Item details			
Enq no: 1001700031 dt 13.10.2017			
Nickel Alloy Plates of various thicknesses to Specn. SB 168 UNS N06617, SB 443 UNS N06625 & SB 435 UNS N07740 (Code case 2702) against TDC TDG: 117 Rev 03, TDC: AUSC/HWR-002 Rev 00 & TDC: AUSC/VALVES-001 Rev 00 respectively.			
Sl.No	Description	Qty (Kg)	Schedule Delivery date
1	Plate 25X1000X3000 mm SB 168 UNS N06617 – 4 nos	**2508**	31.01.2018
2	Plate 25X700X300 mm SB 168 UNS N06617 – 1 no	**44**	31.01.2018
3	Plate 25X2000X2000 mm SB 168 UNS N06617 – 1 no	**836**	31.01.2018
4	Plate 40X1000X3000 mm SB 168 UNS N06617 – 5 nos	**5016**	31.01.2018
5	Plate 40X700X1100 mm SB 168 UNS N06617 – 1 no	**258**	31.01.2018
6	Plate 40X1000X2000 mm SB 168 UNS N06617 – 1 no	**669**	31.01.2018
7	Plate 65X1000X3000 mm SB 168 UNS N06617 – 3 nos	**4891**	31.01.2018
8	Plate 65X1000X2300 mm SB 168 UNS N06617 – 2 nos	**2500**	31.01.2018
9	Plate 65X650X1800 mm SB 168 UNS N06617 – 2 nos	**1272**	31.01.2018
10	Plate 65X500X1000 mm SB 168 UNS N06617 – 1 no	**272**	31.01.2018
11	Plate 40X500X500 mm SB 443 UNS N06625 – 16 nos	**1350.40**	31.01.2018
12	Plate 40X500X500 mm SB 435 UNS N07740 (Code Case 2702)– 4 nos	**322**	31.01.2018
	TOTAL	**19938.40**	

In addition to the TDC requirements, suppliers shall meet the Pre-qualification Requirements (PQR) for the respective grade and is enclosed. The offers of the suppliers who fail to do so will be liable for rejection.

1. ASME SB 168 or SB 564 UNS N06617 - PQR Ref: TDG 117/Rev 03
2. ASME SB 443 UNS N06625 - PQR Ref: A-USC/HWR-002/00
3. ASME SB 435 UNS N07740 (Code case 2702) - PQR Ref: A-USC/VALVES-001/00

Pls submit all the required documents in line with the respective PQR.

BHEL recently received guidelines from Govt. Of India and Central Vigilance Commission and we have been asked to comply with the guidelines with regard to dealings with Indian Agent/Foreign Agent of Foreign Suppliers.

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1. Mandatory submission of an Agency Agreement

1.1 It shall be incumbent on the Indian agent and the foreign principal to adhere to the relevant guidelines of Government of India, issued from time to time.

1.2 The Agency Agreement should specify the precise relationship between the foreign OEM/foreign principal and their Indian agent and their mutual interest in the business. All services to be rendered by agent/associate, whether of general nature or in relation to the particular contract, must be clearly stated by the foreign supplier/Indian agent. Any payment, which the agent or associate receives in India or abroad from the OEM, whether as commission or as a general retainer fee should be brought on record in the Agreement and be made explicit in order to ensure compliance to laws of the country.

1.3 In the absence of any agency agreement, BHEL shall not deal with any Indian agent (authorized representatives / associate / consultant, or by whatever name called) and shall deal directly with the foreign principal only for all correspondence and business purposes.

1.4 Agents will file an authenticated Photostat copy duly attested by a Notary Public / Original certificate of the Principal confirming the agency agreement and giving the status being enjoyed by the agent and the commission / remuneration / salary / retainer ship being paid by the principal to the agent.

1.5 Wherever the Indian representatives have communicated on behalf of their principals and the foreign parties have stated that they are not paying any commission to the Indian agents, and the Indian representative is working on the basis of salary or as retainer, a written declaration to this effect should be submitted by the Foreign Principal.

