

SUPERSEDES INVENTORY NO
 सागरी सूची संख्या को अधिकृत करना है

SEAMLESS TITANIUM TUBES

1. GENERAL:

This specification governs the quality of Seamless Titanium Tubes, Grade 2 for use in condensers and heat exchangers.

2. APPLICATION:

For use in surface condensers and heat-exchangers.

3. CONDITION OF DELIVERY:

Annealed.

4. COMPLIANCE WITH STANDARDS:

The tubes shall comply with the requirements of ASME SB338, latest edition, along with following clarifications/details:-

a) Refer ASME SB338, Clause 4. Ordering Information:


Clause 4.1.7 Product Analysis is required.


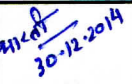
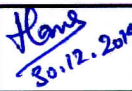
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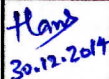
स्वाधिकार एवं गोपनीय
 इस दस्तावेज में दी गई सूचना भारत हेवी एलेक्ट्रिकल लि. की सम्पत्ति है. इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।


दिनांक एवं हस्ताक्षर
 SIGN & DATE


				नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE
PSC Member	DEEPAK KUMAR	<i>Deepak</i> 30/12/14	अनुवादक TRANSLATED BY		
QAX	SUGANDH	<i>Sugandh</i> 30/12/14	निर्माणकर्ता WORKED BY	R C BHARTI	<i>RC</i> 30.12.2014
			जांचकर्ता CHECKED BY	NAMAN HANS	<i>Naman</i> 30.12.2014
सहमत विभाग AGREED DEPTT.	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्यवेक्षणकर्ता SUPERVISED BY	SHASHI KANT	<i>Skant</i> 01/01/2015
			स्वीकृति APPROVED : S K BAVEJA, AGM (HXE & PED)	<i>DB</i> 01/1/15	Gr. NO.
REV.NO.			निर्माण PREPARED : HXE	ज़ारी ISSUED :	दिनांक DATE : 30.12.14
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दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद क्रयविनिर्देश PRODUCT PURCHASE SPECIFICATION	HE 57068			
SUPERSEDES INVENTORY NO.	सामग्री सूची संख्या को अधिकतम करता है		पृष्ठ का Page 2 Of 6			
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.			<p>b) Refer ASME SB338, Clause 7. Product Analysis</p> <p>Clause 7.1 Product analyses for all the elements pertaining to grade 2 as listed in table 1 shall be made on the completed product.</p> <p>c) Refer ASME SB338, Clause 11. Nondestructive Tests</p> <p>Clause 11.1.2 Seamless tubing shall be tested with an electromagnetic test as described in 11.2.1.1 of ASME SB338. In addition to electromagnetic test, hydrostatic test or pneumatic test shall also be conducted on seamless tubing as described in 11.3 or 11.4 of ASME SB338.</p> <p>d) Refer ASME SB338, Clause 12. Permissible Variation in Dimensions</p> <p>Clause 12.5.2 The Outside Diameter of seamless tubes shall be measured by the method and procedure as mentioned in clause 12.5.1 of ASME SB338.</p> <p>e) Refer ASME SB338, Clause 17. Inspection</p> <p>BHEL's representative shall have free access at all times, till work on the contract of BHEL is being performed, to all parts of the manufacturer's works. The supplier shall offer BHEL 's representative all reasonable facilities, without charge to satisfy the latter that the material is being furnished in accordance with this specification.</p>			
स्वत्वाधिकार एवं गोपनीय	इस दस्तावेज में दी गई सूचना भारत हेवी एलेक्ट्रिकल्स की संपत्ति है इसका प्रयोग एवं अनावरण के बिना या इससे पूर्व के बिना या इससे पूर्व के बिना प्रयोग, जो कि स्वत्वाधिकार को न किताब जाए।					
दिनांक एवं हस्ताक्षर SIGN & DATE						
सामग्री सूची संख्या INVENTORY NO.	REV. NO.		निर्माणकर्ता WORKED BY	RCBHARTI	31/12/2014 30.12.2014	
			जांचकर्ता CHECKED BY	NAMAN HANS	Hans 30.12.2014	

