



Ranipet

**TECHNICAL DELIVERY CONDITION
FOR
TITANIUM STRIP/SHEET/ PLATE AS
PER ASTM B265 FOR FGD APPLICATION**

DOC No:

TDC: RTS: 007

Effective Date:

20/05/2019

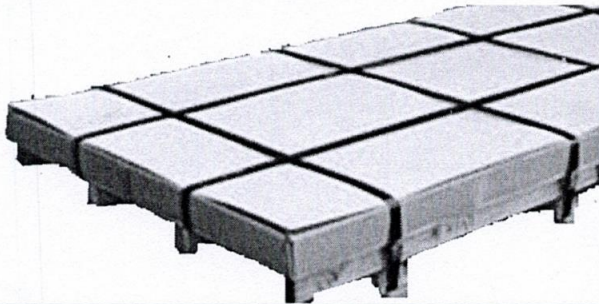
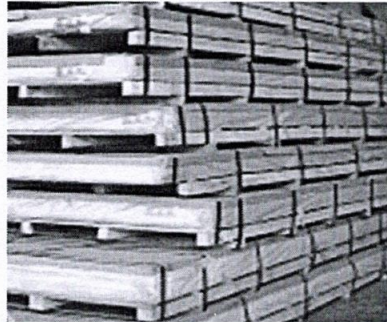
Rev:

00

Page:

1 of 3

1.0	Scope												
1.1	This TDC specifies the requirements for the delivery of Titanium strips/sheets/plates conforming to ASTM B265 and to the latest edition.												
1.2	The size and Quantity shall be as specified in the Enquiry/ Purchase order.												
1.3	Strip/ Sheet/ Plate is classified as per ASTM B265 standard. Strip- Thk less than 4.75mm and width less than 610mm. Sheet- Thk less than 4.75mm and width 610mm or more. Plate- Thk more than 4.75mm and width more than 254 mm.												
2.0	Chemical composition and process												
2.1	Alloy R50400 as per Table-8 of ASTM B265 (Grade 2)												
2.2	Cold or Hot rolling to achieve desired thickness. Plates shall be in annealed condition.												
3.0	Dimensional tolerances												
3.1	The plates shall be supplied to the dimensions specified in the enquiry/PO. Enquiry/PO shall state the following 1) Length and width of plate/sheet/ strip. 2) Thickness The following dimensional tolerances shall apply												
	<table><tr><td>a) Thickness tolerances</td><td>As per Table 1 of ASTM B265 (For Cold rolled& Hot rolled sheet) As per Table 12 of ASTM B265 (For Strip) As per Table 16 of ASTM B265 (For Plate)</td></tr><tr><td>b) Length & Width tolerances</td><td>As per Table 2&4 of ASTM B265 (For Cold rolled& Hot rolled sheet) As per Table 10&11 of ASTM B265 (For Strip) As per Table 14 of ASTM B265 (For Plate)</td></tr><tr><td>c) Straightness</td><td>As per clause 8.5 of ASTM B575 (edgewise curvature- depth of chord-of sheet shall not exceed 0.04mm multiplied by the length in cm)</td></tr><tr><td>d) Squareness</td><td>As per clause 8.6 of ASTM B575 (Angle between adjacent sides shall be $90 \pm 0.15^\circ$)</td></tr><tr><td>e) Flatness</td><td>As per Table 6 of ASTM B265 (For Hot rolled sheet) As per Table 6 of ASTM B265 (For Strip) As per Table 15 of ASTM B265 (For Plate)</td></tr><tr><td>f) Finish</td><td>Finish shall be as per clause 8 of ASTM B265.</td></tr></table>	a) Thickness tolerances	As per Table 1 of ASTM B265 (For Cold rolled& Hot rolled sheet) As per Table 12 of ASTM B265 (For Strip) As per Table 16 of ASTM B265 (For Plate)	b) Length & Width tolerances	As per Table 2&4 of ASTM B265 (For Cold rolled& Hot rolled sheet) As per Table 10&11 of ASTM B265 (For Strip) As per Table 14 of ASTM B265 (For Plate)	c) Straightness	As per clause 8.5 of ASTM B575 (edgewise curvature- depth of chord-of sheet shall not exceed 0.04mm multiplied by the length in cm)	d) Squareness	As per clause 8.6 of ASTM B575 (Angle between adjacent sides shall be $90 \pm 0.15^\circ$)	e) Flatness	As per Table 6 of ASTM B265 (For Hot rolled sheet) As per Table 6 of ASTM B265 (For Strip) As per Table 15 of ASTM B265 (For Plate)	f) Finish	Finish shall be as per clause 8 of ASTM B265.
a) Thickness tolerances	As per Table 1 of ASTM B265 (For Cold rolled& Hot rolled sheet) As per Table 12 of ASTM B265 (For Strip) As per Table 16 of ASTM B265 (For Plate)												
b) Length & Width tolerances	As per Table 2&4 of ASTM B265 (For Cold rolled& Hot rolled sheet) As per Table 10&11 of ASTM B265 (For Strip) As per Table 14 of ASTM B265 (For Plate)												
c) Straightness	As per clause 8.5 of ASTM B575 (edgewise curvature- depth of chord-of sheet shall not exceed 0.04mm multiplied by the length in cm)												
d) Squareness	As per clause 8.6 of ASTM B575 (Angle between adjacent sides shall be $90 \pm 0.15^\circ$)												
e) Flatness	As per Table 6 of ASTM B265 (For Hot rolled sheet) As per Table 6 of ASTM B265 (For Strip) As per Table 15 of ASTM B265 (For Plate)												
f) Finish	Finish shall be as per clause 8 of ASTM B265.												
4.0	Heat Treatment												
4.1	Unless otherwise specified, the plates/sheets/strips shall be supplied in heat treated condition.												
5.0	Mechanical Test												
5.1	Test samples shall be selected and prepared as per ASTM B265. Number of tests and re-tests shall be carried out as per ASTM B265.												
	<table><tr><td>a) Tensile test</td><td>Tension test method shall be as per ASTM E8 & acceptance norms are as per ASTM B265 Table 7.</td></tr><tr><td>b) Bend Test (For Sheet& Strip)</td><td>Test as per clause 6.3 of ASTM B265.</td></tr><tr><td>c) Bend Test (For Plate)</td><td>Test as per Supplementary requirements S1 of ASTM B265.</td></tr></table>	a) Tensile test	Tension test method shall be as per ASTM E8 & acceptance norms are as per ASTM B265 Table 7.	b) Bend Test (For Sheet& Strip)	Test as per clause 6.3 of ASTM B265.	c) Bend Test (For Plate)	Test as per Supplementary requirements S1 of ASTM B265.						
a) Tensile test	Tension test method shall be as per ASTM E8 & acceptance norms are as per ASTM B265 Table 7.												
b) Bend Test (For Sheet& Strip)	Test as per clause 6.3 of ASTM B265.												
c) Bend Test (For Plate)	Test as per Supplementary requirements S1 of ASTM B265.												
6.0	Freedom from defects												
6.1	The material shall be clean, smooth, sound and free from injurious defects.												
6.2	All plates shall be free from harmful defects like cracks, lamination. The edges of plates shall be slit without fish tails and kinks. The plates should not contain any weld seam. The surface shall be free from scales, rust, pitting, wrinkles												
6.3	Repair on finished plate is prohibited and shall not be accepted.												