2. Disclosure of particulars of agents / representatives in India

2.1 Tenderers of Foreign nationality shall furnish the following details:

2.1.1 The Bidder(s) / Contractor(s) of foreign origin shall disclose the name and address of the agents / representatives in India if any and the extent of authorization and authority given to commit the Principals. In case the agent / representative be a foreign Company, it shall be confirmed whether it is existing Company and details of the same shall be furnished.

2.1.2 The amount of commission / remuneration included in the quoted price(s) for such agents / representatives in India.

2.1.3 Confirmation of the Tenderer that the commission / remuneration, if any, payable to his agents / representatives in India, paid in Indian Rupees only.

2.2 Tenderers of <u>Indian Nationality</u> shall furnish the following details:

2.2.1 The Bidder(s) / Contractor(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any, indicating their nationality as well as their status, i.e. whether manufacturer or agents of manufacturer holding the Letter of Authority of the Principal specifically authorizing the agent to make an offer in India in response to tender either directly or through the agents / representatives.

2.2.2 The amount of commission / remuneration included in the price(s) quoted by the Tenderer for himself.

2.2.3 Confirmation of the foreign principals of the Tenderer that the commission / remuneration, if any, reserved for the Tenderer in the quoted price(s), paid in India in equivalent Indian Rupees on satisfactory completion of the Project or supplies of Stores and Spares in case of operation items.

2.3 Failure to furnish correct and detailed information as called for in paragraph 2.1 & 2.2 above will render the concerned tender liable to rejection or in the event of a contract materializing, the same liable to termination by BHEL Besides this there would be a penalty of banning business dealings with BHEL or damage or payment of a named sum.

Please furnish the above information immediately

THIRD PARTY NON-DISCLOSURE AGREEMENT

I, _____, on behalf of the _____ (Name of Company), acknowledge that the information received or generated, directly or indirectly, while working with BHEL, Trichy on contract is confidential and that the nature of the business of the BHEL, Trichy is such that the following conditions are reasonable, and therefore:

I warrant and agree as follows:

I, or any other personnel employed or engaged by our company, agree not to disclose, directly or indirectly, any information related to the BHEL, Trichy Without restricting the generality of the foregoing, it is agreed that we will not disclose such information consisting but not necessarily limited to:

- Technical information: Methods, drawings, processes, formulae, compositions, systems, techniques, inventions, computer programs/data/configuration and research projects.

- Business information: Customer lists, project schedules, pricing data, estimates, financial or marketing data,

On conclusion of contract, I, or any other personnel employed or engaged by our company shall return to BHEL, Trichy all documents and property of BHEL, Trichy, including: drawings, blueprints, reports, manuals, computer programs/data/configuration, and all other materials and all copies thereof relating in any way to BHEL, Trichy 's business, or in any way obtained by me during the course of contract. I further agree that I, or any others employed or engaged by our company shall not retain copies, notes or abstracts of the foregoing.

This obligation of confidence shall continue after the conclusion of the contract also.

I acknowledge that the aforesaid restrictions are necessary and fundamental to the business of the BHEL, Trichy and are reasonable given the nature of the business carried on by the BHEL, Trichy I agree that this agreement shall be governed by and construed in accordance with the laws of country.

I enter into this agreement totally voluntarily, with full knowledge of its meaning, and without duress.

Dated at _____, this ____ day of _____, 20__.

Name

Company

Signature

Pre-Qualification Requirements (PQR) REV: 03 for the procurement through Open Tender for Nickel alloy Plates conforming to ASME SB168 / ASME SB564 UNS N06617 with reference to AUSC/TDG: 117/03 (or) Latest Revision.