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SUPERSEDES INVENTORY NO. संश्लेषणी सूची संख्या में अतिरिक्तिकत न हो	<p>f) Refer ASME SB338, Clause 23. Packing and Package Marking</p> <p>Packing shall be as per BHEL Corporate Standard AA 0490002: PRESERVATION PACKING AND MARKING OF HEAT EXCHANGER TUBES.</p> <p>5. QUALITY ASSURANCE REQUIREMENT:</p> <p>The manufacturer shall conduct all the tests required to ensure that the tubes offered conform to the requirements of the applicable codes and standards. Manufacturer shall submit a detailed quality plan along with this offer as per the standard format which should include all the tests/checks to be carried out by them at the various stages of manufacturing the item. This quality plan shall be reviewed by BHEL and BHEL reserves the right to ask for any more checks, details if required at the time of Quality Plan finalization. The manufacturer shall manufacture the item as per the quality plan duly approved by BHEL.</p> <p>6. CHECK LIST:</p> <p>The supplier shall fill up the enclosed check List as per Annexure-A and submit the same along with each batch.</p>				
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स्वत्वाधिकार एवं गोपनीय संश्लेषण में ही यह सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है, इसका प्रयुक्त एवं अप्रयुक्त रूप में किसी भी तरह प्रयोग, जो कि कंपनी के हित में इतिकारक हो, न किया जाए।					
दिनांक एवं हस्ताक्षर SIGN & DATE					
संश्लेषणी सूची INVENTORY	REV. NO.		निर्माणकर्ता WORKED BY R C BHARTI		 30.12.2014
			जांचकर्ता CHECKED BY NAMAN HANS		 30.12.2014

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सामग्री सूची संख्या को अधिनीहित करना है SUPERSEDES INVENTORY NO.	<p>7. DOCUMENTS TO BE FURNISHED:</p> <p>The following documents shall be furnished along with the offer:</p> <ol style="list-style-type: none"> 1. A process chart clearly indicating the sequence of manufacturing. 2. Heat treatment details. 3. Packing box drawing. 4. Quality plan. <p>8. TEST CERTIFICATES:</p> <p>Four copies of test certificates shall be supplied unless otherwise stated in the order.</p> <p>The test certificate shall bear the following information:</p> <p>BHEL References : BHEL Order No. HE 57068 (Rev. XX): Seamless Titanium Tubes - Grade 2.</p> <p>Supplier's References:</p> <p>Supplier's Name</p> <p>Test Certificate No. Size & Quantity Identification Marks Process of Manufacture Heat treatment and Batch No.</p> <p>Results of Tests: Results of chemical analysis, mechanical and non-destructive tests</p>			
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		दिनांक एवं हस्ताक्षर SIGN & DATE	REV. NO.	
सामग्री सूची संख्या INVENTORY			जांचकर्ता CHECKED BY NAMAN HANS	

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद क्रयविनिर्देश PRODUCT PURCHASE SPECIFICATION		HE 57068 पृष्ठ का Page 5 Of 6	
सामग्री सूची संख्या को अधिकाधिक बढ़ाएं SUPERSEDES INVENTORY NO.	9. REJECTION AND REPLACEMENT: Material failing to confirm to this specification will be rejected. The supplier shall undertake to replace the rejected material at his own cost.				
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स्वाधिकार एवं गोपनीय स्वतंत्रता में की गई सूचना भारत देशी एलेक्ट्रिकल की स्वतंत्रता है। स्वतंत्रता है स्वतंत्रता स्वतंत्रता एवं स्वतंत्रता कायम रहे बिना ही तब तक प्रयोग, जो कि स्वतंत्रता के हित में हानिकारक हो न किया जाय।					
दिनांक/हस्ताक्षर SIGN & DATE					
सामग्री सूची संख्या INVENTORY	REV. NO.		निर्माणकर्ता WORKED BY R C BHARTI		<i>R.C.B.</i> 30.12.14
			जांचकर्ता CHECKED BY NAMAN HANS		<i>Naman</i> 30.12.2014

