



## CORPORATE PURCHASING SPECIFICATION

AA10403

Rev No.01

PREFACE SHEET

### CARBON STEEL PRESSURE VESSEL PLATES FOR LOW AND MODERATE TEMPERATURE SERVICES (IS 2041 Grade R260 & ASME SA-516/SA-516M Gr.70)

FOR INTERNAL USE ONLY  
REMOVE THIS PREFACE BEFORE ISSUE TO SUPPLIERS

#### Equivalent / Comparable Standards:

- |                  |   |                               |
|------------------|---|-------------------------------|
| 1) International | : | ASME SA-516/SA-561M, Grade 70 |
| 2) Indian        | : | IS 2041                       |

#### Probable / Suggested Suppliers and Grades:

Refer plant vendors list

#### User Plants and Replaced Plant Specifications / References:

- |                   |   |             |
|-------------------|---|-------------|
| 1) BAP Ranipet    | : | TDC:RTA:407 |
| 2) HPEP Hyderabad | : | HY10498     |
| 3) HEP, Bhopal    | : | HT10499     |

**Revisions:** All clauses are updated by rationalising the units' requirements

**APPROVED:**  
INTERPLANT MATERIAL RATIONALISATION  
COMMITTEE – MRC(FCF+HTM)

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### CARBON STEEL PRESSURE VESSEL PLATES FOR LOW AND MODERATE TEMPERATURE SERVICES

(IS 2041 Grade R260 & ASME SA-516/SA-516M Gr.70)

#### 1 Scope

The specification covers the technical requirements of heat-treated Boiler Quality carbon steel plates used for the fabrication of pressure vessels, structures and heat exchangers as per ASME Boiler and Pressure Vessel code or Indian Boiler Regulations (IBR).

#### 2 Chemical & Mechanical properties

The chemical composition and mechanical properties shall be as per IS 2041 Grade R260 and SA-516 / SA-516M Grade 70 and SA-20/SA-20M, whichever is stringent.

#### 3 Supply Condition

3.1 Repair by fusion welding is prohibited.

3.2 Plates shall be free from mill scales, segregation or impurities, cracks, surface flaws and laminations, rough, jagged and imperfect edges. Plates below 10mm thickness shall be suitably protected with rust preventive coatings at the time of supplies.

3.3 The steel shall be vacuum treated and fully killed. (As per supplementary requirement (S1) of SA 20)

3.4 Plates above 12mm thickness shall be normalized. Online normalisation is not acceptable.

3.5 Supplementary requirements details are given in Annexure 1. Plates are to be supplied in compliance with specified supplementary requirements as given in purchase order.

3.6 The ratio of slab to plate thickness shall be at least 3:1 reduction ratio up to 75mm plates and plates of 75mm thickness and above can be with reduction ratio less than 3:1 subject to meeting the requirements of clause 5.3 of SA-20/SA-20M and clause 6.3 of IS 2041.

#### 4 Dimension and Tolerance

Thickness and sizes shall be as per as per BHEL enquiry.

**Tolerances:** Tolerances shall be in accordance with SA-20/SA-20M.

#### 5 Non-destructive Testing & Acceptance

Plates shall be ultrasonically tested and accepted as per ASTM A578 Level B.

However, in compliance with clause 5.3 of SA-20/SA-20M for plates manufactured with reduction ratio less than 3:1, acceptance shall be as per ASTM A578 Level C.

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## 6 INSPECTION AT SUPPLIER'S WORKS

BHEL representative / BHEL appointed Inspection Agency shall have free entry and access to all areas where the manufacture of the plates is carried out. All reasonable facilities shall be extended to him including labour wherever necessary.

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.

## 7 Marking

Each plate shall be hard stamped and bordered with white paint within the following information:

- a) P O No.& Date
- b) Size & Quantity
- c) Specification
- d) Heat No. & Plate No.
- e) Inspection authority mark
- f) Maker's identification

In addition to the above, each plate shall be marked with the Standard BIS certification marking. The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the rules and Regulations made thereunder.