A) Organizational Capability:

1. Plates supplier (Vendor/bidder) shall meet at least one requirement of either Nickel based Alloy melt producer in at least one of the grade specified in the purchase enquiry or the one having required plate rolling / forging facility in the required sizes and having experience in rolling / forging of plates of at least either nickel base alloys or austenitic stainless steels. Offers from traders, re-rollers, fabricators and stockists are not acceptable and shall not be considered for evaluation. Vendors to indicate the nature of firm stating in brief his experience and which portion is outsourced. The sub-vendor, if any, shall meet the requirements as stated above.
2. Vendor (Bidder) with basic manufacturing facilities like hot rolling / forging, Heat treatment and Nondestructive testing are qualified to quote for this tender. However, Vendor may also suitably outsource the above activities. In case of outsourcing, the product quality requirements shall be ensured by the Vendor. Heat treatment furnace calibration certificate alongwith procedure for calibration shall be submitted.
3. Chemical, Mechanical testing shall be done in-house calibrated facility or at Labs certified as per ISO 17025 or Government approved Laboratories.
4. Vendor shall submit a valid ISO 9001 certificate or Equivalent Quality Management System Certificate.
5. BHEL reserves the right for free access to the plant area where the ordered material is produced and inspected. In case of non- compliance with the mutually agreed documents for the supply, the material could be liable for rejection.

K.V. RAMANI Addl. General Manager / Engineering BHEL / Piping Centre T. Nagar, Chennai - 600 017	VIVEKANANDA YELLU Dy. Manager / Quality BHEL / Piping Centre T. Nagar, Chennai - 600 017
Engineering	Quality

B) **Technical Competence:**

1. Point by point confirmation to the TDC ref: **TDG: 117/03 (or) Latest Revision** Requirements is mandatory for consideration of offer.
2. Vendor shall submit the manufacturing plan to meet the TDC ref: **TDG: 117/03 (or) Latest Revision** requirements and quality assurance programme for the material ordered subsequent to placement of purchase order but before the start of production.
3. Manufacturer's test certificates (MTC), Heat Treatment Charts, Ultrasonic test report as per TDC requirement and any report /record as per approved quality plan to be submitted for BHEL's review/approval before dispatch.

C) **Financial Soundness:**

1. Indigenous Vendors shall submit Audited copies of annual reports/complete set of annual accounts for the last four years (or from date of incorporation whichever is less).
2. Foreign Vendors shall submit latest D&B report.

Necessary supporting documents shall be submitted for meeting each of the above Pre-Qualification Criteria for evaluation of the offers.

BHEL reserves the right to consider/Not-consider the offers based on the evaluation of documents submitted for the above Pre-Qualification Criteria. BHEL also reserves the right to have on-site assessment of the facilities at Vendor's works during the bid evaluation.

K.V. RAMANI Addl. General Manager / Engineering BHEL / Piping Centre T. Nagar, Chennai - 600 017	VIVEKANANDA YELLU Dy. Manager / Quality BHEL / Piping Centre T. Nagar, Chennai - 600 017.
Engineering	Quality

Pre-Qualification Requirements (PQR) for the procurement through open tender for Nickel Alloy Plates to specification ASME SB443 UNS N06625, with reference to TDC A-USC/HWR-002 REV 00.

A) **Organizational Capability:**

1. Plate supplier (Vendor/bidder) shall meet at least one requirement of either Nickel based alloy melt producer in at least one of the grade specified in the purchase enquiry or the one having required plate rolling/forging facility in the required sizes and having experience in rolling/forging of plates of at least either nickel base alloy or austenitic stainless steels. Offers from traders, re-rollers, fabricators and stockiest are not acceptable and shall not be considered for evaluation. Vendors to indicate the nature of firm, stating in brief his experience and which portion is out sourced. The sub vendor, if-any shall met the requirement as stated above.
2. Vendors (Bidders) with basic manufacturing facilities like hot rolling/forging, heat treatment and non-destructive testing are qualified to quote for this tender. However vendor may also suitably outsource the above activities. In case of outsourcing the product quality requirement shall be ensured by the vendor. Heat treatment furnace calibration issued by approved agency/statutory bodies along with procedure for calibration shall be submitted.
3. Chemical, Mechanical testing shall be done in-house or at Labs certified as per ISO 17025 or Government approved Laboratories
4. Vendor shall submit a valid ISO 9001 certificate or equivalent Quality Management System Certificate.
5. BHEL reserves the right to free access to the plant area where the ordered material is produced and inspected in case of non-compliance with the mutually agreed document for the supply, the material could be liable for rejection.

