

## UNIFIED PROCUREMENT CELL (UPC)

Corporate Office, BHEL

### ANNEXURE – B – Rev 01

#### **TERMS AND CONDITIONS FOR SUBMISSION OF OFFER**

1. Offers shall be submitted in two Part bids system in e-tender portal. The bidder shall submit his response through bid submission to the tender on e-procurement platform at <https://eprocurebhel.co.in/> within 15:00 Hours of the due date of this tender. The bidder would be required to register on the e-procurement market place <https://eprocurebhel.co.in/> and submit their bids online. SEALED COVER BIDS/ E-MAILS / FAX / Manual offers will not be accepted. Amounts shall be indicated in figures in the bid format, wherein for each item corresponding value in words will appear automatically. Supplier may take cognizance of the quoted value in both figures and corresponding words for each item before submission of bid.
2. Supplier needs to submit Integrity pact, MII declaration (in line with point 16 mentioned below), Udyam certificate (if applicable for claiming MSE benefits) along with Price bid BOQ.
3. Offers should be in **ENGLISH** only.
4. Suppliers shall quote only for those items agreed in the MOU. Offers, quoted for items not covered in MOU, will not be considered for evaluation and will be rejected.
5. **Payment terms: Usance LC @ 60 days from the date of receipt of documents at Beneficiary bank counters. No other payment terms and any deviations will not be acceptable.**
6. **LD Clause: LD shall be 0.5 (half) % or part thereof of the undelivered portion, for each week of delay. The total damages owing to delayed delivery will not exceed 10 (ten) % of the undelivered portion of the contract value.**
7. The tender is governed by the Techno-Commercial MOU signed with BHEL, Trichy and terms and conditions indicated in this Annexure B of the tender. Supplier shall submit **Integrity Pact, MII Declaration (in line with point 16 mentioned below), UDYAM certificate** (if applicable) & **Price Bid only**. **In case if supplier takes deviation to the Techno-Commercial points of the MOU, the same will be ignored and the terms as agreed in the techno commercial MOU will be considered for evaluation. If any supplier quotes against this tender, it will be deemed that the offer/price submitted is in line with the terms and conditions agreed in the MOU, without any deviation to the same.**
8. **Evaluation criteria:** Quotations will be evaluated on individual L1 basis for all items of tender.
9. **Reverse Auction:** Reverse Auction will not be conducted against this tender.
10. **Load Distribution (Splitting of total quantity of individual items among vendors) clause:** Total quantity of individual items will be awarded to respective L1 vendor only. Load Distribution (splitting of total quantity of individual items among vendors) will not be done against this tender.
11. The offer (price bid) will be opened after receipt of duly filled (signed & stamped) copy of integrity pact. Bids of those vendors who fail to provide integrity pact, will be rejected. Tentative Quantity to be ordered by BHEL Units/Regions distributed in geographical regions is as below **(Please note that below mentioned quantities against respective regions & locations are**

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tentative only. Quantities may be redistributed among various Units/Regions/Divisions of BHEL, and purchase orders may be placed by any Unit/Region/Division of BHEL, as per actual requirements during the validity period of framework agreement):

Note: Following regions/locations are tabulated to facilitate vendors in calculation for freight charges.

Region	Plates and Sheets (MT)	Tentative locations under respective region	
		State	Name of BHEL unit/Project site
Southern Region	28099	Andhra Pradesh	HPVP, Vizag
		Karnataka	EDN, Bengaluru
		Tamil Nadu	BAP, Ranipet HPBP, Trichy NTPL Tuticorin TANGEDCO North Chennai TANGEDCO Udangudi
		Telangana	HPEP, Hyderabad TSGENCO Kothagudem TSGENCO Yadadri
Eastern Region	10820	Jharkhand	PVUNL Patratu
		Odisha	NTPC Talcher
		West Bengal	WBPDCCL Sagardighi
Western Region	9467	Chattisgarh	NTPC Lara
		Madhya Pradesh	HEP, Bhopal
Northern Region	9264	Uttar Pradesh	FSIP, Jagdishpur HERP, Varanasi TP Jhansi UPRVUNL Panki
		Uttarakhand	CFFP, Haridwar HEEP, Haridwar
Total	57,650		

12. Offer shall be valid for ordering up to 30.09.2024. All Plates above 20 mm to be supplied in trimmed condition.

**13. Breach of contract, Remedies and Termination:**

In case of breach of contract, wherever the value of security instruments like performance bank guarantee available with BHEL against the said contract is 10% of the contract value or more, such security instruments to the extent of 10% contract value will be encashed. In case no security instruments are available or the value of the security instruments available is less than 10% of the contract value, the 10% of the contract value or the balance amount, as the case may be, will be recovered in all or any of the following manner:

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- a. from dues available in the form of Bills payable to defaulted supplier against the same contract.
- b. from the dues payable to defaulted supplier against other contracts in the same Region/Unit /any other region/unit
- c. In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against defaulted supplier.

