

BHARAT HEAVY ELECTRICALS LIMITED
HEEP HARIDWAR INDIA-PIN 249403
PHONE NO: +91 1334 285879

Sub: Procurement of Rubber Items (Gasket, Rubber, O-ring, Packing)
(F/T237/24/2168/C)

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 from Indian indigenous suppliers for following items through GeM Portal-
<https://gem.gov.in>

SL.NO.	MATERIAL CODE	DESCRIPTION	LOT-QTY	UNIT	DELIVERY (in Days from PO date)
1	HW5911791030	HW5911791030 NEOPRENE RUBBER MOULDED ARTICLES (SHEET), GR-I TYPE-B, SPEC: 0503.206 REV: 04, SIZE: 3	20	KG	60
2	AA5904502311	AA5904502311 HEAT RESISTANT RUBBER RECT CORD GR II TYPE A (RUBBER INSERTION JOINTING GR II) SPEC: AA59002 REV: 02, SIZE: 10X20	6056	MR	60
3	AA5981703024	AA5981703024 CHLOROPRENE RUBBER SHEETS GASKETS AND MOULDINGS 60 IRHD, SPEC: AA59803 REV: 03 SIZE: 3, DIM.: T	20	KG	60
4	W96716601139	W96716601139 DRG: 41660170025 REV: 01 PACKING SPEC: ST24001 REV: 19	150	NO	60
5	W96716601066	W96716601066 DRG: 31660170045 REV: 02 PACKING SPEC: 0503.206 REV: 04	198	NO	60
6	W97716503286	W97716503286 DRG: 41650370045 REV: 00 O-RING, VITON SPEC: ST24001 REV: 19	12	NO	60
7	W97716503308	W97716503308 DRG: 41650370052 REV: 01 O-RING, VITON SPEC: ST24001 REV: 19	8	NO	60
8	W97716501178	W97716501178 DRG: 3165017026200 REV: 00 O-RING	16	NO	60

9	W97716501186	W97716501186 DRG: 3165017026201 REV: 00 O-RING	32	NO	60
10	W96716601058	W96716601058 DRG: 41660170013 REV: 02 GASKET, U SPEC: 0503.206 REV: 04	151	NO	60
11	W96716601619	W96716601619 DRG: 41660170077 REV: 00 GASKET,U SPEC: 0503.206 REV: 04	28	NO	60
12	W96716601600	W96716601600 DRG: 41660170076 REV: 00 GASKET,U (GR II,TYPE-B) SPEC: 0503.206 REV: 04	28	NO	60
13	W98716601041	W98716601041 DRG: 4165017029601 REV: 02 GASKET,U SPEC: 0503.206 REV: 04 GRADE: NEOPRENE GRADE-III, TYPE-B	125	MR	60
14	W98716601050	W98716601050 DRG: 4165017029602 REV: 02 GASKET,U SPEC: 0503.206 REV: 04 GRADE: NEOPRENE GRADE-III, TYPE-B	70	MR	60

Remarks-

1. Vendor to fill the following details for this tender

1	Contact Details	Email id- Mob- Contact Person Name-
2	Office Address	
3	Whether vendor is participating as Trader or Manufacturer?	
4	If participating as a Trader, Name (s) of the Manufacturer	
5	MSME status as on date	
6	If MSME, Udyam No.	
7	PAN No.	
8	GST No.	
9	Deviation opted or Not?	

2. Delivery mentioned above is indicative, bidders to quote their best possible delivery schedule.

3. Payment Terms:

The payment shall be made within no. of days as defined in the below table from appointed day.

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

- The day of delivery of material i.e. Consignee-Note Date (C-Note Date), subject to submission of non-discrepant documents by vendor as per Purchase Order.

or

- Where there is any objection regarding acceptance of goods, the same shall be informed to supplier within fifteen days from the day of the delivery of good. Appointed day will be the day on which such objection is removed by the supplier.

4. Conflict of Interest: "A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity's interests. The bidder found to have a conflict of interest shall be disqualified.

A bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if:

- a) they have controlling partner (s) in common; or
- b) they receive or have received any direct or indirect subsidy/ financial stake from any of them; or
- c) they have the same legal representative/agent for purposes of this bid; or
- d) they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; or
- e) Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly/ Assemblies from. one bidding manufacturer in more than one bid; or
- f) In cases of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorise only one agent/dealer. There can be only one bid from the following: 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. Bidders must proactively declare such sister/ common business/ management units in same/ similar line of business. "

5. In course of evaluation, if more than one bidder happens to occupy L-1 status, effective L-1 will be decided by soliciting discount from respective L-1 bidders.

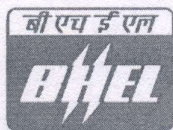
In case more than one bidder happens to occupy the L-1 status even after soliciting discounts, the L-1 bidder shall be decided by a toss/draw of lots, in the presence of respective L-1 bidders or their representatives.

6. Offer validity will be 120 days from Part-1 opening date.

- 7.** Reverse Auction (RA) with qualification option as “H1-Highest Priced Bid Elimination” will be conducted as per GeM guidelines after price bid opening as a price reduction effort.
- 8.** Testing and certification as per Ordering specification & Drawing. Test certificates are required.
- 9.** Kindly submit duly-filled and signed & stamped Annexures (as applicable) with the offer.
- 10.** Benefits of MSE (such as 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 / Stockiest / Dealers / Traders etc. for the items offered but not manufactured by themselves.
- 11.** Guarantee Certificate required: Goods shall comply with the specifications for material, workmanship and performance. Unless otherwise specified, the guarantee shall be for a period of 18 months from the date of receipt.
- 12.** In case of breach of contract, wherever the value of security instruments like performance bank guarantee available with BHEL against the said contract is atleast 10% of the contract value, the same be encashed. In case the value of the security instruments available is less than 10% of the contract value, the balance amount be recovered from other financial remedies (i.e. available bills of the contractor, retention amount, etc. with BHEL) or legal remedies be pursued. The balance scope shall be got done independently without Risk & Cost of the failed supplier/ contractor. Further, levy of liquidated damages, debarment, termination, de-scoping, short-closure, etc., shall be applied as per provisions of the contract. Accordingly, recovery of an amount equivalent to 10% of the contract value may be made in case of breach of contract.
- 13.** Prices shall remain firm and fixed during entire tender process and execution of the contract. Quoted prices on GEM against the GEM bid for each schedule is F.O.R. BHEL HEEP Haridwar on firm basis & inclusive of all cost components (Packing & Forwarding, Freight, GST, Insurance etc.).
- 14.** Once the offer has been submitted in GeM, it's deemed that vendor has read all the terms and conditions of the bid and accordingly have submitted their offer.
- 15.** Deviations, if any, to be mentioned explicitly in the offer. In case of no explicit mention of deviation (if any), it's deemed that all terms and conditions of the tender (including all annexures) are acceptable to the supplier in-toto.
- 16.** If the bidder/seller fails to deliver any or all of the Goods/Services within the original/re-fixed delivery period(s) specified in the contract, the Buyer will be entitled to deduct/recover the Liquidated Damages for the delay, unless covered under Force Majeure conditions aforesaid, @0.5% of the contract value of delayed quantity per week or part of the week of delayed period as pre-estimated damages not exceeding 10% of the contract value of delayed quantity without any controversy/ dispute of any sort whatsoever.
- 17.** Rest terms and conditions shall be as per latest GeM GTC.