B) **Technical Competence:**

1. Point by point confirmation to the TDC requirements is mandatory for consideration of offer.
2. Vendor shall submit the manufacturing plan to meet the TDC requirements and quality assurance programme for the material ordered subsequent to placement of purchase order but before the start of production.
3. Manufacturer's test certificates (MTC), Heat treatment charts, and ultrasonic test reports as per TDC requirements and any report/record as per approved quality plan to be submitted for BHEL's review/approval before dispatch.

PQR-625

c) **Financial Soundness:**

1. Indigenous suppliers shall submit Audited copies of annual reports/complete set of annual accounts for the last four years (or from date of incorporation whichever is less).

2. Import suppliers shall submit latest D&B report.

Necessary supporting documents shall be submitted for meeting each of the above Pre-Qualification Criteria for evaluation of the offers.

BHEL reserves the right to consider/Not-consider the offers based on the evaluation of documents submitted for the above Pre-Qualification Criteria. BHEL also reserves the right to have on-site assessmentof the facilities at supplier's works during the bid evaluation.

VISHAL SINGH
Development Engineer
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Bharat Heavy Electricals Limited
Tiruchy-620 014

R. SUBBARAYALU
Addl. General Manager
Welding Research Institute
Bharat Heavy Electricals Limited
Tiruchirappalli - 620 014.

Pre-Qualification Requirements (PQR) for the procurement through Open Tender for Nickel alloy Plates to specification ASME SB435 UNS N07740 (Code Case 2702) with reference to TDC A-USC/VALVES-001/00.

A) Organizational Capability:

1. Plate supplier (Vendor/bidder) shall meet at least one requirement of either Nickel based alloy melt producer in at least one of the grade specified in the purchase enquiry or the one having required plate rolling/forging facility in the required sizes and having experience in rolling/forging of plates of at least either nickel base alloy or austenitic stainless steels. Offers from traders, re-rollers, fabricators and stockiest are not acceptable and shall not be considered for evaluation. Vendors to indicate the nature of firm, stating in brief his experience and which portion is out sourced. The sub vendor, if-any shall met the requirement as stated above.
2. Vendors (Bidders) with basic manufacturing facilities like hot rolling/forging, heat treatment and non-destructive testing are qualified to quote for this tender. However vendor may also suitably outsource the above activities. In case of outsourcing the product quality requirement shall be ensured by the vendor. Heat treatment furnace calibration issued by approved agency/statutory bodies along with procedure for calibration shall be submitted.
3. Chemical, Mechanical testing shall be done in-house or at Labs certified as per ISO 17025 or Government approved Laboratories
4. Vendor shall submit a valid ISO 9001 certificate or equivalent Quality Management System Certificate.
5. BHEL reserves the right to free access to the plant area where the ordered material is produced and inspected in case of non-compliance with the mutually agreed document for the supply, the material could be liable for rejection.

B) Technical Competence:

1. Point by point confirmation to the TDC requirements is mandatory for consideration of offer.
2. Vendor shall submit the manufacturing plan to meet the TDC requirements and quality assurance programme for the material ordered subsequent to placement of purchase order but before the start of production.
3. Manufacturer's test certificates (MTC), Heat treatment charts, and ultrasonic test reports as per TDC requirements and any report/record as per approved quality plan to be submitted for BHEL's review/approval before dispatch.