Further, levy of liquidated damages, debarment, termination, de-scoping, short-closure, etc., will be applied as per provisions of the contract

#### 14. Business Dealings with debarred Suppliers/ Contractors

The offers of the bidders who are debarred from doing business with BHEL as also the offers of the bidders, who engage the services of the debarred firms, shall be rejected. The list of banned firms is available on BHEL web site [www.bhel.com](http://www.bhel.com).

Integrity commitment, performance of the contract and punitive action thereof:

##### 1. Commitment by BHEL

BHEL commits to take all measures necessary to prevent corruption in connection with the tender process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity

##### 2. Commitment by Bidder/ Supplier/ Contractor

- a. The bidder/ supplier/ contractor commits to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India
- b. The bidder/ supplier/ contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL
- c. The bidder/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation, to BHEL

If any bidder/ supplier/ contractor during pre-tendering/ tendering/ post tendering/ award/ execution/ post-execution stage indulges in mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the price or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, then, action may be taken against such bidder/ supplier/ contractor as per extant guidelines of the company available on [www. bhel.com](http://www.bhel.com) and/or under applicable legal provisions.

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15. BHEL's Guidelines for Suspension of Business Dealings with Suppliers/ Contractors shall apply to this Notice Inviting Tender/ Enquiry. The said Guidelines are available at [http://www.bhel.com/vender\\_registration/pdf/Suspension\\_guidelines\\_adbridged.pdf](http://www.bhel.com/vender_registration/pdf/Suspension_guidelines_adbridged.pdf) The Bidders shall peruse the same prior to submission of the bid. Any action taken or proposed to be taken by BHEL under the said policy shall be without prejudice, and in addition, to other rights and remedies as may be available to BHEL under contract or law.
16. This tender shall be monitored by Independent External Monitor. Hence submission of Integrity Pact is mandatory.

**INTEGRITY PACT:** Signed Integrity pact (IP) should be furnished along with offer. IP would be signed & stamped (on all pages) by authorized official of the bidder/vendor/contractor. Offer without signed Integrity Pact (IP) shall be rejected. Copy of IP must be enclosed.

IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner. Following Independent External Monitors (IEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

SI No	IEM	Email
1.	Shri Otem Dai, IAS (Retd.)	<a href="mailto:iem1@bhel.in">iem1@bhel.in</a>
2.	Shri Bishwamitra Pandey, IRAS (Retd.)	<a href="mailto:iem2@bhel.in">iem2@bhel.in</a>
3.	Shri Mukesh Mittal, IRS (Retd.)	<a href="mailto:iem3@bhel.in">iem3@bhel.in</a>

The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-I bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.

Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEMs shall be done through email only.

Note:

No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department's officials whose contact details are provided below:

#### Details of contact person(s):

Name	Ms Dolly Gera	Kumar Kishlaya
Designation/Dept	AGM (UPC)	Dy.Manager (UPC)
Address	BHEL House, Siri Fort, New Delhi	BHEL House, Siri Fort, New Delhi

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Phone	0120-6748143/9425604796	011-66337710/9816400528
E-Mail	<a href="mailto:dollygera@bhel.in">dollygera@bhel.in</a>	<a href="mailto:kishlaya@bhel.in">kishlaya@bhel.in</a>

#### 14. **Conflict of Interest among Bidders/ Agents:**

A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity's interests. **The bidder found to have a conflict of interest shall be disqualified.** A bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if:

- a. they have controlling partner (s) in common; or
- b. they receive or have received any direct or indirect subsidy/financial stake from any of them, or
- c. they have the same legal/representative/agent for purposes of this bid; or
- d. they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on, the bid of another Bidder, or
- e. Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly/ Assemblies from one bidding manufacturer in more than one bid; or
- f. In cases of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorize only one agent/dealer. There can be only one bid from the following:
  - I. The principal manufacturer directly or through one Indian agent on his behalf; and
  - II. Indian/foreign agent on behalf of only one principal; **or**
- g. A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid; **or**
- h. In case of a holding company having more than one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Bidders must proactively declare such sister/ common business/ management units in same/ similar line of business. "

