

BHARAT HEAVY ELECTRICALS LIMITED
HEEP HARIDWAR INDIA-PIN 249403
FAX NO: 0091 1334 226462/223948
PHONE NO: 0091 1334 284144

Sub: Requirement of Alloys Steel Plates

The Heavy Electricals Equipment Plant (HEEP) located in Haridwar, India is one of the major manufacturing plants of Bharat Heavy Electricals Ltd. The core business of HEEP includes design and manufacture of large steam turbines, turbo generators and so on.

Bids are invited for following items through GeM Portal- <https://gem.gov.in>

Item Description	Mat. Code	Size (mm)	Qty. (Kg)	Delivery
ALLOY STEEL PLATES OF GRADE - 16MO3 SPEC: HW10570 Rev.03	HW1051870038	10 x 1250 x 4000	1570	15/02/2024
	HW1051870160	90 x 2000 x 6000	17000	15/02/2024
15MO3 - Z15 ALLOY STEEL PLATES SPEC: HW10564 Rev.02	HW1051864046	25 x 2200 x 8000	6900	15/02/2024

Remarks-

1. Delivery period mentioned in enquiry is indicative, bidders to quote their best possible delivery.
2. Quantity tolerance $\pm 10\%$ is acceptable in view of dimensional tolerances.
3. **Risk Purchase:** In case of abnormal delays (beyond the maximum late delivery period as per LD clause in supplies / defective supplies or nonfulfillment of any other terms and conditions given in Purchase Order, BHEL may cancel the Purchase Order in full or part thereof, and may also make the purchase of such material from elsewhere / alternative source at the risk and cost of the supplier. BHEL will take all reasonable steps to get the material from alternate source at optimum cost. If bidder does not agree to the above Risk Purchase Clause, BHEL reserves the right to reject the offer.

In case for compelling reasons BHEL accepts the offer without acceptance of this clause by the bidder and in the eventuality of Risk Purchase, appropriate action will be taken as per BHEL extant rules. This will be without prejudice to any other right of BHEL under the contract or under General Law.

Action against Bidders / vendor / supplier / contractor in case of default:

In order to protect the commercial interests of BHEL, BHEL shall take action against supplies / contractors by way of suspension of business dealings, who either fail to perform or are in default without any reasonable cause, cause loss of business/ money/ reputation, indulge in malpractices, cheating, bribery, fraud or any other misconduct or formation of cartels so as to influence the bidding process or influence the price etc.

Suspension of Business Dealings could be in the form of "Hold" or "Banning" a supplier/ contractor or a bidder and shall be as per "Guidelines for Suspension of Business Dealings with Suppliers/ Contractors" available at BHEL's website ["https://www.bhel.com/guidelines-suspension-business-dealings-supplierscontractors"](https://www.bhel.com/guidelines-suspension-business-dealings-supplierscontractors)

4. Payment terms shall be as follows:

Type of Bidder	Payment Terms (Number of days)
Micro & Small Enterprises (MSEs)	45 days
Medium Enterprises	60 days
Non MSME	90 days

5. EMD will be applicable (Amount as mentioned in bid document), however EMD is waived in following cases-

- a. Central/ State – PSUs
- b. As per government guidelines, MSE suppliers are exempted for submission of EMD (Valid Documentary proof against MSE must be submitted along with offer to avail the benefits).
- c. The vendors registered with BHEL (HEEP), Haridwar are also exempted from EMD.
- d. Other exemptions on EMD will be as per GeM Terms and conditions.

Note: Benefits of MSE (such as EMD Waiver, Tender fee exemption, Price preference, Payment preference etc.) will be given only to those MSE Vendors who are manufacturers of offered items against the NIT. No MSE benefits shall be provided to Agents / Stockists / Dealers / Traders etc. for the items offered but not manufactured by themselves.

6. “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 the bidding process, if”

- a. They have controlling partner (s) in common; **or**
- b. They receive or have received any direct or indirect subsidy/financial state 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:

Tender No. F/F219/23/1577/K1

1. The principal manufacturer directly or through one Indian agent on his behalf;
and
2. 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. Bidder must proactively declare such sister/ common business/ management units in same/ similar line of business.”