PQR-740

c) **Financial Soundness:**

1. Indigenous suppliers shall submit Audited copies of annual reports/complete set of annual accounts for the last four years (or from date of incorporation whichever is less).
2. Import suppliers shall submit latest D&B report.

Necessary supporting documents shall be submitted for meeting each of the above Pre-Qualification Criteria for evaluation of the offers.

BHEL reserves the right to consider/Not-consider the offers based on the evaluation of documents submitted for the above Pre-Qualification Criteria. BHEL also reserves the right to have on-site assessment of the facilities at supplier's works during the bid evaluation.

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Tiruchirappalli - 620 014.

TECHNICAL SPECIFICATIONS FOR ASME SB443 UNS N06625 PLATES
(Ref. No. A-USC/HWR-002/00)

Scope

This Technical Delivery Conditions pertains to manufacturing and procurement Nickel based plates for high temperature boiler application. Material shall be procured only from manufacturers only (not be procured from traders/ stockists).

1. General:

a. Nickel Alloy : ASME SB443 UNS N06625
b. Additional Requirements : As listed below (Supplementary to above material Specifications)
c. Size and Quantity : As per Purchase Order.

2. CHEMICAL COMPOSITION & PROCESS:

a) Material shall be produced by using Electric Arc Furnace (EAF) or Induction Furnace followed by Argon Oxygen Decarburization Process (AOD) or by using vacuum induction melting (VIM) followed by vacuum arc re-melting (VAR) or electro slag refining (ESR).
b) Product Analysis: As per material specification.
c) Ladle Analysis in weight % as per Table 1: Test method as per ASTM B880

Table 1. Chemical Analysis

Element	C	S	P	Cr	Fe	Mn	Mo	Si	Nb+Ta	Al	Ti	N	Ni
Wt %	0.06 max	0.015 max	0.015 max	20-23	3.5 Max	0.5 max	8-10	0.5 max	3.15-4.50	0.2 Max	0.2 Max	0.05 Max	Bal.

d) Tolerance for chemistry shall be as per the applicable material specification specified in Clause 1 above.
e) Raw materials used in making of plates including incoming scrap shall be checked by suppliers to ensure freedom from radioactivity.

3. Dimension Tolerances:

As per SB443. Size as per purchase order.
Tolerances on thickness of plate shall be positive only.

4. Heat Treatment (as delivered condition):

Grade 2: Solution annealed at 1093°C minimum, with subsequent stabilization anneal at 980°C minimum to increase resistance to sensitization as per ASTM B443.

5. Mechanical Testing (on as delivered condition):

Extent of test: One sample/each size/heat/HT batch; on final heat treated condition sample:
Tensile Testing as per: ASTM E8; Tensile Strength: Min 690 MPa; Yield Strength (0.2% offset): Min 276 MPa; Elongation in 2 inch: min 30%; Grain size (tested as per ASTM E112): 2-5.
Tensile strength at 600 Deg C, 650 Deg C, 700 Deg C and 725 Deg C - for information only

6. Non Destructive Testing:

UT: 100% for all thickness. Testing method: SA 578 with acceptance Level B & SA 577
For plates <10mm, UT shall be done on plate.

UT shall be done to ensure freedom from internal defects, laminations and material separations are not permissible.

7. Workmanship and Finish

The material shall be plain finish for industrial application, uniform in quality and condition, smooth, straight or flat and free of wrinkles, overlaps, tears, cracks and injurious imperfections. No repairs/weld repairs permitted.

8. Marking & Packing

Details of stamping on front face of each item with low stress stamps and border by oil paint: (1) Heat number, (2) Specification & grade, (3) Size, (4) Maker's emblem/code, (5) Inspection Authority's seal next to heat number. The plates are to be properly packed and despatched to avoid damage during transit.

