	<b>BHEL – Tiruchirappalli - 620014, India.</b> <b>Quality Assurance Department</b> <b>TECHNICAL DELIVERY CONDITIONS</b>	DOC No: <b>TDC:0:301</b> Rev: <b>12</b> Effective Date: <b>26/06/2023</b> Page: <b>1 of 2</b>
<b>Product: STRUCTURAL QUALITY PLATES FOR BOILER STRUCTURES</b>		

## Revision record:

- Rev 01: Text Modified. IS 8500Fe 540, IS 2062 Gr B added.
- Rev 02: Shapes removed. UT>40mm IS 2062 Gr A introduced.
- Rev 03: 06/10/06 Cl.2.0, 3.0 & 4.0 modified.
- Rev.04: Revised in entirety merging IS 8500 with IS 2062 as per IS 2062-2006 and replacing BSEN 10113 with BS EN: 10025
- Rev.05: 01/10/09 - Cl.3.0, 4.0, 8.0: Normalized rolled clause included.
- Rev 06: 27/10/14 - TDC 313 Rev 02 merged with TDC 301, IS 2062 Gr E350, E450 and its requirements added in Cl1, Cl 2, 3, 4. Cl 7 modified, Note added.
- Rev 07: 20/12/14 - Cl 1, 4, 5, 7, 8 and note modified.
- Rev 08: 23/07/2016 - Cl 2, 3, 4, 7 and 8 modified.
- Rev 09: 23/09/2016 - Cl 2, 3 modified to include IS 2062 E350 Gr A; Cl 4(c), 8(e) modified to bring clarity regarding grain size.
- Rev 10: 01/08/2017 - Cl 2, 3 modified to include IS 2062 E250 Gr B0, C
- Rev 11: 15/11/2017 - Cl 3.a .i – thickness and heat treatment condition modified  
Cl 3.a.ii – class removed  
Cl 4.b – grain size specified for all grades of Normalised rolled condition  
Cl 4.c –removed
- Rev 12: 20/06/2023 Cl 7.i, modified to include coil form plates for thickness up to 25mm,  
Cl 7ii –newly added

## 1. MATERIAL SPECIFICATION: {Latest on date of Purchase Order (PO)}

PLATES : ASTM A 36, IS 2062, BS EN 10025-2, BSEN 10025-3 [applicable grades

as per drawing]

**Additional Requirement :** **As listed below (Supplementary to Specification)**

Size and Qty. : As per Purchase order (PO)

## 2. CHEMICAL COMPOSITION AND PROCESS:

- ASTM A36 shall be procured in killed condition.
- IS 2062 E250 A, B0, BR, E350 A, B0, BR up to 20mm thickness shall be in killed or semi killed condition. IS 2062 E250 A, B0, BR, E350 A, B0, BR 20mm and above thickness shall be in killed condition.
- IS 2062 E250 C and IS 2062 E350 C shall be in killed condition.
- BS EN 10025-2 S355 J2+N shall be in killed condition with Carbon: 0.20% max (in Product Analysis).
- IS 2062 E410 BR / BS EN 10025-3 S420N shall be in killed condition. Vanadium: 0.15% max; Carbon: 0.20% max (in Product Analysis).

## 3. HEAT TREATMENT:

- ASTM A36, IS 2062 E250 A, B0, BR, C and E350 A, B0, BR, C:
  - Thickness up to and including **20mm** in rolled condition. Thickness more than **20mm** shall be Normalized/ Normalized rolled.
- IS 2062 E410 BR/ BSEN 10025-3-S420N, BS EN 10025-2 Gr S355 J2 +N: Normalized condition.

## 4. MECHANICAL TESTS:


- All mandatory tests shall be as per the applicable materials specifications.
- Additionally, microstructure analysis for Grain size shall be carried out for Normalizing rolling plates above **20mm** thickness at the same frequency as the mechanical tests. Grain size:  $\geq 5$  at 100X magnification.

## 5. NON DESTRUCTIVE TEST:

Ultrasonic Test: For plates of thickness > 40 mm as per ASTM A435 or ASTM A578 (Acceptance Level A or B).

## 6. FINISH AND REPAIR:

Plates shall be free from all mill scales, edge crack and other injurious defects. Repairs by fusion welding is prohibited. Mechanical removal of defects permitted subject to meeting minimum thickness and smooth surface.

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## 7. MARKING (by mill):

1. Specification (IS specification designation for IS 2062 grades), 2. Grade, 3. Melt number, 4. Maker's emblem/Code/ Identification and 5. Plate number. PO No (BHEL PO only), buyer name & Weight to be painted on the product. Marking shall be done as indicated below:

- All plates of thickness > 25mm 1 to 4 shall be maintained by hard stamping and 5 by paint stenciling
- For plates of thickness >10mm and upto 25mm (produced from plate / coil) form 1, 2, 3, 4 shall be maintained by paint stenciling/ink jet painting/ hard stamping/ engraving. In case of paint stenciling/ink jet painting, markings to be done along length of the plate at periodic intervals. Suppliers should ensure high life of the printing details.
- All plates of thickness ≤ 10 mm (except made from strip in coil form )1,2,3,4 shall be maintained by paint stenciling.
- Plates of thickness ≤ 10mm (produced from strip in coil form): 1, 2, 3, 4 by paint stenciling on the top of each pile/ packet.





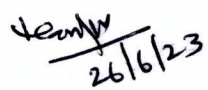
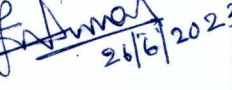
## 8. INSPECTION AND CERTIFICATION:

Products must be inspected & tested at supplier's works. Test certificate, in English, shall accompany each product with the following details:

- Purchase Order No. (BHEL PO only), TDC No. & its Revision No., Test certificate No. & Date, Size, Plate number and Quantity-Melt wise.
- Material Specification and Grade with applicable year of code, Heat Number, Steel making process, de-oxidation process.
- Chemistry, Carbon equivalent and Heat Treatment details.
- Mechanical test values, including impact values (where applicable), shall be reported.
- Grain size at 100X magnification for Normalizing rolling Plates of thickness above 20mm (Refer Cl. 4(b) of this TDC).
- NDE results with reference and acceptance standards.

### Note:

- This TDC shall be read along with SIP:NP:14 (latest revision), for POs placed by Outsourcing department on OVM/ACF vendors.

 26/6/23	 26/6/23	 26/6/23	 26/6/23	 26/6/23	 26/6/2023
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<b>Prepared</b>	<b>Reviewed</b>			<b>Approved</b>	