



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

TITLE

**Nickel Alloy Plates of various
thicknesses to Specn. SB 168 UNS
N06617, SB 443 UNS N06625 & SB 435
UNS N07740 (Code case 2702)**

Phone: +91 431 2574247/ 4203

Fax : +91 431 252 0719

Email : kjoe@bheltry.co.in

Reference Number Enquiry

1001700020

Enquiry Date:

10.07.2017

Due date for submission of quotation

29.07.2017

You are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order

Tenders are invited by the MM / Steel for 23094 kg of Nickel Alloy Plates of various thicknesses to Specn. SB 168 UNS N06617, SB 443 UNS N06625 & SB 435 UNS N07740 (Code case 2702)

BHEL commercial terms & conditions and all annexures can be downloaded from BHEL web site <http://www.bhel.com> or from the Government tender website <http://tenders.gov.in> (public sector units Bharat Heavy Electricals Limited) or from <http://bheleps.buyjunction.in> against RFQ/Enquiry reference "1001700020 "

Yours faithfully,
For **Bharat Heavy Electricals Limited**

DGM/ MM / Steel
Ph: 0431- 2574247/ 4203, Fax: 0431- 2520719
Email: kjoe@bheltry.co.in

Item details

Enq no: 1001700020 dt 10.07.2017

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 02, TDC: A-USC/HWR-002 Rev 00 & TDC: A-USC/VALVES-001 Rev 00 respectively.

Item Sl.No	Description	Qty (Kg)	Schedule Delivery date
1	PLATE 25X2000X5000 MM SB 168 UNS N06617 – 1 no	2,090.00	31.12.2017
2	PLATE 25X2000X2000 MM SB 168 UNS N06617 – 1 no	836.00	31.12.2017
3	PLATE 40X2000X5000 MM SB 168 UNS N06617 – 2 nos	6,688.00	31.12.2017
4	PLATE 40X2000X1000 MM SB 168 UNS N06617 – 1 no	668.80	31.12.2017
5	PLATE 65X2000X5000 MM SB 168 UNS N06617 – 2 nos	10,868.00	31.12.2017
6	PLATE 65X1000X500 MM SB 168 UNS N06617 – 1 no	271.70	31.12.2017
7	PLATE 40X500X500 MM SB 443 UNS N06625 – 16 nos	1,350.40	31.12.2017
8	PLATE 40X500X500 MM SB 435 UNS N07740 (CODE CASE 2702)– 4 nos	322.00	31.12.2017
TOTAL		23094.90	

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 02
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.

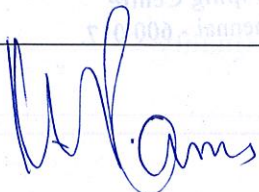
Pre-Qualification Requirements (PQR) for the procurement through Open Tender for Nickel alloy Plates conforming to ASME SB168 / ASME SB564 UNS N06617 with reference to AUSC/TDG: 117/02 (or) Latest Revision.

A) Organizational Capability:

1. Material shall be from manufacturers of Nickel based alloys, ref to Pt. No-3 below, (preferably for high temperature service) conforming to International standards having hot rolling facility. The plate manufacturers shall have required Plate Rolling, Machining and Testing facilities also. Offer from traders, re-rollers, fabricators and stockist are not acceptable and shall not be considered for evaluation.

Vendor to indicate the nature of the firm.

2. Suppliers without basic manufacturing facilities in-house, shall not be considered for evaluation. In house facilities for hot rolling, Heat Treatment & Non-Destructive Testing are mandatory requirements for consideration of the offer. Heat treatment furnace calibration certificate issued by approved agency/statutory bodies alongwith procedure for calibration shall be submitted.
3. If the supplier is not having nickel alloy melting facility, then source of raw material shall be informed. The nickel alloy manufacturer shall be IBR approved well-known steel maker. In case of nickel alloy manufacturer not approved by IBR as well-known steel maker, then material test certificate shall be certified by IBR approved inspecting authority. If the supplier is dependent on more than one source for nickel alloy making, all the sources shall be indicated, and the supplies shall be restricted to the indicated list of raw material suppliers. For the submitted raw material sources, the supplier shall confirm that the raw material test certificate/s will be furnished along with product test certificate/s.
4. Chemical, Mechanical testing shall be done in-house calibrated facility or at Labs certified as per ISO 17025 or Government approved Laboratories.
5. Suppliers shall submit a valid ISO 9001 certificate or Equivalent Quality Management System Certificate.
6. BHEL reserves the right to visit supplier works to audit & inspect to ensure the capability.
7. BHEL reserves the right to inspect the items ordered at any stage at vendor's works and if found not meeting the stipulated conditions, items shall be liable for rejection.
8. BHEL reserves the right to inspect the first lot of materials at vendor's works for giving clearance before bulk production.