9. Inspection & Certification: (in English only)

a) Products shall be inspected at supplier's works/mill by BHEL/BHEL approved angency and separate Test certificate in English language (with following details), shall accompany the product:
   1. Purchase Order No. Technical Specifcations No & its revision no, Test certificate no & date.
   2. Specification, Grade & class with applicable year of code, Heat Number, TDC No, Quantity & Size.
   3. Supplier TC for the Nickel alloy used in making the finished product
   4. Melting & manufacturing process, Chemistry (Laddle & Product analysis) including incidental elements: Heat number-wise.
   5. Heat treatment details.
   6. Mechanical test results- Tensile (UTS, YTS (0.2 offset), % elongation), and NDE (UT) test results with reference & acceptance standards & grain size (tested as per ASTM E112).
   7. Results of Dimensional Checks.

10. Quality Plan

Before start of production the manufacturer shall submit a Manufacturing and Inspection plan (MIP) to BHEL approval.
The MIP shall constitute of: i) melting & refining, ii) ingot weight and type, iii) rolling process iv) NDE v) heat treatment, vi) internal tests and inspection before final heat treatment, vii) test and inspections after heat tratment, viii) marking preservation and dispatch, ix) test certificate requriements.

11. Audit Checks at BHEL

BHEL reserves the right to carry out audit checks at any stage of manufacture on representative test bars or job. Supplies found defective during check or subsequent processing at BHEL are liable for rejection.

12. END USE

To be used in welding procedure development and welder training related to boiler components manufacture, working at temperatures above 700 Deg C and pressure above 300 bar.

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Development Engineer
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TECHNICAL SPECIFICATIONS FOR ASME SB435 (Code Case 2702) UNS N07740 PLATES (Ref. No. A-USC/VALVES-001/00)

Scope

This Technical Delivery Conditions pertains to manufacturing and procurement of Nickel plates for high temperature boiler application. Material shall be procured only from manufacturers only (not be procured from traders/ stockists).

1. **General:**
   a. Nickel Alloy : ASME SB435 (Code Case 2702) UNS N07740
   b. Additional Requirements : As listed below (Supplementary to above material specifications)
   c. Size and Quantity : As per Purchase Order.

2. **CHEMICAL COMPOSITION & PROCESS:**
   a) **Melting:** Material shall be produced by using Electric Arc Furnace (EAF) or Induction Furnace followed by Argon Oxygen Decarburization Process (AOD) or by using vacuum induction melting (VIM) followed by vacuum arc re-melting (VAR) or electro slag refining (ESR).
   b) Product Analysis: As per material specification.
   c) Ladle Analysis in weight % as per Table 1: Test method as per ASTM B880

Table 1. Chemical Analysis

Element	Cr	Fe	Mn	Mo	Co	Al	C	Cu
By % weight	23.5 - 25.5	3.0 max	1.0 max	2.0 max	15 - 22	0.2 - 2.0	0.005 - 0.08	0.5 max

B	Si	S	P	Nb+T	Ti	Ni
0.0006 - 0.006	1.0 max	0.03 max	0.03 max	0.5 -2.5	0.5 -2.5	Balance

   d) Tolerance for chemistry shall be as per the applicable material specification specified in Clause 1 above.
   e) Raw materials used in making of plates including incoming scrap shall be checked by suppliers to ensure freedom from radioactivity.

3. **Dimension Tolerances:**
   As per SB435. Size as per purchase order.
   Tolerances on thickness of plate shall be positive only.

4. **Heat Treatment (as delivered condition):**
   Solution annealed condition at 1100°C minimum for 1 hour per inch (25 mm) of thickness & Precipitation hardened (Aging) at 760-815°C for 4 hours minimum upto 2 inch (50 mm) of thickness plus additional ½ hour for each inch of thickness above 2 inches. Local heat treatment is not permitted.

5. **Mechanical Testing (on as delivered condition):**
   Extent of test: One sample/each size/heat/HT batch; on final heat treated condition sample:
   Tensile Testing as per: ASTM E8; Tensile Strength: Min 1035 MPa; Yield Strength (0.2% offset): Min 620 MPa; Elongation in 2 inch: min 20%;
   Grain size (tested as per ASTM E112): 2-5.