#### 15. **Special Provisions for Micro and Small Enterprises (MSE) bidders registered as per MSME act:**

(Subject to participating MSE vendors meeting the tender requirements of BHEL)

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- a) As per Gazette Notification no. S.O. 2119(E) dated 26.06.2020 issued by Ministry of MSME applicable/ existing Micro and small suppliers are requested to get registered with Udyam Registration portal and share us the Udyam registration No. along with Udyam registration certificate. MSE suppliers can avail the intended benefits only if they submit Udyam registration certificate along with the offer.
- b) 25% of the tendered quantity is earmarked for MSE suppliers in this tender, subject to participating MSE Vendors should meet the tender requirements of BHEL. In case MSE vendor participating in the tender quotes within the price band of L1 + 15%, they will be allowed to supply the portion of the requirement subject to acceptance of L1 price by MSE vendor. In case of more than one such MSE vendor within the "L1+15% price band", the supply shall be shared proportionately.
- c) In the event of Non MSE supplier becoming L1 and MSE supplier quotes within the price band of L1+15% and it is not possible to split the tendered quantity on account of reasons like customer contract requirement/technical requirements, then 100% of the quantity will be offered to MSE suppliers subject to acceptance of L1 price by MSE supplier.
- d) Counter offering of L1 rate will not be made with any MSE vendor whose quoted rate is more than the price band of L1+15%.
- e) Payment to MSE vendor will be as per the applicable provisions of the MSMED Act 2006.
- f) If L1 offer is from a Micro / Small enterprise, the 25% earmarking provision is not applicable.
- g) Out of the 25% tendered quantity reserved for MSE suppliers, 6.25% shall be earmarked for procurement from MSE owned by SC/ST entrepreneurs. Apart from this 3% shall be earmarked for procurement from MSE owned by Women entrepreneurs.
- h) In case of any change in the MSE status of the bidder, it shall be the responsibility of the bidder to notify the change as a part of the bid document. If at a later date it comes to the knowledge of BHEL, that the change in the status has not been intimated by the bidder and the order is obtained under the premise of an MSE then BHEL would cancel the pending order against this tender and take necessary steps for suspension of the business dealing with the bidder as per the procurement policy of BHEL.
- i) MSE suppliers can avail the intended benefits by submission of documents as per the latest notification of Ministry of Micro, Small and Medium Enterprises. Non-submission of such documents will lead to consideration of their bid at par with other bidders. No benefit shall be applicable for this enquiry if any deficiency in the above required documents are not submitted before price bid opening. Documents should be notarized or attested by a Gazetted officer. However, credentials of all MSE suppliers will be verified before considering the intended benefits for MSE suppliers at the time of tender evaluation.

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16. **Applicability of PPP-MII order dated 04.06.2020**: This tender is governed by PPP-MII order dated 04.06.2020, issued by DPIIT, Government of India. Hence, all bidders must submit a declaration stating following details:

- a) Tender reference number, Viz. 2024Q2STEELPLTSHT01
- b) Percentage of local content in offered products
- c) Place (s) of value addition in India

Note: The suppliers (bidders) shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.



## 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-516M, 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)

Rev No.01

Amd No.

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Prepared  
Committee

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## CORPORATE PURCHASING SPECIFICATION

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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.

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

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

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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																								
		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																										
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																											

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	CORPORATE PURCHASING SPECIFICATION			AA10404	
				Rev No.05	
				PREFACE SHEET	
<div>CARBON STEEL PLATES FOR PRESSURE VESSELS FOR INTERMEDIATE AND HIGH TEMPERATURE SERVICES ASME SA515, Gr.: 70</div> <div>FOR INTERNAL USE ONLY REMOVE THIS PREFACE BEFORE ISSUE TO SUPPLIERS</div> <div>Equivalent / Comparable Standards:  International : ASME SA515 Grade-70</div> <div>Probable / Suggested Suppliers and Grades: Refer plant vendors list</div> <div>User Plants and Replaced Plant Specifications / References:</div>					
Revisions:			APPROVED: INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC(FCF+HTM)		
Rev No.05	Amd No.	Reaffirmed	Prepared HPEP, Hyderabad	Issued Corp.R&D	Dt. of 1 <sup>st</sup> Issue September 1978
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## CARBON STEEL PLATES FOR PRESSURE VESSELS FOR INTERMEDIATE AND HIGH TEMPERATURE SERVICES ASME SA515, Gr.: 70

### 1 GENERAL

The plates shall conform to the latest version for ASME SA515, Gr:70 and comply with the following additional requirements.