## 8 Test Certificates

Test Certificates shall be in English and it shall contain following details:

- a) Purchase Order Number and Date
- b) Material Specification and Grade
- c) Drawing No (if applicable)
- d) Number & weight
- e) Chemical Composition (heat & product analysis as per SA-20/SA-20M)
- f) Mechanical Properties (Each plate as per SA-20/SA-20M)
- g) Ultrasonic Testing Report
- h) Results of tests given in Annexure (as applicable as per PO)
- i) Manufacturer's Test certificates explicitly stating the compliance to IS 2041 Gr.R260 and SA-516/SA-516 M, Gr. 70 (S1, S5 & S12) & SA-20/SA-20M shall also be submitted. The test certificates shall also mention the compliance to AA10403 Rev.01.
- j) The mill test certificate shall also certify that the plates supplied are free from primary mill scales.
- k) Wherever specified in BHEL order, Test certificates (in English) shall be furnished as per IBR format FORM IV clearly specifying material meeting the requirements of ASME SA-516/SA-516M Gr.70 and AA10403 Rev.01.

## 9 Rejection and Replacement

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

## 10 Referred Standards (Latest Publications Including Amendments)

1) SA-516/SA-516M	2) SA-20/SA-20M	3) EN 10164
4) ASTM A578	5) IS 2041	



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### ANNEXURE 1 – Supplementary Requirements

Sl. No.	Supplementary Requirement	Standard	Remarks																										
1	Charpy V-Notch impact test on Longitudinal Specimen	ASME-SA-20/SA-20M and ASME SA-370/SA-370M	Only for plates identified in BHEL enquiry																										
2	Charpy V-notch impact test on transverse specimen	ASME SA-20/ SA-20M Temperature of testing shall be 10°C above the minimum temperature specified in Table A2.15 for longitudinal tests																											
3	Low Temperature Impact, S5 as per ASME SA 20 in line with the following table. <table><tr><th rowspan="2">Plate Thickness</th><th rowspan="2">Temperature °C</th><th colspan="2">Energy Absorbed, J</th></tr><tr><th>Minimum average for 3 specimen</th><th>Minimum for 1 specimen</th></tr><tr><td>25mm and under</td><td>- 46 °C</td><td>20</td><td>16</td></tr><tr><td>Over 25mm to 50 mm, Incl</td><td>- 40 °C</td><td>20</td><td>16</td></tr><tr><td>Over 50mm to 75 mm, Incl</td><td>- 35 °C</td><td>20</td><td>16</td></tr><tr><td>Over 75mm to 125 mm, Incl</td><td>- 29 °C</td><td>20</td><td>16</td></tr><tr><td>Over 125mm</td><td>- 29 °C</td><td>20</td><td>16</td></tr></table>	Plate Thickness		Temperature °C	Energy Absorbed, J		Minimum average for 3 specimen	Minimum for 1 specimen	25mm and under	- 46 °C	20	16	Over 25mm to 50 mm, Incl	- 40 °C	20	16	Over 50mm to 75 mm, Incl	- 35 °C	20	16	Over 75mm to 125 mm, Incl	- 29 °C	20	16	Over 125mm	- 29 °C	20	16	ASME SA-20/ SA-20M
Plate Thickness	Temperature °C				Energy Absorbed, J																								
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Over 75mm to 125 mm, Incl	- 29 °C	20	16																										
Over 125mm	- 29 °C	20	16																										
4	Through thickness tension testing to Quality class Z25 (Test applicable for plate thickness 25mm and above)	EN 10164																											
5	Bend test (Longitudinal direction)	ASME SA-20/SA-20M																											
6	IBR Certification	As per IBR format FORM IV																											
7	Third Party Inspection	BVQI LLOYDS TUV																											