Pre- Qualification Requirements

PQR Clause	Requirements	Vendor response										
1	<p>Past Experience Requirement: Vendor should have supplied alloy steel plates in material grade 16Mo3 / ASTM A204 Grade B or higher Cr-Mo / Cr-Mo-V etc. against at least one purchase order in last seven years on enquiry issue date. In support of above, vendor to submit details of at least one past supply in format given below:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Sl. No.</th> <th style="text-align: center;">Plate Dimension (Thick. X Width X Length)</th> <th style="text-align: center;">Material Grade</th> <th style="text-align: center;">Name of customer/Purchase order No/Date of Supply</th> <th style="text-align: center;">Quantity</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Vendor to submit copy of purchase order and its correlated material test certificates with dispatch documents of above-mentioned purchase order.</p>	Sl. No.	Plate Dimension (Thick. X Width X Length)	Material Grade	Name of customer/Purchase order No/Date of Supply	Quantity	1					
Sl. No.	Plate Dimension (Thick. X Width X Length)	Material Grade	Name of customer/Purchase order No/Date of Supply	Quantity								
1												
2	<p>Manufacturing & Testing Facility details:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="text-align: center;">a</td> <td>Vendor to confirm that have manufacturing facilities like steel melting, rolling and heat treatment to manufacture plates of enquiry material grade and dimensions. Details of facility to be submitted.</td> </tr> <tr> <td style="text-align: center;">b</td> <td>Vendor to confirm that they have all testing facility (in-house / outsourced) to carry out testing as per enquiry drawing and specification. In case of outsourcing of any test, vendor to agree for testing at NABL accredited labs only.</td> </tr> <tr> <td style="text-align: center;">c</td> <td>Bureau of Indian Standard (BIS) approved vendors are exempted from submitting manufacturing & testing facilities details against 2a & 2b above. For this vendor to submit valid BIS certificate of their approval for plates of IS:2002 / IS:2041.</td> </tr> </tbody> </table>	a	Vendor to confirm that have manufacturing facilities like steel melting, rolling and heat treatment to manufacture plates of enquiry material grade and dimensions. Details of facility to be submitted.	b	Vendor to confirm that they have all testing facility (in-house / outsourced) to carry out testing as per enquiry drawing and specification. In case of outsourcing of any test, vendor to agree for testing at NABL accredited labs only.	c	Bureau of Indian Standard (BIS) approved vendors are exempted from submitting manufacturing & testing facilities details against 2a & 2b above. For this vendor to submit valid BIS certificate of their approval for plates of IS:2002 / IS:2041.					
a	Vendor to confirm that have manufacturing facilities like steel melting, rolling and heat treatment to manufacture plates of enquiry material grade and dimensions. Details of facility to be submitted.											
b	Vendor to confirm that they have all testing facility (in-house / outsourced) to carry out testing as per enquiry drawing and specification. In case of outsourcing of any test, vendor to agree for testing at NABL accredited labs only.											
c	Bureau of Indian Standard (BIS) approved vendors are exempted from submitting manufacturing & testing facilities details against 2a & 2b above. For this vendor to submit valid BIS certificate of their approval for plates of IS:2002 / IS:2041.											

Note: In case of trader / stockiest, details of principal manufacturer for point 1 & 2 are to be submitted.

Sl. No.	Quality Requirements	Vendor's confirmation (Y/N)
01	Testing and certification as per ordering specifications and documents.	
02	Plates to be supplied from manufacturers those are original steel producers only.	

Signature with stamp

Name:

Name of Firm:

Designation:

Date:

Self-Certification for local content

In line with Government Public Procurement Order 2017 dated 16.09.2020, we hereby certify that we

.....
(supplier name) inform that local content is% (indicate percentage of local content) and are

Class- I local supplier (meeting requirement of)-

Minimum Local content 50%

or

Class- II local supplier (meeting requirement of)-

Minimum Local content 20%

(mark wherever applicable)

defined by Nodal Ministries/ Departments as per above order for the material against Enquiry No.