ANNEXURE-I
(F/T237/24/2168/C)

(PRE-QUALIFICATION REQUIREMENTS)



Pre-Qualification Requirement for Rubber Gaskets

(For specification 0503.206, AA59002, AA59803, ST24001 of indent no. 20242168)

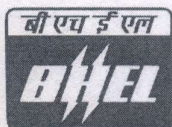
Description

Gasket materials are intended to be used as gasket/packing in condenser & coolers of thermal power plants

Qualification Criteria

Only the vendors meeting the below mentioned criteria shall be considered for further evaluation. Vendor to state their response as per Format below:

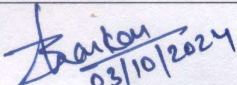
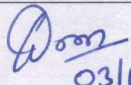
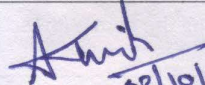
Sr. No.	PRE-QUALIFICATION REQUIREMENTS	VENDOR RESPONSE																					
1	Vendor should have the status of either as manufacturer or the Authorised dealer of an OEM for rubber Gaskets. Vendor to confirm.	YES / NO																					
2	Vendor to submit proof of manufacturer by submitting any of following documents i.e., ISO Certificate or Factory license or NSIC Certificate or any other relevant certificate/document issued by government authority. In case of non-manufacturer, vendor to provide a valid authorisation certificate from their principal OEM along with the documents for OEM as specified above. Authorisation certificate should clearly indicate contact details/e-mail address and phone no. of both OEM and vendor.	Document Enclosed: YES / NO																					
3	Vendor should have experience of supply of rubber gaskets of any cross section for industrial applications meeting the minimum technical parameters listed in Table – 1 below <table border="1"><caption>Table-1</caption><thead><tr><th>S. No.</th><th>Parameter</th><th>Value</th></tr></thead><tbody><tr><td>1</td><td>Tensile Strength (min.)</td><td>5 N/mm²</td></tr><tr><td>2</td><td>Shore hardness (min.)</td><td>50</td></tr><tr><td>3</td><td>Elongation at break (min.)</td><td>150 %</td></tr></tbody></table>	S. No.	Parameter	Value	1	Tensile Strength (min.)	5 N/mm ²	2	Shore hardness (min.)	50	3	Elongation at break (min.)	150 %	YES / NO									
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2	Shore hardness (min.)	50																					
3	Elongation at break (min.)	150 %																					
4	Vendor must have executed at least two (2) nos. of purchase orders of rubber gaskets in last 7 years from the date of issuance of enquiry. In support of the above specified experience requirement, supplier to furnish details of purchase orders (fulfilling requirements as mentioned at Sl. No.3) in the format given in Table-2 below: <table border="1"><caption>Table-2</caption><thead><tr><th>Sl. No.</th><th>P.O. Number & Date</th><th>Item Details</th><th>Tensile Strength (min.)</th><th>Shore hardness (min.)</th><th>Elongation at break (min.)</th><th>Name, Address, Email & Contact Details of customer</th></tr></thead><tbody><tr><td>01</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>02</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table>	Sl. No.	P.O. Number & Date	Item Details	Tensile Strength (min.)	Shore hardness (min.)	Elongation at break (min.)	Name, Address, Email & Contact Details of customer	01							02							Format Filled: YES / NO
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01																							
02																							
5	Vendor has to submit following documentary evidence in support of above experience: I. Unpriced Purchase Order Copies (as per above details)..... II. Dispatch documents of any one supply..... III. Test certificates pertaining to any one supply. (The correlation of dispatch documents and test certificates with purchase orders referred in support of experience has to be ensured by the supplier).....	Document Enclosed: YES / NO YES / NO YES / NO																					



Pre-Qualification Requirement for Rubber Gaskets

General Notes:

- Against vendor's reply, BHEL reserves the right to verify /ask additional information / documents / clarifications. In case any information is found to be false / incorrect, BHEL reserves the right to reject vendor's offer.
- Vendor's offer shall not be considered if vendor fails to furnish the document / information / clarification as mentioned above or vendor doesn't meet the acceptance criteria mentioned above.
- All the documents and correspondences shall be accepted in English language only.
- BHEL team may visit Vendor works to assess vendor's manufacturing and testing facilities, if required.