	
K.V. RAMANI Engineering 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

B) Technical Competence:

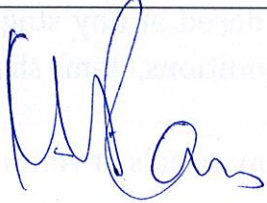
1. Point by point confirmation to the TDC ref: **TDG: 117/02 (or) Latest Revision** Requirements is mandatory for consideration of offer.
2. Suppliers shall submit the list of facilities available at the mill (Raw material to finished product), manufacturing process flow chart & manufacturing quality plan to meet the TDC ref: **TDG: 117/02 (or) Latest Revision** requirements along with technical bid.
3. Suppliers shall submit the experienced manpower details specific to Manufacturing, Quality and NDE requirements.
4. Suppliers shall have to give UT-reference block used for ultrasonic testing of plates along with the main supply.
5. 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 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. Foreign 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.

	
K.V. RAMANI Addl. General Manager / Engineer BHEL / Piping Centre T. Nagar, Chennai - 600 017	VIVEKANANDA YELLU Dy. Manager / Quality BHEL / Piping Centre T. Nagar, Chennai - 600 017. 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. Manufacturers of Nickel based alloy plates (preferably for high temperature service) conforming to National / International standards and having rolling mills/facility are only eligible to participate. Offer from traders, re-rollers, fabricators and stockists are not acceptable and will not be considered for evaluation. Vendor to indicate the nature of the firm.
2. Suppliers without basic manufacturing facilities in-house, shall not be considered for evaluation. In house facilities for hot rolling, Heat Treatment & Non-Destructive Testing are mandatory requirements for consideration of the offer.
3. If the supplier is not having nickel alloy melting facility, then source of raw material shall be informed. The nickel alloy manufacturer shall be from BHEL approved well known maker or material test certificate shall be certified by BHEL approved inspecting authority. If the supplier is dependent on more than one source for nickel alloy making, *all the sources should be indicated, and the supplies should be restricted to the indicated list of raw material suppliers.* For the submitted raw material sources, the supplier shall confirm that the raw material test certificate/s will be furnished along with product test certificate/s.
4. Chemical, Mechanical testing shall be done in-house or at Labs certified as per ISO 17025 or Government approved Laboratories
5. Suppliers shall submit a valid ISO 9001 certificate or Quality Management System Certificate or Written-down Procedures.
6. BHEL reserves the right to visit supplier works to audit & inspect to ensure the capability for technical evaluation.
7. BHEL reserves the right to inspect the item ordered at any stage at vendor's works and if found not meeting the stipulated conditions, material is liable for rejection.
8. BHEL reserves the right to inspect the first lot of materials at vendor's works for giving clearance before bulk production.

B) Technical Competence:

1. Point by point confirmation to the TDC requirements is mandatory for consideration of offer.
2. Suppliers shall submit the list of facilities available at the mill/Plant

(Raw material to finished product), manufacturing process flow chart & manufacturing quality plan to meet the TDC requirements along with technical bid.

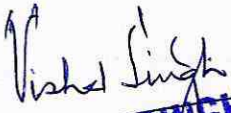
3. Suppliers shall submit the experienced manpower details specific to Manufacturing, Quality and NDE requirements.
4. Suppliers has to give BHEL the calibration block used for ultrasonic testing of plates along with the main supply.
5. Manufacturer's test certificates (MTC), Ultrasonic test report as per TDC requirement to be submitted for BHEL approval before dispatch.