.....
Details of location at which local value addition will be made is as follows:

.....
.....
.....

We also understand, false declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law.

Seal and Signature of Supplier

(Specification: HW10564 Rev 02)

(For Mat Code: HW1051864046)

&

(Specification: HW10570 Rev 03)

(For Mat Code: HW1051870038 and HW1051870160)

दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)	HW10564 पृष्ठ का Page 1 of 3
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SUPERSEDES INVENTORY NO.	TLV 9170 Part 20, 07/14	HEAT RESISTANT PLATE STEEL GRADE 16Mo3+Z15
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1.0 GENERAL:
 This material specification governs the quality of heat resistant plate of steel grade 16Mo3+Z15, material no 1.5415 as per EN10028-2.
 Plates as per ASTM A204 Gr B + Z15 or SB480M+N+Z15 as per JIS G3103 are also acceptable for plates upto 150mm thickness subject meeting the following requirements of this specification.

2.0 APPLICATION:
 The plate shall be used for manufacture of turbine and generator components.

3.0 CONDITION OF DELIVERY:
 The plate shall be supplied in normalized condition.

4.0 DIMENSION AND TOLERANCES:
 The plate shall be supplied to the dimensions as per purchase order and tolerances shall be as per EN10029, class C

5.0 HEAT-TREATMENT:
 Plates shall be normalized at 890 -950°C.

6.0 PROPERTIES:
 Chemical composition and mechanical properties of plate shall be meet any one of the following three material grade (a/b/c) given below:
(a) 16Mo3+Z15, material no 1.5415, EN10028 - 2

C	Si	Mn	Mo	S	P	Cr	Cu	N	Ni
0.12 - 0.20	≤ 0.35	0.40 - 0.90	0.25 - 0.35	≤ 0.010	≤ 0.025	≤ 0.30	≤ 0.30	≤ 0.012	≤ 0.30

The tensile and impact test shall be tested on specimen taken perpendicular to rolling direction and following properties shall be achieved at room temperature.

Thickness (t) (mm)	Yield strength N/mm ²	Tensile strength N/mm ²	Elongation L=5d %	Impact Energy J* (20 °C)
t ≤ 16	≥ 275	440 - 590	≥ 22	≥ 31
16 < t ≤ 40	≥ 270	440 - 590		
40 < t ≤ 60	≥ 260	440 - 590		
60 < t ≤ 100	≥ 240	430 - 580		
100 < t ≤ 150	≥ 220	420 - 570		
150 < t ≤ 250	≥ 210	410 - 570		

* Average of 3 Charpy V notch specimens, Minimum value ≥ 70% specified value.

दिनांक एवं हस्ताक्षर SIGN & DATE 27/04/18	नाम NAME D. GANGWAL	नाम एवं हस्ताक्षर SIGNATURE & DATE G. KRISHNAN 19.4.18	नाम NAME SUBODH RANA	नाम एवं हस्ताक्षर SIGNATURE & DATE 19.4.18
दिनांक एवं हस्ताक्षर SIGN & DATE P. 3202	नाम NAME U. K. PANDA	नाम एवं हस्ताक्षर SIGNATURE & DATE P. K. BANSAL 19.4.18	नाम एवं हस्ताक्षर SIGNATURE & DATE ASHISH RANJAN 19.4.18	नाम एवं हस्ताक्षर SIGNATURE & DATE GOPAL KRISHNAN 19.4.18
संस्थान मानकीकरण समिति APPROVED : PLANT STANDARDIZATION COMMITTEE		स्विकृति APPROVED : MTE		जारी ISSUED : TSX
सहायक विभाग AGREED DEPTT.	नाम NAME 02 (SUPERSEDES)	दिनांक एवं हस्ताक्षर DATE & SIGNATURE 21.04.18	दिनांक DATE : 07.10.91	दिनांक DATE : 07.10.91
CHANGE ADVICE NO.	TSX (MTE) - 18-24	निर्याण PREPARED : MTE		जारी ISSUED : TSX



संस्थान क्रय विनिर्देश (हीप : हरिद्वार)

HW10564

PLANT PURCHASE SPECIFICATION
(HEEP: HARIDWAR)

पृष्ठ का
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संस्थान क्रय विनिर्देश
SIGN & DATE

SUPERSEDES
INVENTORY NO.

