



**PLANT PURCHASING
SPECIFICATION
HYDERABAD**

HY 10699

Rev. No. 02

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**ALLOY STEEL PRESSURE VESSEL PLATES FOR ELEVATED
TEMPERATURE SERVICE
(ORDERING DESCRIPTION FOR ASME: SA 387 Gr : 12 CLASS 2
WITH S1, S3, S5 AND S8)**

1.0 GENERAL:

The material and other requirements shall comply with the latest version of ASME : SA 387, Gr : 12 class 2, with the following additional requirements.

2.0 APPLICATION:

For fabrication of pressure vessels and heat exchangers as per ASME Boiler and Pressure Vessel code or Indian Boiler Regulations (IBR) requiring S1, S3, S5 and S8 supplementary requirements as per SA 387.

3.0 CONDITION OF DELIVERY:

- 3.1 The plates shall be supplied in Hot rolled, Normalised and Tempered, shot blasted condition meeting dimensions and tolerances as per BHEL order conditions.
- 3.2 Plates shall be free from mill scales.
- 3.3 All plates shall be free from segregation or impurities, cracks, surface flaws, and laminations, rough, jagged and imperfect edges.
- 3.4 As rolled milled edges (round corners) are not acceptable. However, as rolled edges as obtained through Universal Mill (UM) process (where, edges are rolled with special set of side rolls) are acceptable. The tolerances on width and length shall be as per applicable tables given in SA20.
- 3.5 For rolled plates, the edges shall be cut either through shearing or gas/ flame/ plasma cutting by using automated process only. Manual gas/ flame/ plasma cutting is not permitted. Cut edges shall meet the tolerances as per SA20.
- 3.6 All the plates below 10mm thickness shall be suitably protected with rust preventative coatings at the time of supplies.

Revisions:
Modified Clause 3.0, 4.0, 12.0 & 13.0
Removed Clause 10.0, 14.0 & renumbered

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4.0 DIMENSIONS:

Size of the plates shall be as per BHEL enquiry/Purchase Order.

5.0 CHEMICAL COMPOSITION:

Chemical Composition shall be as per SA 387, Gr: 12.

6.0 VACUUM TREATMENT:

Plates shall be vacuum degassed as per supplementary requirement S1 of ASME SA 387.

7.0 SIMULATED POST WELD HEAT TREATMENT (SUPPLEMENTARY REQUIREMENT S3) OF MECHANICAL TEST COUPONS:

The test coupons representing the plate shall be thermally treated after the final Heat treatment. The simulated post weld heat treatment cycles shall be selected as per ASME SEC.VIII Div. I (UCS-56).

8.0 LOW TEMPERATURE IMPACT TEST:

Charpy V-Notch impact test (at 0°C or lower) shall be conducted as per supplementary requirement S5 of SA387. The impact energy shall be 28 J minimum (average of 3 values). One value can be lower than 28 J but not less than 21 J. All the three values shall be reported in the test Certificate.

9.0 ULTRASONIC TEST:

Plates of all thickness shall be ultrasonically examined in accordance with ASTM A435, as per supplementary requirements S8 of ASME SA 387.

10.0 INSPECTION:

- 10.1 If the material is purchased from WELL-KNOWN STEEL MAKER as approved by IBR (Indian Boiler Regulations) then inspection by any other third party inspection agency is not necessary unless it is specifically mentioned on the order.
- 10.2 In case of procurement from other suppliers all plates shall be inspected at supplier's works by an Inspection authority recognised by IBR and the test certificates shall be attested to that effect.



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11.0 INSPECTION AT SUPPLIER'S WORKS:

- 11.1 BHEL representative / BHEL appointed Inspection Agency shall have free entry and access to all areas where the manufacture of the bars is carried out. All reasonable facilities shall be extended to him including labour wherever necessary.
- 11.2 BHEL representative / BHEL appointed Inspection Agency shall be given sufficient advance intimation to witness the various processes, tests etc. Punching and identification of test coupons and execution of various tests shall be done in presence of BHEL representative / BHEL appointed Inspection Agency.

12.0 TEST CERTIFICATES:

The test certificates for the plates shall consist of the following:

- 1) Test certificates (in English) shall be furnished as per IBR format FORM IV clearly specifying material meeting the requirements of ASME SA387 Gr.12, Class 2 and HY10699 Rev.02.
- 2) Additionally, Manufacturer's Test certificates (inspection certificate format of EN10204 Type 3.1 or 3.2) explicitly stating the compliance to SA 387 Gr. 12 Class 2 (S1, S3, S5 & S8) & SA 20 shall also be submitted. The test certificates shall also mention the compliance to HY10699 Rev.02.
- 3) The mill test certificate shall also certify that the plates supplied in shot blasted condition and are free from mill scales.

13.0 MARKING:

All the plates shall be identified and marked as given below to meet the requirement of SA 20

- (i) SA 387 Gr: 12 Cl 2, MT, LTV, UT-A435
- (ii) Heat No./Melt No. & Plate No.
- (iii) Inspection authority mark
- (iv) Name/ Brand/ Trade mark of the manufacturer
- (v) BHEL Order No.
- (vi) HY10699 Rev.02

Marking shall be in at least two places on each finished plate, at least 12 inch from the edge of the plates.

14.0 REJECTION & REPLACEMENT:

In the event of the material proving defective in the course of further processing at BHEL, the same shall be rejected notwithstanding any previous acceptance. The supplier shall replace the material forging at his own cost and the rejected material shall be returned after all the commercial conditions are satisfied.