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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Development Engineer
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R. SUBBARAYALU
Addl. General Manager
Welding Research Institute
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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. Manufacturers of Nickel based alloy plates (preferably for high temperature service) conforming to National / International standards having rolling mills/facility are only eligible to participate. Offer from traders, re-rollers, fabricators and stockists are not acceptable and will not be considered for evaluation. Vendor to indicate the nature of the firm.
2. Suppliers without basic manufacturing facilities in-house, shall not be considered for evaluation. In house facilities for hot rolling, Heat Treatment & Non-Destructive Testing are mandatory requirements for consideration of the offer.
3. If the supplier is not having nickel alloy melting facility, then source of raw material shall be informed. The nickel alloy manufacturer shall be from BHEL approved well known maker or material test certificate shall be certified by BHEL approved inspecting authority. If the supplier is dependent on more than one source for nickel alloy *making, all the sources should be indicated, and the supplies should be restricted to the indicated list of raw material suppliers.* For the submitted raw material sources, the supplier shall confirm that the raw material test certificate/s will be furnished along with product test certificate/s.
4. Chemical, Mechanical testing shall be done in-house or at Labs certified as per ISO 17025 or Government approved Laboratories.
5. Suppliers shall submit a valid ISO 9001 certificate or Quality Management System Certificate or Written-down Procedures.
6. BHEL reserves the right to visit supplier works to audit & inspect to ensure the capability for technical evaluation.
7. BHEL reserves the right to inspect the item ordered at any stage at vendor's works and if found not meeting the stipulated conditions, material is liable for rejection.
8. BHEL reserves the right to inspect the first lot of materials at vendor's works for giving clearance before bulk production.

B) Technical Competence:

1. Point by point confirmation to the TDC requirements is mandatory for

consideration of offer.

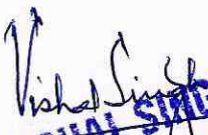
2. Suppliers shall submit the list of facilities available at the mill/plant (Raw material to finished product), manufacturing process flow chart & manufacturing quality plan to meet the TDC requirements along with technical bid.
3. Suppliers shall submit the experienced manpower details specific to Manufacturing, Quality and NDE requirements.
4. Suppliers has to give BHEL the calibration block used for ultrasonic testing of plates along with the main supply.
5. Manufacturer's test certificates (MTC), Ultrasonic test report as per TDC requirement to be submitted for BHEL approval before dispatch.

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.

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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 agency and separate Test certificate in English language (with following details), shall accompany the product:
 1. Purchase Order No. Technical Specifications 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 (Ladle & 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 treatment, viii) marking preservation and dispatch, ix) test certificate requirements.

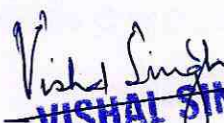
11. Audit Checks at BHEL

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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 Bharat Heavy Electricals Limited
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VISHAL SINGH
 Development Engineer
 Welding Research Institute
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 Tiruchirappalli - 620 014.

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 %	23.5 -	3.0	1.0	2.0	15 -	0.2 -	0.005 -	0.5
weight	25.5	max	max	max	22	2.0	0.08	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 agency 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 Nickel alloy used in making the finished product.
 4. Melting & rolling process, Chemistry (Ladle & 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 treatment, viii) marking preservation and dispatch, ix) test certificate requirements.

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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BHEL Piping Centre	Quality Assurance	Technical Delivery Conditions
Product: Nickel Alloy Plates of UNS N06617 for Advanced Ultra Super Critical (AUSC) Boiler		
Document No. TDG: 117	Rev.No.02	Effective Date: 06/07/2017
		Page 1 of 2

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

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 only (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).

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.

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.

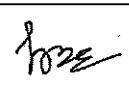
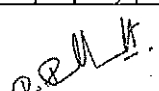
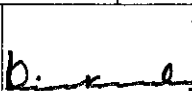
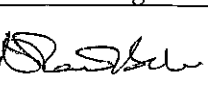
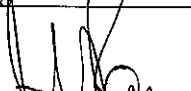
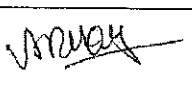
7. Workmanship and Finish

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 treatment, viii) marking preservation and dispatch, ix) test certificate requirements.

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
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