संस्थान क्रय विनिर्देश
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संस्थान क्रय विनिर्देश

संस्थान क्रय विनिर्देश
SIGN & DATE

- Through thickness tension test (quality class Z15) shall be performed according to EN 10164 per lot, where 1 lot consists of up to 4 plates of the same thickness and melt.

(b) ASTM A 204, Gr B + Z15: For thickness upto 150 mm (with additional requirements)

C	Si	Mn	Mo	S	P	Cr
≤ 0.20 / ≤ 0.23*	0.15- 0.40	0.40 - 0.90	0.45 - 0.60	≤ 0.015	≤ 0.025	≤ 0.30
Cu	N	Ni				
≤ 0.40	≤ 0.012	≤ 0.40				

*C: ≤ 0.23 for plate thickness > 25mm;

The tensile and impact test shall be tested on specimen taken perpendicular to rolling direction and following properties shall be achieved at room temperature.

Thickness(t) (mm)	Yield strength N/mm ²	Tensile strength N/mm ²	Elongation L=5d %	Impact Energy J* (20 °C)
t ≤ 16	≥ 275	440 – 620	≥ 21	≥ 31
16 < t ≤ 40	≥ 270			
40 < t ≤ 60	≥ 260			
60 < t ≤ 100	≥ 240			
100 < t ≤ 150	≥ 220	420 - 620		

* Average of 3 Charpy V notch specimens, Minimum value ≥ 70% specified value.

- Through-thickness tension test shall be performed according to ASTM A 770 per lot, where 1 lot consists of up to 4 plates of the same thickness and melt.

(c) SB480M+N+Z15 as per JIS G3103: For thickness upto 150 mm (with additional requirements)

C	Si	Mn	Mo	S	P	Cr
≤ 0.20 / ≤ 0.23*	0.15- 0.40	0.40 - 0.90	0.45 - 0.60	≤ 0.015	≤ 0.020	≤ 0.30
Cu	N	Ni				
≤ 0.30	≤ 0.012	≤ 0.30				

*C: ≤ 0.23 for plate thickness > 25mm

The tensile and impact test shall be tested on specimen taken perpendicular to rolling direction and following properties shall be achieved at room temperature.

Thickness(t) (mm)	Yield strength N/mm ²	Tensile strength N/mm ²	Elongation L=5d %	Impact Energy J* (20 °C)
t ≤ 16	≥ 275	440 – 620	≥ 21	≥ 31
16 < t ≤ 40	≥ 270	440 – 620		
40 < t ≤ 60	≥ 260	440 – 620		
60 < t ≤ 100	≥ 240	430 – 620		
100 < t ≤ 150	≥ 220	420 - 620		

* Average of 3 Charpy V notch specimens, Minimum value ≥ 70% specified value.

संस्थान क्रय विनिर्देश
INVENTORY NO.

02

REV. NO.

02

निर्माणकर्ता
WORKED BY


S.RANA

19.04.2018

जांचकर्ता
CHECKED BY

A. RANJAN

19.04.2018

REVIEWER SIGN & DATE		संस्थान क्रय विनिर्देश (हीप : हरिद्वार)	HW10564
		PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)	पृष्ठ का Page 3 of 3

• Through thickness tension test shall be performed according to JIS G3199 per lot, where 1 lot consists of up to 4 plates of the same thickness and melt.

Aluminium content shall be determined and reported in inspection reports for all the above three grades. Elements not listed in table above shall not be intentionally added to the steel without the agreement of the purchase except for finishing the cast.

7.0 OUTER AND INNER QUALITY / NON DESTRUCTIVE TESTING:

7.1 SURFACE CONDITION:
 As per EN 10163-2, class B. Welding repair not permitted.

7.2 SCOPE OF INSPECTION:
 Following NDE shall be performed in delivery condition:

- Verification inspection of all plates
- UT inspection shall be according to EN10160. The criteria for registration and decision of quality class S1 according to EN 10160 (table 3) shall be applied and fulfilled; where 10 clusters of heterogeneities in the square of 1m x 1m with the highest density are the maximum acceptable number.