6. **Non Destructive Testing:**
   UT: 100% for all thickness. Testing method: SA 578 with acceptance Level B & SA 577

For plates <10mm, UT shall be done on plate.
UT shall be done to ensure freedom from internal defects, laminations and material separations are not permissible.

7. Workmanship and Finish

The material shall be plain finish for industrial application, uniform in quality and condition, smooth, straight or flat and free of wrinkles, overlaps, tears, cracks and injurious imperfections. No repairs/weld repairs permitted.

8. Marking & Packing

Details of stamping on front face of each item with low stress stamps and border by oil paint: (1) Heat number, (2) Specification & grade, (3) Code Case Number, (4) Size, (5) Maker's emblem/code, (6) Inspection Authority's seal next to heat number. The plates are to be properly packed and despatched to avoid damage during transit.

9. Inspection & Certification: (in English only)

a) Products shall be inspected at supplier's works/mill by BHEL/BHEL approved angency and separate Test certificate in English language (with following details), shall accompany the product:

1. Purchase Order No./Technical Specifications/TDC No & its revision no, Test certificate no & date.
2. Specification, Grade & class with applicable year of code, Code case number, Heat Number, TDC No, Quantity & Size.
3. Supplier TC for the Nickle alloy used in making the finished product.
4. Melting & rolling process, Chemistry (Laddle & Product analysis) including incidental elements: Heat number-wise.
5. Heat treatment details.
6. Mechanical test results- Tensile (UTS, YTS (0.2 offset), % elongation), and NDE (UT) test results with reference & acceptance standards & Grain size (tested as per ASTM E112).
7. Results of Dimensional Checks.

10. Quality Plan

Before start of production the manufacturer shall submit a Manufacturing and Inspection plan (MIP) to BHEL approval.
The MIP shall constitute of: i) melting & refining, ii) ingot weight and type, iii) rolling process iv) NDE v) heat treatment, vi) internal tests and inspection before final heat treatment, vii) test and inspections after heat tratment, viii) marking preservation and dispatch, ix) test certificate requriements.

11. Audit Checks at BHEL

BHEL reserves the right to carry out audit checks at any stage of manufacture on representative test bars or job. Supplies found defective during check or subsequent processing at BHEL are liable for rejection.

12. END USE

To be used in welding procedure development and welder training related to boiler components manufacture, working at temperatures above 700 Deg C and pressure above 300 bar.

VISHAL SINGH
Development Engineer
Welding Research Institute
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R. SUBBARAYALU
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Record of Revision:
Rev 00: 09/05/17: Fresh Issue
Rev 01: 05/06/17: Cl 1 Specification SB/B168 added. Cl 2, 3, 5, 6, 7 & 9 – modified to add clarity
Rev 02: 06/07/17: Heading modified. Cl 1,8 & 9 modified for clarity
Rev 03: 05/10/17: Cl 2: Process added.

Scope

This Technical Delivery Conditions pertains to manufacturing and procurement of *Nickel Alloy* plates for Advanced Ultra Super Critical Power Station Piping conforming to Indian Boiler Regulations. Material shall be procured from manufacturers (not be procured from traders/ stockists).

1. General:

Specification	:	ASTM B168/ ASME SB168 (or) ASTM B564/ASME SB564 (Latest revision on the date of Purchase Order)
Material	:	*Nickel Alloy* UNS N06617
Additional Requirement	:	As listed below (Supplementary to Specification)
Size and Qty.	:	As per Purchase order

2. Chemical Composition & process:

Material shall be produced by using vacuum induction melting (VIM) followed by vacuum arc re-melting (VAR) or Electro slag refining (ESR). *Any other suitable melting and re-melting process shall be used, only after approval from the purchaser.*
Plates shall be **hot forged/rolled lengthwise**, solution treated and descaled.
Ladle analysis: 1 sample per cast. Product analysis: min 1 sample per plate as rolled/forged.
Full melt analysis shall be reported in Test certificate.