### 2 APPLICATION

For high temperature service at stress levels and temperatures allowed by ASME Boiler & Pressure Vessel Code, Section I and Indian Boiler Regulations.

### 3 MANUFACTURE

**3.1** All plates shall be of fully killed steel. Drum plates shall be Vacuum Degassed conforming to S1 of SA20 and the final rolling shall be done Lengthwise.

**3.2** Plates may be made from ingots or strand cast slabs wherein a reduction ratio in thickness from slab/ingot to plate shall be maintained to 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. Sufficient "Top of Ingot" has to be discarded to ensure plate free of segregation. After top discard, the increase in carbon content at the top- mid width, mid thickness of the plate shall not exceed 20% of the reported ladle analysis value and this value shall be duly indicated in the Test certificate.

**3.3** Ladle analysis: 1 sample per cast; Product analysis: Min.1 sample per plate as rolled.

Max. Carbon: CS: 0.25%.

Max. Carbon Equivalent for Carbon Steel: As per S20 of SA20.

### 4 HEAT TREATMENT

**4.1 Normalizing Temperature: 880-920°C**

**4.2** SIMULATION HEAT TREATMENT for test coupons in addition to clause 4.1 shall be as follows (For CS Drum plates only as indicated in the Enquiry/PO)

Stress Relieving (SR):  $615 \pm 10^{\circ}\text{C}$ , 3 hr/inch of thick (t), furnace cool to  $400^{\circ}\text{C}$

ROH/ROC for SR:  $< 220^{\circ}\text{C/hr}$  divided by t in inches, but need not be slower than  $55^{\circ}\text{C/hr}$ .

### 5 CHEMICAL COMPOSITION

Carbon content obtained through ladle analysis shall be restricted to a maximum of 0.25% irrespective of the thickness. Maximum Carbon equivalent shall be governed by S20 of SA20.

### 6 TEST SAMPLES

One tensile, One High Temperature Tensile (For CS Drum plates only as indicated in the Enquiry/PO) and one bend sample for each rolled/mother plate.

<b>Revisions:</b>			<b>APPROVED:</b> INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC(FCF+HTM)		
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## 7 MECHANICAL PROPERTIES (In simulated heat treated condition for CS Drum plates and in “as delivered condition” for other CS plates)

### a) Tensile Test

a) Bend Test: Angle of bend: 180 deg. Diameter of the Mandrel = 2 x Thickness of the plate as rolled.

b) High temperature tensile test for carbon steel drum plates shall be as per S7 of SA20. Min yield strength at 350°C: 19.7 kg/mm<sup>2</sup>.

## 8 ADDITIONAL TESTS

**8.1** Ultrasonic examination and acceptance standards shall be as per SA578 Level B (For all plates of thickness > 10mm).

**8.2** All dimensions shall be as per PO. Tolerance on thickness of plates shall be positive only.

## 9 INSPECTION AT SUPPLIER'S WORKS

BHEL's representative shall have free access at all times to all parts of the manufacture's works, until the work on the contract of BHEL is being performed. The manufacturer shall offer BHEL's representative all reasonable facilities, without charge, to satisfy the latter that the material is being furnished in accordance with the specification.

## 10 MARKING

Hard stamping of melt number, specification, size and grade, plate number and the inspection authority's stamp on each plate along rolling direction.

a) For plates of thickness > 6mm, marking shall be by stencilling & steel die stamping.

b) For plates of thickness ≤ 6mm, marking shall be by stencilling & steel die stamping using low stress on each plate & bordered by white paint.

## 11 REPAIR

**11.1** Fusion welding is prohibited.

**11.2** When done by mechanical means, the specified thickness to be met with and the surface to be smoothly dressed up from any sharp edges.