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद क्रयविनिर्देश PRODUCT PURCHASE SPECIFICATION	HE 57068 पृष्ठ का Page 6 Of 6
सामग्री सूची संख्या को अधिलिखित करना है SUPERSEDES INVENTORY NO.	ANNEXURE - A (Clause 6) CHECK LIST FOR HE 57068 (To be filled by supplier)		
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	A. Name of Principal Supplier : B. Name of Indian Agent : 1. Grade of material as per specification : Yes/No 2. Mechanical properties as per specification : Yes/No 3. Test : i) Flattening test : Yes/No ii) Flaring test : Yes/No 4. NDT Tests Offered: i) Hydraulic test : Yes/No ii) Pneumatic test : Yes/No 5. Finish of tubes : i) Outside surface _____ Ra = 2 microns : Yes/No ii) Inside surface _____ Rz = 10 microns : Yes/No 6. Lifting beam offered : Yes/No 7. Packing box drawing enclosed : Yes/No 8. End guides included (Both ends) : Yes/No 9. Deviation taken (please clearly specify, if any) : Yes/No		
स्वयंनिर्माण एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है। इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।	Date: _____ Place: _____ Signature & Seal of Manufacturer.		
दिनांक एवं हस्ताक्षर SIGN & DATE	REV. NO.		निर्माणकर्ता WORKED BY R C BHARTI जांचकर्ता CHECKED BY NAMAN HANS
सामग्री सूची संख्या INVENTORY			30.12.2014 36.12.14



CORPORATE STANDARD

AA 049 00 02

Rev. No. 02

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PRESERVATION, PACKING AND MARKING OF HEAT EXCHANGER TUBES

1.0 SCOPE:

This standard stipulates the requirements of preservation, packing and marking of ferrous and non ferrous heat exchanger tubes.

2.0 PRESERVATION:

2.1 End Caps/Guides:

All the tubes shall be provided with plastic end caps of conical shape on both sides, in order to avoid ingress of water and other foreign matter and to serve as a guide for tube insertion through the support plates during assembly of the Heat exchangers.

A typical figure of the plastic guide is shown in the fig 2 for guidance.

2.2 Rust prevention:

All carbon steel tubes shall be applied with suitable temporary rust preventive on the outer surface of the tubes and required quantity of rust inhibitive powder shall be inserted inside the tubes before end capping.

3.0 PACKING:

3.1 The tubes shall be wrapped with polythene sheet in order to avoid movements and rubbing and packed in wooden cases (as an alternate bubble sheet and thermocol also acceptable) with suitable cushioning materials. The bottom of the case shall be rigid to enable the tubes to maintain straightness. Special lifting tackles, including beams, wherever necessary shall be provided with each case to avoid damage during transit. The case shall be fastened with corner metal plates and nailed at all cleats. The reinforcing bolts shall be bound with band steel.

A suitable amount of desiccant such as silica gel shall be placed in each packing box.

3.2 Each package shall be of convenient weight for ease in handling. The weights shall not exceed 2000 kg (Gross) when tubes longer than 7000 mm are ordered.

3.3 The recommended packing case design and the method of packing is illustrated in Fig. No.1 Any alternate method of packing shall be submitted to BHEL for approval.