Prepared By	Checked By	Approved By
 03/10/2024	 03/10/24	 03/10/2024
Bhaskar Sundriyal (Manager / HXE)	Deepak Kumar Yadav (Sr. Manager / HXE)	Alok Kumar Singh (Sr. DGM / HXE)

ANNEXURE-II
(F/T237/24/2168/C)

QUALITY REQUIREMENTS

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
1	TESTING & CERTIFICATION AS PER ORDERING DRAWING AND SPECIFICATION IS REQUIRED	

Signature with stamp

Name:

Name of Firm:

Designation:

Date:

ANNEXURE-III
(F/T237/24/2168/C)

Self-Certification format for local content declaration

**DECLARATION REGARDING MINIMUM LOCAL CONTENT IN LINE WITH
REVISED PUBLIC PROCUREMENT (PREFERENCE TO MAKE IN INDIA), ORDER 2017 DATED 04TH
JUNE, 2020 AND SUBSEQUENT ORDER(S)**

(To be typed and submitted in the Letter Head of the Entity/Firm providing certificate as applicable)

To,

(BHEL HEEP Haridwar)

Dear Sir,

Sub: Declaration reg. minimum local content in line with Public Procurement (Preference to Make in India), Order 2017-Revision, dated 04th June, 2020 and subsequent order(s).

Ref: 1) GeM Bid Specification No:

2) All other pertinent issues till date

We hereby certify that the items/works/services offered by..... *(specify the name of the organization here)* has a local content of _____ % and this meets the local content requirement for **'Class-I local supplier' / 'Class II local supplier'** ** as defined in Public Procurement (Preference to Make in India), Order 2017-Revision dated 04.06.2020 issued by DPIIT and subsequent order(s).

The details of the location(s) at which the local value addition is made are as follows:

1. _____ 2. _____

3. _____ 4. _____

...

Thanking you,

Yours faithfully,

**(Signature, Date & Seal of
Authorized Signatory of the Bidder)**


**** - Strike out whichever is not applicable.**



Note:


1. Bidders to note that above format, duly filled & signed by authorized signatory, shall be submitted along with the techno-commercial offer.
2. In case the bidder's quoted value is in excess of Rs. 10 crores, the authorized signatory for this declaration shall necessarily be the statutory auditor or cost auditor of the company (in the case of companies) or a practising cost accountant or practicing chartered accountant (in respect of suppliers other than companies).
3. In the event of false declaration, actions as per the above order and as per BHEL Guidelines shall be initiated against the bidder.

ANNEXURE-IV
(F/T237/24/2168/C)