**11.3** Plates to be free of mill scales, edge crack & other injurious defects.

## 12 CERTIFICATION

**12.1** 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 SA515 Gr.70 and AA10404 Rev.05 as follows

- Imported: Inspecting Authority approved by IBR for the country of origin (to be concurred by BHEL).
- Indigenous Supply: Director of Boilers/Chief Inspector of Boilers/Inspecting Authority approved by IBR, for the respective state.
- For Non-IBR application, Form IV is not applicable
- Additionally, manufacturer's test certificate shall be submitted meeting all the requirements contained in the purchase order, this specification, and the applicable ASME Specification.





## CORPORATE PURCHASING SPECIFICATION

AA10404

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**12.2** In addition to above, the following details shall be furnished with the test certificates.

- BHEL Purchase Order No, AA10404 & Rev No. 05, Test certificate number & Date, Quantity.
- Specification and Grade with applicable year of code, Heat Number, Plate number.
- Steel making process, Chemistry including incidental elements - Ladle and Product analysis [as per clause 3.3].
- Heat Treatment details of material and test coupons like temperature, soaking time, cooling medium etc.
- The certification of reduction ratio in thickness  $\geq 3:1$  from a strand-cast slab/ingot to plate shall be reported in the test certificate.
- Mechanical, NDE & other test results with reference & acceptance standards.
- Print of the stamp of Inspecting Officer, which is used on the plate.
- The manufacturer shall furnish a certificate of compliance stating that the plates have been manufactured, inspected, and tested in accordance with the requirements of the applicable product specification.


### 13 REJECTION AND REPLACEMENT

In the event of any material proving defective during the course of preparation, machining, testing or erection such material shall be rejected notwithstanding any previous certification of satisfactory testing and/or inspection.

The supplier shall under take to replace the rejected material at his own cost and the rejected material shall be taken back by the supplier after fulfilling the commercial terms and condition.

### 14 REFERRED STANDARDS (Latest Publications Including Amendments)

- 1) ASME SA20
- 2) ASME SA578

	<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.



Product: STRUCTURAL QUALITY PLATES FOR BOILER STRUCTURES

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  $> 25\text{mm}$  1 to 4 shall be maintained by hard stamping and 5 by paint stenciling
- For plates of thickness  $> 10\text{mm}$  and upto  $25\text{mm}$  (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  $\leq 10\text{ mm}$  (except made from strip in coil form )1,2,3,4 shall be maintained by paint stenciling.
- Plates of thickness  $\leq 10\text{mm}$  (produced from strip in coil form): 1, 2, 3, 4 by paint stenciling on the top of each pile/ packet.



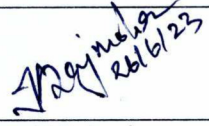
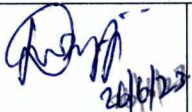
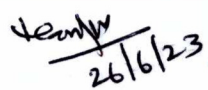
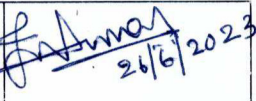
8. INSPECTION AND CERTIFICATION:

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  $20\text{mm}$  (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	 26/06/23	 26/6/23	 26/6/23	 26/6/23	 26/6/2023
M. Jeyaram	S. Anand Kumar	K. Rajmohan	D. Nagaraj	T. Pandian	J. V. V. Aruna kumar
Manager/QA	SDGM/MM	SDGM/Engineering	DGM/ OS	AGM/ QC	AGM/QA&BE
Prepared	Reviewed				Approved



	<b>BHEL – Tiruchirappalli - 620014, India.</b> <b>Quality Assurance Department</b> <b>TECHNICAL DELIVERY</b> <b>CONDITIONS</b>	DOC No: <b>TDC:6:386</b> Rev: <b>03</b> Effective Date: <b>26/06/2023</b> Page: <b>1 of 2</b>
<b>Product: STRUCTURAL QUALITY PLATES FOR BOILER STRUCTURES OF PROJECTS: TELANGANA (2x800 MW) - CUST No: 1819, 1820, 1429 , PATRATU (3x800 MW) - CUST No: 1828, 1829, 1830 ,TALCHER (2x660 MW) CUST No: 1732, 1733</b>		

**Record of revisions:**

Rev 00: 15/06/2017 - Fresh issue

Rev 01: 07/12/2017 – Cl 2 modified, Cl 3 modified to remove controlled rolling, Cl 4 modified to remove normalizing rolling grain size requirement, Cl 6 and Cl 9(c) modified, Cl 9 (f) removed.

Rev 02: 19/07/2018 – Projects modified to include Patratu (3x800 MW) project.