Revisions :
Cl. 18.11.01 of MRC – NFCW+HE

APPROVED :
INTERPLANT MATERIAL RATIONALIZATION
COMMITTEE-MRC (NFCW+HE)

Rev. No. 02	Amd.No.	Reaffirmed	Prepared	Issued	Dt. of 1st Issue
Dt: 15.02.2004	Dt :	Year :	HARDWAR	Corp. R&D	APRIL, 1985

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C.S. 671

**4.0 MARKING:**

4.1 Each tube shall be stenciled with the following information:

- a) BHEL order number:
- b) BHEL Specification No.
- c) Melt/Heat No:
- d) Size of tube:
- e) Supplier 's mark

4.2 A metal label shall be securely attached to each packing case, punched with the following details :

- a) BHEL order number:
- b) BHEL Specification No.
- c) Consignment or Identification No.
- d) Size of the tubes and Total weight
- e) Supplier's Name

4.3 The packing case shall be marked with the following symbols in order to avoid damage during transit:

- a) A mark indicating UP-DOWN position of the case.
- b) A mark indicating that the case shall not be given any impact.
- c) A mark indicating that the case shall be kept free from contact with moisture.
- d) A mark showing the slinging position.

5.0 HANDLING AT PORT, SITE, SHOP, ETC., 9INCLUDING TRANSPORTATION):**5.1 Procedure:**

If the tube length is more than 7000 mm invariably beams are ordered by BHEL, two in numbers which are supplied with first consignment by the vendor.

On receipt of consignment at port, boxes and lifting beams shall be inspected. If boxes are found broken, inspection of tubes shall be carried out. Broken box shall be suitably repaired before sending to site. Boxes shall be inspected before loading on the truck/trailer at supplier's works. Repair shall be carried out if required.

Invariably lifting beam shall be used for handling of boxes.

Boxes shall be placed on the floor on supports (at least 300 mm above the floor). Distance between supports shall not be more than 500 mm. While handling /stacking, vertical direction as marked on the box shall be followed.

Boxes shall be stacked on each other in such a way that are upright, straight and not projecting outside the lower box. Normally not more than 3 boxes shall be kept on each other.



CORPORATE STANDARD

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5.2 Loading of boxes on trailers/trucks:

Preferably trailer shall be of flat floor and its length shall not less than the box. However, in case it is not feasible, following is recommended:

<u>Box length max. in metres</u>	<u>Floor length not less than in metres</u>
20	18.5
15	14
10	9.5
8	7.6

In case, the floor of trailer/truck is not flat, following procedure shall be adopted:

- a) Packers of suitable strength shall be placed on the floor such that when boxes are placed, the packer's bottom of the boxes is horizontal.
- b) Packers shall be placed such that at the driver end, the box projects maximum 300 mm from the support and on the opposite end, it is 300 mm less than end of the floor such that total projection from last support shall not be more than as specified above.
- c) Boxes shall be placed on each other as specified in clause 5.1. The each vertical row shall be secured tight using ropes /wires and tightened with each other and secured with the trailer floor suitably. The gap between the tightening rope/wire shall not be more than 2 metres.
- d) Out of two lifting beams, one number shall be sent with first consignment and the second lifting beam with the last consignment.
- e) Boxes shall be covered with tarpaulin and tightened suitably so as to prevent seepage of water.

5.3 Receipt at site:

The boxes shall be again inspected at the site for any breakage, if found shall be reported back to concerned unit.

The boxes from trailer/truck shall be lifted using lifting beam only supplied with the first and last consignment and stacked in the store in line with clause 5.1.

The boxes shall be covered with tarpaulin to prevent water seeping in the boxes.