**Specification:- 0503.206 REV: 04, AA59002 REV: 02, AA59803 REV: 03 and ST24001
REV: 19/HW7240197**

दिनांक एवं हस्ताक्षर SIGN & DATE मशीनरी सूची संख्या INVENTORY NO. SUPERSEDES INVENTORY NO.		संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		0503.206 पृष्ठ 09 का 01 Page 01 of 09	
		NEOPRENE RUBBER MOULDED ARTICLES			
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.	1. GENERAL This specification governs the properties of Rubber used for the manufacture of moulded articles of various shapes with or without metallic and fabric inserts manufactured by vulcanization of rubber in the moulds. The articles are intended to work in air, water, steam, gases and oil. This specification does not cover the properties of rubber sealing cups for hydraulic devices.				
	2. GRADES AND TYPES The grade and type of the article shall be indicated on the drawing and purchase order.				
स्वत्वाधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत भारती लिमिटेड का संपत्ति है, जो किसी भी प्रकार के बिना अनुमति के प्रसारित नहीं की जा सकती है।	3. SIZES AND TOLERANCES The sizes and tolerances shall be indicated on the drawings supplied along with these specifications. Unless otherwise stated on the order/drawing tolerances on length, width and thickness shall be as follows: On Length & Width of sheet $\pm 3\%$ mm (Max. 3 mm) On Thickness $+ 10\%$ up to 4 mm thickness $+ 0.40$ mm from 05 to 08 mm $+ 0.60$ mm from 09 to 12 mm $+ 0.80$ mm from 13 to 16 mm On cord \varnothing $+ 0.10$ mm up to $\varnothing 3$ mm $+ 0.20$ mm from $\varnothing 04$ to 06 mm $+ 0.25$ mm from $\varnothing 07$ to 12 mm $+ 0.30$ mm from $\varnothing 13$ to 20 mm $+ 0.35$ mm from $\varnothing 21$ to 30 mm $+ 0.40$ mm from $\varnothing 31$ to 40 mm				
	4. FINISH & FREEDOM FROM DEFECTS 4.1 The surface of the rubber moulded articles shall be uniform, smooth without cracks, air-holes, foreign inclusions, scratches, blisters, patches of talcum, porosity of the cross-section and other defects. Overflow along mould opening shall be thoroughly removed without damaging the surface of the article. The overflow shall not protrude by more than 0.1mm. 4.2 In rubber moulded articles with fabric insert, there should not be any displacement of fabric inside the articles.				
दिनांक एवं हस्ताक्षर SIGN & DATE Sandeep 9/11/23	नाम NAME TSX Him PSC SSMeeva QAX KAMAL SENGAL	दिनांक एवं हस्ताक्षर SIGNATURE & DATE 5/11/23 10/10/23 11/10/23	अनुवादक TRANSLATED BY कार्यकर्ता WORKED BY जांचकर्ता CHECKED BY पर्यवेक्षणकर्ता SUPERVISED BY	ASHISH KUMAR PRATIBHA GUPTA AMIT MITTAL	दिनांक एवं हस्ताक्षर SIGNATURE & DATE 10/10/23 10/10/23 10/10/23
मशीनरी सूची संख्या INVENTORY NO. P-708	SUPERSEDES REV.NO. 04 Dt. 10.10.2023 CHANGE ADVICE NO. TSX(EME)-23 11.10.2023	स्वीकृति APPROVED : संस्थान मानकीकरण समिति PLANT STANDARDIZATION COMMITTEE	जारी ISSUED : EME TSX	दिनांक DATE : 08.04.1999	Gr. No. 2.76