8.0 TEST CERTIFICATES:
 The supplier shall supply four copies of test certificates as per EN 10204, certificate 3.1 B, unless otherwise stated on the order. The test certificates shall bear the following:

- BHEL References:
- Specification number, Purchase order no.
- Suppliers references: Name, emblem, material designation, melt no., heat treatment batch no.

Results of testing



- Melting process, melt analysis
- Details of Heat-treatment performed,
- Mechanical and Impact test results
- U.T. Results
- Confirmation of the verification inspection

9.0 MARKING:
 The marking of the materials shall be such that heat no., steel grade/specification & manufacturer name / identifications are legible.

10.0 CLEARANCE FOR DELIVERY:
 The total results of the tests carried out are the deciding factor for clearance for delivery. BHEL shall evaluate the total results taking into consideration the intended use of the material and examines accordingly the permissibility of deviation (if any) from the specified properties. The clearance however does not relieve the supplier of his responsibility for the hidden non-permissible defects, which are found later.

11.0 FREEDOM FROM DEFECTS:
 Plate shall be free from defects such as cracks, flacks, seams, segregation, inclusion and other defects which may affect the utility of the plates.


12.0 CROSS REFERRED STANDARDS: EN 10028, EN 10029 ASTM A204, JIS G3103, EN 10160, EN 10163, EN 10204, ASTM A770, EN10164, JIS G3199

सापेक्षी सूची संख्या INVENTORY NO. R3202	REV. NO. 02	निर्माणकर्ता WORKED BY S.RANA		19.04.2018
		जांचकर्ता CHECKED BY A. RANJAN		19.04.2018

SUPERSEDES
INVENTORY NO.

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सत्यविकार एवं बोधोत्थिव
 वा सत्ये के ही मूल्य प्राप्त होंगे क्योंकि विक्रय की शर्तों में सत्य व सत्य एवं सत्य के ही मूल्य प्राप्त होंगे, जो कि विक्रय के लिए में सुविधाएँ न होंगी

REVIEWER
SIGN & DATE


Rev. सं. संकेत SIGN & DATE		संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)	HW10570 पृष्ठ का Page 1 of 3
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SUPERSEDES INVENTORY NO.	TLV 9170 Part 04, 07/14	HEAT RESISTANT PLATE STEEL GRADE 16Mo3
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1.0 GENERAL:

This material specification governs the quality of heat resistant plate of steel grade 16Mo3, material no 1.5415 as per EN10028-2.
 Plates as per ASTM A204 Gr B or SB480M+N as per JIS G3103 are also acceptable for plates upto 150mm thickness subject to meeting the following additional requirements of this specification.

2.0 APPLICATION:

The plate shall be used for manufacture of turbine and generator components.

3.0 CONDITION OF DELIVERY:

The plate shall be supplied in normalized condition.

4.0 DIMENSION AND TOLERANCES:

The plate shall be supplied to the dimensions as per purchase order and tolerances as per EN 10029, class C

5.0 HEAT-TREATMENT:

Plates shall be normalized at 890 - 950°C.

6.0 PROPERTIES:

Chemical composition and mechanical properties of plate shall be meet any one of the following three material grade (a/b/c) given below:

(a) 16Mo3, material no 1.5415, EN10028 - 2

C	Si	Mn	Mo	S	P	Cr
0.12 - 0.20	≤ 0.35	0.40 - 0.90	0.25 - 0.35	≤ 0.010	≤ 0.025	≤ 0.30
Cu	N	Ni				
≤ 0.30	≤ 0.012	≤ 0.30				

The tensile and impact test shall be tested on specimen taken perpendicular to rolling direction and following properties shall be achieved at room temperature.