Element	Cr	Fe	Mn	Mo	Co	Al	C	Cu	B	Si	S	N	Ti	Ni
Wt %	21-23	1.5 max	0.3 max	8-10	11-13	0.8-1.3	0.05-0.08	0.05 max	0.002-0.005	0.3 max	0.008 max	0.05 max	0.3-0.5	Bal.

Raw materials used shall be checked by supplier to ensure freedom from radioactivity.

3. Dimension Tolerances:

As per SB168. Size as per purchase order.
Tolerances on thickness of plate shall be positive only.

4. Heat Treatment (as delivered condition):

UNS N06617 – solution annealed condition - 1150°C to 1175°C.

5. Mechanical Testing (on as delivered condition):

The test sample for each size/heat/HT batch; on final heat treated condition samples in transverse direction.
UNS N06617: Tensile Strength: Min 655 Mpa, Yield Strength (2% off set): Min 241 Mpa, Elongation: min 35%
Micro: Grain size ASTM 2-5. Test method as per ASTM E112.

6. Non Destructive Testing:

UT: 100% for all thickness. Testing method: SA 578 with acceptance Level B & SA 577
For plates <10mm, UT shall be done on mother plate/slab.
UT shall be done to ensure freedom from internal defects, laminations and material separations are not permissible.

7. Workmanship and Finish

The material shall be plain finish for industrial application, uniform in quality and condition, smooth, straight or flat and free of wrinkles, overlaps, tears, cracks and injurious imperfections. No repairs/weld repairs permitted.

8. Marking & Packing

All items shall be punched low stress stamp with 1) Specification, 2) Grade, 3) Heat No, 4) Maker's emblem and 5) Inspection Authorities Seal.
The Plates are to be properly packed and despatched to avoid damage during transit.

Haritha.C/ QA	Ravibharath.R / WRI	Vivekananda Yellu/ QA	Panneerselvam.G /MM	Ramani.K.V / Engg	Madhavankutty.A.P / Quality
Prepared by	Reviewed by				Approved by

9. Inspection & Certification: (in English only)

All items are to be Inspected at the manufacturer's works by IBR approved authorities.

Inspection certificate in IBR Form IV shall be submitted along with the Work Test Certificate (EN 10204 Type 3.2) countersigned by authorities as per IBR (if not well-known) and shall include the following (Three ink signed originals required):

1. Purchase Order No. (BHEL), TDG No. & Test certificate number.
2. Specification, Grade with applicable year of code, Heat Number, Quantity & Size
3. Details of ingot, Melting & rolling process, Chemistry including incidental elements - Heat wise.
4. Heat treatment details of the material, Mechanical test results with reference & acceptance standard.
5. Individual NDE reports with reference & acceptance standard on finished plates.

The following shall also be furnished:

6. Heat treatment chart
7. TC for raw material shall be provided.

10. Quality Plan

Before start of production the manufacturer shall submit a Manufacturing and Inspection plan (MIP) to BHEL approval.

The MIP shall constitute of: i) melting & refining, ii) ingot weight and type, iii) rolling process iv) NDE v) preliminary heat treatment, vi) internal tests and inspection before final heat treatment, vii) test and inspections after heat tratment, viii) marking preservation and dispatch, ix) test certificate requriements.

11. Audit Checks at BHEL

BHEL reserves the right to carry out audit checks at any stage of manufacture on representative test bars or job. Supplies found defective during check or subsequent processing at BHEL are liable for rejection.

Haritha.C/ QA	Ravibharath.R / WRI	Vivekananda Yellu/ QA	Panneerselvam.G /MM	Ramani.K.V / Engg	Madhavankutty.A.P / Quality
Prepared by	Reviewed by				Approved by