6.0 REFERRED STANDARDS (LATEST PUBLICATIONS INCLUDING AMENDMENTS):

NIL

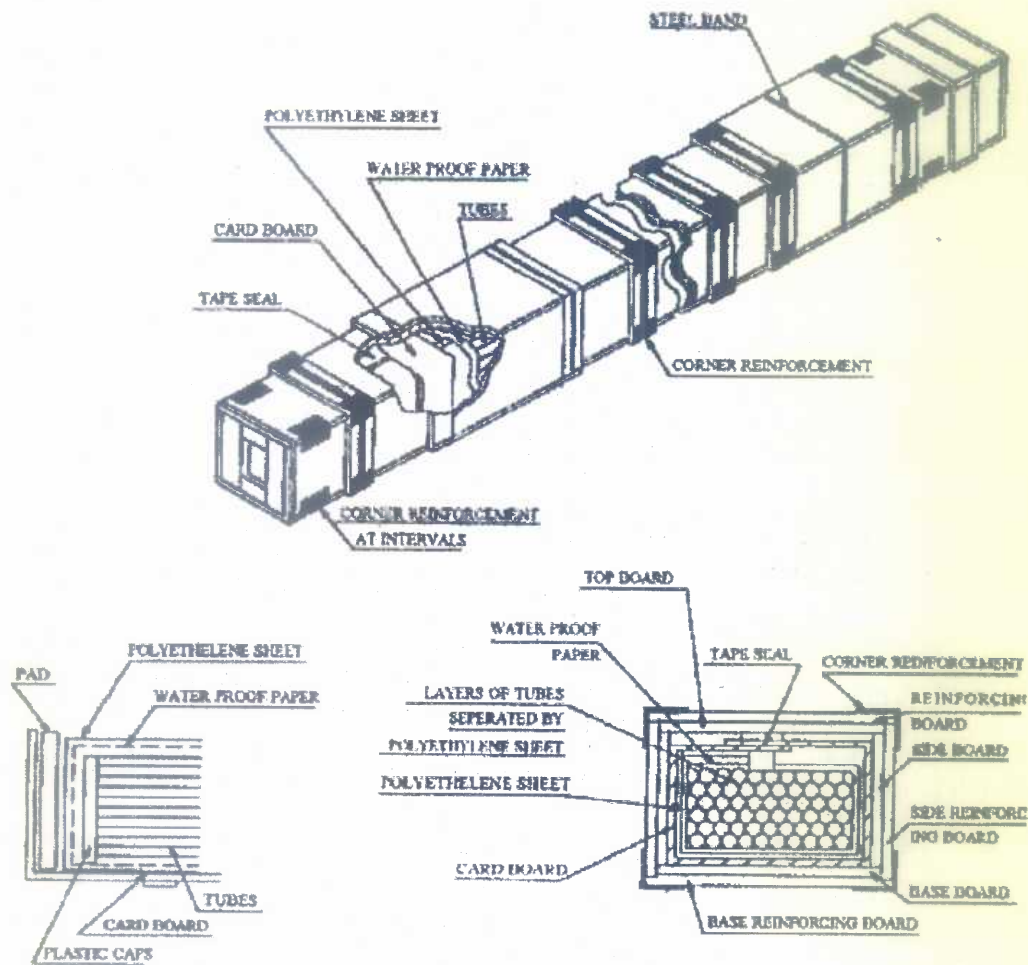


FIG. 1 TYPICAL PACKING OF HEAT EXCHANGER TUBES

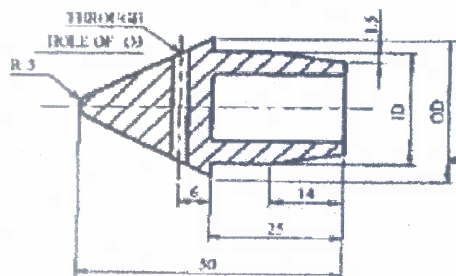


FIG. 2 TYPICAL DRAWING OF CAP FOR TUBE END

(All dimensions are in mm)

MANUFACTURER'S NAME AND ADDRESS		QUALITY PLAN					TO BE FILLED BY BHEL		TO BE FILLED BY BHEL			
BHEL	VENDOR'S NAME	ITEM		QP NO.								
				REV								
		DRG. NO.	AS PER PO									
		SPEC.	AS PER PO									
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	D	10		11

MANUFACTURER/SUBCONTRACTOR	LEGEND:	FOR CUSTOMER USE	APPROVED BY
	! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		