Thickness(t) (mm)	Yield strength N/mm ²	Tensile strength N/mm ²	Elongation L=5d %	Impact Energy J *(20°C)
t ≤ 16	≥ 275	440 - 590	≥ 22	≥ 31
16 < t ≤ 40	≥ 270	440 - 590		
40 < t ≤ 60	≥ 260	440 - 590		
60 < t ≤ 100	≥ 240	430 - 580		
100 < t ≤ 150	≥ 220	420 - 570		
150 < t ≤ 250	≥ 210	410 - 570		

* Average of 3 Charpy V notch specimens, Minimum value ≥ 70% specified value.

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संस्थापक एवं गोपनीय
 इस दस्तावेज में दी गई सूचना भारत भारती उपकरणों लिमिटेड की संपत्ति है। इसका प्रयोग एवं प्रसारण केवल के लिए ही किया जा सकता है। अन्य किसी भी उद्देश्य के लिए इसका उपयोग नहीं किया जा सकता।

Rev. सं. संकेत SIGN & DATE 27/11/18	
INVENTORY NO. P-3726	

TSX	D. GANGULI	नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE
PSC	G.KRISHNAN	अनुवादक TRANSLATED BY	
QAX	U. K. PANDA	निर्माणांकक WORKED BY	SUBODH RANA
STE	P. K. BANSAL	जांचकर्ता CHECKED BY	ASHISH RANJAN
सहमत विभाग AGREED DEPT.	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्यवेक्षणकर्ता SUPERVISED BY
			GOPAL KRISHNAN
स्वीकृति APPROVED : संस्थान मानकीकरण समिति PLANT STANDARDIZATION COMMITTEE			Gr. NO. 2.60
REV.NO.	03	निर्माण PREPARED : MTE	जारी ISSUED : TSX
DI	21.04.18	दिनांक DATE : 02.12.91	
CHANGE ADVICE NO.	TSX(MTE)-18-25		



संस्थान क्रय विनिर्देश (हीप : हरिद्वार)

HW10570

**PLANT PURCHASE SPECIFICATION
(HEEP: HARIDWAR)**

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संस्था के अधिकारी
SIGN & DATE

सुपेर्सिडिंग नंबर
INVENTORY NO.

संस्था की वेबसाइट पर
अधिकारिक वेबसाइट

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स्वामित्व अधिकार एवं गोपनीयता
इस प्रतीक में की गई सूचना भारत हीवी इलेक्ट्रिकल्स लिमिटेड की संपत्ति है। इसका प्रयोग
एवं आसपास रूप से किसी भी तरह से प्रयोग, जो कि संस्था के हित में सुविधाजनक हो न किया
जाए।

संस्था के अधिकारी
SIGN & DATE

(b) ASTM A 204, Gr B: For thickness upto 150 mm (with additional requirements)

C	Si	Mn	Mo	S	P	Cr
≤ 0.20 / ≤ 0.23*	0.15- 0.40	0.40 - 0.90	0.45 - 0.60	≤ 0.015	≤ 0.025	≤ 0.30
Cu	N	Ni				
≤ 0.40	≤ 0.012	≤ 0.40				

*C: ≤ 0.23 for plates thickness > 25mm;

The tensile and impact test shall be tested on specimen taken perpendicular to rolling direction and following properties shall be achieved at room temperature.

Thickness(t) (mm)	Yield strength N/mm ²	Tensile strength N/mm ²	Elongation L=5d %	Impact Energy J *(20°C)
t ≤ 16	≥ 275	440 – 620	≥ 21	≥ 31
16 < t ≤ 40	≥ 270			
40 < t ≤ 60	≥ 260	430 - 620	≥ 21	≥ 31
60 < t ≤ 100	≥ 240			
100 < t ≤ 150	≥ 220	420 - 620		

* Average of 3 Charpy V notch specimens, Minimum value ≥ 70% specified value.

(c) SB480M+N as per JIS G3103, For thickness upto 150 mm (with additional requirements)

C	Si	Mn	Mo	S	P	Cr
≤ 0.20 / ≤ 0.23*	0.15- 0.40	0.40 - 0.90	0.45 - 0.60	≤ 0.015	≤ 0.020	≤ 0.30
Cu	N	Ni				
≤ 0.30	≤ 0.012	≤ 0.30				

*C: ≤ 0.23 for plates thickness > 25mm

The tensile and impact test shall be tested on specimen taken perpendicular to rolling direction and following properties shall be achieved at room temperature.