7.0	Inspection at Supplier's works
7.1	BHEL's representative shall have free access at all times until work on contract of BHEL is being performed, to all parts of the manufacturer's works. The supplier shall offer BHEL's representative all reasonable facilities without any financial implication to satisfy the latter that the material is being furnished in accordance with this specification.
8.0	Packing and Marking
8.1	The material shall be separated by size and prepared for shipment in such a manner as to ensure acceptance by common carrier transportation and to afford protection from the normal hazards of transportation by sea. Packing shall be of sea worthy packing. Each package shall be suitably marked with the following details. A metal label shall be securely attached to each package and shall bear the following information: 1. Titanium Strip/Sheet/Plates as per ASTM B265 2. BHEL PO no: 3. Consignment and Identification No. 4. Size, number and Weight 5. Supplier's name
8.2	Marking on Strip/Sheet/Plate shall be as per clause 16.1 of ASTM B265.
8.4	The bundle/crate shall be rigid enough to withstand the packed weight.
8.5	Each bundle shall weigh approximately 2MT. $\pm$
8.6	Images of packing (For reference only):  
9.0	Dispatch
9.1	It is the responsibility of the supplier to ensure that no damage occurs during transit.
10.0	Inspection and Certification
10.1	All tests shall be complied as per the specification for each heat and dimensional reports containing all elements of cl.3.0 to 5.0 shall be furnished for our verification. Despatch clearance will be issued after verification of reports and is mandatory before effecting despatch to BHEL stores.
10.2	The test certificates shall be furnished with the following details legibly in English language only 1. BHEL reference a) BHEL PO no b) Titanium Strips/Sheets/ plates as per ASTM B265 2. Supplier's reference: a) Supplier's name b) Test certificate no c) Specification & grade with applicable year of code d) PO quantity & size e) Melt number f) Quantity and Weight g) Identification marks h) Process of manufacture 3. Test results: a) Chemistry (melt wise)



Ranipet

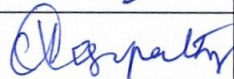
TECHNICAL DELIVERY CONDITION
FOR
TITANIUM STRIP/SHEET/ PLATE AS
PER ASTM B265 FOR FGD APPLICATION

DOC No:	TDC: RTS: 007
Effective Date:	20/05/2019
Rev:	00
Page:	3 of 3

	b) Material test certificates c) Heat treatment Batch no and details d) Mechanical properties e) Dimensional report
11.0	End use
11.1	These are intended for welding corner pieces with Titanium clad plates in Ducts.
12.0	Rejection and replacement
12.1	In the event of any sheet/plate proving defective in the course of rolling (forming), machining, testing, assembly or erection, such plates shall be rejected notwithstanding, any previous certification of satisfactory testing and/or inspection.
12.2	The supplier shall undertake to replace the rejected plates/sheets at his own cost and the rejected plates shall be sent back to the supplier after fulfilling the commercial terms and conditions.

RECORD OF REVISIONS

REV. NO	Clause revised	Details of revision	Date
00	--	Original issue	20.05.2019

Prepared by	Reviewed by		Signature	Approved by
	Department	Name and Desig. (Shri/ S)		
 Rajamanickam.M Dy. Mgr/ QA	ENGG (FGD)	Kumuda Ballav Padhi DGM/ EDC- AQCS		 K.C. Gandhi Parimalam DGM / QA
	PURCHASE	V. Ragupathy SM/ Purchase		
	MATERIAL PLANNING	P. Annamalai Sr. Mgr/ MPL		
	QC/Proc.	R. Kesavan DGM/ QC- Proc		
Issued by Quality Assurance				