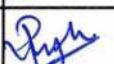
सामग्री सूची संख्या INVENTORY p-708	दिनांक एवं हस्ताक्षर SIGN & DATE Sandeep 9/11/23	स्वत्वाधिकार एवं गोपनीयता The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	COPYRIGHT 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.	सामग्री सूची संख्या को अधिकारित करना है SUPERSEDES INVENTORY NO.	दिनांक एवं हस्ताक्षर SIGN & DATE																																																																																																																															
REV. NO. 04			<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>संस्थान क्रय विनिर्देश (हीप : हरिद्वार)</p> <p>PLANT PURCHASE SPECIFICATION</p> <p>(HEEP: HARIDWAR)</p> </div> <div style="text-align: right;"> <p>0503.206</p> <p>पृष्ठ 09 का 02</p> <p>Page 02 of 09</p> </div> </div>																																																																																																																																	
<p>5.0 PROPERTIES : The physical and mechanical properties of the rubber used for making the rubber moulded articles shall be as per table:</p> <table border="1"> <thead> <tr> <th rowspan="4">Property of Rubber</th> <th colspan="3">Grade - I</th> <th colspan="3">Grade - II</th> <th colspan="3">Grade - III</th> <th colspan="3">Grade - IV</th> </tr> <tr> <th colspan="3">Acid & Alkaline Resistant</th> <th colspan="3">Heat Resistant</th> <th colspan="3">Oil Resistant</th> <th colspan="3">Oil Resistant for hydraulic system</th> </tr> <tr> <th>Soft</th><th>Medium Hard</th><th>Hard</th> <th>Soft</th><th>Medium Hard</th><th>Hard</th> <th>Soft</th><th>Medium Hard</th><th>Hard</th> <th>Soft</th><th>Medium Hard</th><th>Hard</th> </tr> <tr> <th colspan="3">Type</th> <th colspan="3">Type</th> <th colspan="3">Type</th> <th colspan="3">Type</th> </tr> <tr> <th></th> <th>A</th><th>B</th><th>C</th> <th>A</th><th>B</th><th>C</th> <th>A</th><th>B</th><th>C</th> <th>A</th><th>B</th><th>C</th> </tr> </thead> <tbody> <tr> <td>5.1 Tensile Strength Kg/cm², Min.</td> <td>30</td><td>45</td><td>45</td> <td>40</td><td>40</td><td>40</td> <td>50</td><td>50</td><td>55</td> <td>130</td><td>100</td><td>120</td> </tr> <tr> <td>5.2 Elongation % Min.</td> <td>350</td><td>250</td><td>200</td> <td>300</td><td>200</td><td>100</td> <td>350</td><td>250</td><td>180</td> <td>500</td><td>300</td><td>140</td> </tr> <tr> <td>5.3 Residual Elongation</td> <td>35</td><td>35</td><td>35</td> <td>30</td><td>30</td><td>30</td> <td>45</td><td>45</td><td>40</td> <td>20</td><td>15</td><td>8</td> </tr> <tr> <td>5.4 Shore-A Hardness</td> <td>35-49</td><td>50-65</td><td>66-80</td> <td>35-49</td><td>50-65</td><td>66-80</td> <td>35-49</td><td>50-65</td><td>66-80</td> <td>50-55</td><td>50-65</td><td>66-80</td> </tr> <tr> <td>5.5 Ageing coefficient after being subjected to temp. of 100°C for 96 hrs. Min. (based upon tensile strength)</td> <td>-</td><td>-</td><td>-</td> <td>0.7</td><td>0.7</td><td>0.7</td> <td>-</td><td>-</td><td>-</td> <td>-</td><td>-</td><td>-</td> </tr> </tbody> </table>						Property of Rubber	Grade - I			Grade - II			Grade - III			Grade - IV			Acid & Alkaline Resistant			Heat Resistant			Oil Resistant			Oil Resistant for hydraulic system			Soft	Medium Hard	Hard	Soft	Medium Hard	Hard	Soft	Medium Hard	Hard	Soft	Medium Hard	Hard	Type			Type			Type			Type				A	B	C	A	B	C	A	B	C	A	B	C	5.1 Tensile Strength Kg/cm ² , Min.	30	45	45	40	40	40	50	50	55	130	100	120	5.2 Elongation % Min.	350	250	200	300	200	100	350	250	180	500	300	140	5.3 Residual Elongation	35	35	35	30	30	30	45	45	40	20	15	8	5.4 Shore-A Hardness	35-49	50-65	66-80	35-49	50-65	66-80	35-49	50-65	66-80	50-55	50-65	66-80	5.5 Ageing coefficient after being subjected to temp. of 100°C for 96 hrs. Min. (based upon tensile strength)	-	-	-	0.7	0.7	0.7	-	-	-	-	-	-
Property of Rubber	Grade - I			Grade - II			Grade - III			Grade - IV																																																																																																																										
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5.1 Tensile Strength Kg/cm ² , Min.	30	45	45	40	40	40	50	50	55	130	100	120																																																																																																																								
5.2 Elongation % Min.	350	250	200	300	200	100	350	250	180	500	300	140																																																																																																																								
5.3 Residual Elongation	35	35	35	30	30	30	45	45	40	20	15	8																																																																																																																								
5.4 Shore-A Hardness	35-49	50-65	66-80	35-49	50-65	66-80	35-49	50-65	66-80	50-55	50-65	66-80																																																																																																																								
5.5 Ageing coefficient after being subjected to temp. of 100°C for 96 hrs. Min. (based upon tensile strength)	-	-	-	0.7	0.7	0.7	-	-	-	-	-	-																																																																																																																								
निर्माणकर्ता WORKED BY ASHISH KUMAR	जांचकर्ता CHECKED BY PRATIBHA GUPTA		10/10/23																																																																																																																																	