Thickness(t) (mm)	Yield strength N/mm ²	Tensile strength N/mm ²	Elongation L=5d %	Impact Energy J *(20°C)
t ≤ 16	≥ 275	440 – 620	≥ 21	≥ 31
16 < t ≤ 40	≥ 270	440 – 620		
40 < t ≤ 60	≥ 260	440 – 620	≥ 21	≥ 31
60 < t ≤ 100	≥ 240	430 – 620		
100 < t ≤ 150	≥ 220	420 - 620		

* Average of 3 Charpy V notch specimens, Minimum value ≥ 70% specified value.

Aluminium content shall be determined and reported in inspection reports for all the above three grades. Elements not listed in table above shall not be intentionally added to the steel without the agreement of the purchase except for finishing the cast.

संस्था की वेबसाइट पर
INVENTORY NO.


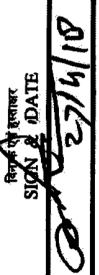


REV. NO.
03

निर्माणकर्ता
WORKED BY
S.RANA

19.04.2018

जांचकर्ता
CHECKED BY
A. RANJAN

19.04.2018

दिनांक एवं संकेत SIGN & DATE		संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)	HW10570 पृष्ठ का Page 3 of 3
सुपरसेडस INVENTORY NO. भारतीय नौका सेवा की संज्ञांकित संख्या है	7.0 OUTER AND INNER QUALITY / NON DESTRUCTIVE TESTING: 7.1 SURFACE CONDITION: As per EN 10163-2, class B. Welding repair not permitted. 7.2 SCOPE OF INSPECTION: Following NDE shall be performed in delivery condition: <ul style="list-style-type: none"> - Verification inspection of all plates - UT inspection shall be according to EN10160. The criteria for registration and decision of quality class S1 according to EN 10160 (Table 3) shall be applied and fulfilled; where 10 clusters of heterogeneities in the square of 1m x 1m with the highest density are the maximum acceptable number. 		
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	8.0 TEST CERTIFICATES: The supplier shall supply four copies of test certificates as per EN 10204, certificate 3.1 B, unless otherwise stated on the order. The test certificates shall bear the following: <ul style="list-style-type: none"> - BHEL References: - Specification number, Purchase order no. - Suppliers references: Name, emblem, material designation, melt no., heat treatment batch no. Results of testing <ul style="list-style-type: none"> - Melting process, melt analysis - Details of Heat-treatment performed - Mechanical and impact test results - U.T. Results - Confirmation of the verification inspection 		
स्वत्वाधिकार एवं गोपनीय यह प्रलेख मे की गई सूचना भारत भारती एलेक्ट्रिकल लिमिटेड की संपत्ति है। सूचना प्रलेख एवं आसपास रूप से किसी भी रूप में प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किता	9.0 MARKING: The marking of the materials shall be such that heat no., steel grade/specification & manufacturer name / identifications are legible. 10.0 CLEARANCE FOR DELIVERY: The total results of the tests carried out are the deciding factor for clearance for delivery. BHEL shall evaluate the total results taking into consideration the intended use of the material and examines accordingly the permissibility of deviation (if any) from the specified properties. The clearance however does not relieve the supplier of his responsibility for the hidden non-permissible defects, which are found later.		
दिनांक एवं संकेत SIGN & DATE 	11.0 FREEDOM FROM DEFECTS: Plate shall be free from defects such as cracks, flacks, seams, segregation, inclusion and other defects which may affect utility of the plates. 12.0 CROSS REFERRED STANDARDS: EN 10028, EN 10029, ASTM A 204 , JIS G3103, EN 10160, EN 10163, EN 10204		
भारतीय नौका सेवा INVENTORY NO. P-3126	REV. NO. 03	निर्माणकर्ता WORKED BY S.RANA	 19.04.2018 जांचकर्ता CHECKED BY A. RANJAN  19.04.2018