 - iii. Coil Number
 - iv. Nominal thickness and width
 - v. Chemical composition – melt wise.
 - vi. Bend test result
 - vii. Max. camber
 - viii. Gross and net weight
 - ix. Hardness and Erichson cupping values
- 6.2 BHEL reserves the right to carry out tests and reject the item wherever non-conforming to the requirement of Purchase Order and Technical Delivery Condition.

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RECORD OF REVISIONS

Rev No	Date	Revision details
00	26.02.1996	TDC RTA 008 REV 04 revised and renumbered as TDC RTA 408/REV/00.
01	29.11.2002	Clause 4.0 and Clause 4.1 revised to change tolerance on thickness plus 0.00 to plus 0.015 mm.
02	10.05.2002	TDC totally reviewed and revised.
03	27.04.2021	IS 513 GR.DD terminology based on obsolete standard is revised as IS 513 GR-CR3 based on latest revision. MOM dated 24.04.2021 (Meeting with Engineering, M&S, Purchase, Material Planning, Marketing, QA and QC- Procurement) recommends the above.

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QUALITY ASSURANCE
QWI NO: TDC:RTA:408 Rev.02 Dtd.10.05.2002
<i>Amendment to Quality Work Instruction (QWI)</i>
Amendment No: A1 Date: 09.05.2017
Title: TDC FOR Cold rolled carbon sheets coils.8

Details of Amendment		
Clause No	Amended As	Basis for Amendment
Refer Clause no 3.4	OD of the Coil shall be 1300mm max and Coil wt. 5 to 9 MT max.	Shop feedback. Refer Email Dated:06.05.2017

Prepared By (QA)		Reviewed & Approved By