Rev 03: 20/06/2023 – Talcher project added in title, Editorial corrections made in Cl 6 & 9. Clause 8.i., modified to include coil form plate for thickness upto 25mm, Clause 8.ii newly added.

**1. MATERIALS:**

All the codes, standards, specifications, procedures, etc., referred in this TDC shall be of latest revision as on the date of Purchase Order, unless specified otherwise.

Specification for Plates : IS 2062,  
Grades : IS 2062 E 250 Gr BR & E 350 Gr B0;  
**Additional Requirement : As listed below (Supplementary to Specification)**  
Size and Qty. : As per Purchase order (PO)

**2. CHEMICAL COMPOSITION AND PROCESS:**

IS 2062 E 250 Gr BR & E 350 Gr B0: Fully killed; In addition, for plates of t > 40 mm: Vacuum degassing shall be done.

**3. HEAT TREATMENT:**

For plates of thickness lesser than and including 12mm: As rolled

For plates of thickness beyond 12 mm to and including 40 mm: Normalizing Rolling

For plates of thickness greater than 40 mm: Furnace normalized.

**4. MECHANICAL TESTS**

- All mandatory tests as per the specification.
- Frequency of all tests: As per material specification.

**5. ADDITIONAL MECHANICAL TEST**

IS 2062 E250 Gr BR: Impact Testing shall be done at room temperature & acceptance as per material specification.

**6. NON DESTRUCTIVE TEST**

Ultrasonic Test: For all plates of thickness >40 mm, testing as per ASTM A578.

**Acceptance Level:** ASTM A578 Level B-S2.

**7. 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.

**8. MARKING (by mill)**

1. Specification, 2. Grade, 3. Melt number, 4. Maker's emblem/Code/ Identification

- All plates of thickness > 25mm 1 to 4 shall be maintained by hard stamping.
  - 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 (as rolled )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.
2. Additionally, Plate number, PO No (in case of BHEL PO only), buyer name & Weight also shall be painted/stenciled on all the products.



BHEL – Tiruchirappalli - 620014, India.  
Quality Assurance Department  
TECHNICAL DELIVERY  
CONDITIONS

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Product: STRUCTURAL QUALITY PLATES FOR BOILER STRUCTURES OF  
PROJECTS: TELANGANA (2x800 MW) - CUST No: 1819, 1820, 1429 , PATRATU (3x800 MW)  
- CUST No: 1828, 1829, 1830 ,TALCHER (2x660 MW) CUST No: 1732, 1733

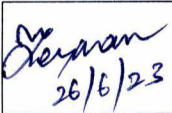

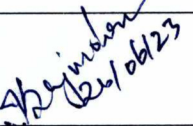
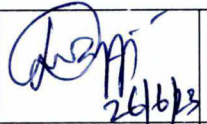
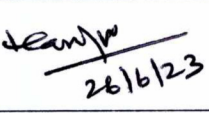
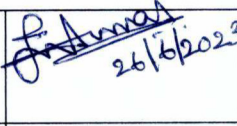
#### 9. INSPECTION AND CERTIFICATION:

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

- Purchase Order No (BHEL PO only), TDC No. & Rev No, Test certificate No. & Date, Size, Plate number and Quantity-Melt wise.
- Specification and Grade with applicable year of code, Heat Number, Steel making process, de-oxidation process, vacuum degassing.
- Chemistry including trace elements, Carbon equivalent and Heat treatment details.
- Mechanical test Results, Impact values, NDE results with reference and acceptance standards.
- Acceptance limits (for chemistry & mechanical properties) shall be mentioned along with actual test results.

Notes:

- This TDC shall be read along with SIP:NP:14 (latest), for POs placed by outsourcing on OVM/ACF vendors.
- Refer TDC:0:301 (Latest revision) for the requirements of other structural material specifications which are not covered in this TDC.**
- End use:** These plates are meant for use in structural applications for Telangana (2x800 MW) project including Auxiliary boilers ,Patrattu project (3x800 MW) and Talcher project (2x660 MW).

 26/6/23	 26/6/23	 26/6/23	 26/6/23	 26/6/23	 26/6/2023
M. Jeyaram	S. Anand Kumar	K. Rajmohan	D. Nagaraj	T. Pandian	J. V. V. Aruna kumar
Manager/QA	SDGM/MM	SDGM/Engineering	DGM/ OS	AGM/ QC	AGM/QA&BE
Prepared	Reviewed				Approved