सामग्री सूची संख्या INVENTORY P-706	रिजर्व एवं हस्ताक्षर SIGN & DATE Sandeep 9/10/23	स्वाधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत के विद्युत नियंत्रण विभाग की संपत्ति है। इसका प्रयोग एवं प्रसारण केवल रूप में किया जा सकता है। अन्यथा इसका उपयोग कानून के विरुद्ध होगा।	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.	सामग्री सूची संख्या को अधिकतम करना है। SUPERSEDES INVENTORY NO.	रिजर्व एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)	0503.206 पृष्ठ 09 का 03 Page 03 of 09																																																																																																																										
<table border="1"> <thead> <tr> <th rowspan="3">c i a u s e n o.</th> <th rowspan="3">Property of Rubber</th> <th colspan="3">Grade - I</th> <th colspan="3">Grade - II</th> <th colspan="3">Grade - III</th> <th colspan="3">Grade - IV</th> </tr> <tr> <th colspan="3">Acid & Alkaline Resistant</th> <th colspan="3">Heat Resistant</th> <th colspan="3">Oil Resistant</th> <th colspan="3">Oil Resistant for hydraulic system</th> </tr> <tr> <th>Soft</th> <th>Medium Hard</th> <th>Hard</th> <th>Soft</th> <th>Medium Hard</th> <th>Hard</th> <th>Soft</th> <th>Medium Hard</th> <th>Hard</th> <th>Soft</th> <th>Medium Hard</th> <th>Hard</th> </tr> <tr> <th colspan="2"></th> <th colspan="3">Type</th> <th colspan="3">Type</th> <th colspan="3">Type</th> <th colspan="3">Type</th> </tr> <tr> <th colspan="2"></th> <th>A</th> <th>B</th> <th>C</th> <th>A</th> <th>B</th> <th>C</th> <th>A</th> <th>B</th> <th>C</th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>5.6</td> <td>Ageing coefficient after being subjected to temp. of 70°C for 96 hrs. Min. (based upon tensile strength)</td> <td>0.65</td> <td>0.65</td> <td>0.65</td> <td>-</td> <td>-</td> <td>-</td> <td>0.6</td> <td>0.7</td> <td>0.7</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>5.7</td> <td>Ageing coefficient after being subjected to temp. of 70°C at 144 hrs. Min. (based upon tensile strength)</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>0.9</td> <td>0.8</td> <td>0.5</td> </tr> <tr> <td>5.8</td> <td>Swelling by weight %, within 24 hrs. at 27°C</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>5.8 (a)</td> <td>In mineral oil (Servo prime 46 of IOC or equivalent)</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>5</td> <td>3</td> <td>3</td> <td>+9</td> <td>+10</td> <td>+10 -1</td> </tr> </tbody> </table>									c i a u s e n o.	Property of Rubber	Grade - I			Grade - II			Grade - III			Grade - IV			Acid & Alkaline Resistant			Heat Resistant			Oil Resistant			Oil Resistant for hydraulic system			Soft	Medium Hard	Hard	Soft	Medium Hard	Hard	Soft	Medium Hard	Hard	Soft	Medium Hard	Hard			Type			Type			Type			Type					A	B	C	A	B	C	A	B	C	A	B	C	5.6	Ageing coefficient after being subjected to temp. of 70°C for 96 hrs. Min. (based upon tensile strength)	0.65	0.65	0.65	-	-	-	0.6	0.7	0.7	-	-	-	5.7	Ageing coefficient after being subjected to temp. of 70°C at 144 hrs. Min. (based upon tensile strength)	-	-	-	-	-	-	-	-	-	0.9	0.8	0.5	5.8	Swelling by weight %, within 24 hrs. at 27°C	-	-	-	-	-	-	-	-	-	-	-	-	5.8 (a)	In mineral oil (Servo prime 46 of IOC or equivalent)	-	-	-	-	-	-	5	3	3	+9	+10	+10 -1
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REV. NO. 04		निर्माणकर्ता WORKED BY		ASHISH KUMAR		[Signature]		10/10/23																																																																																																																										
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सामग्री सूची संख्या INVENTORY NO.	REV. NO.	निष्कर्ष एवं हस्ताक्षर SIGN & DATE	स्वाधिकार एवं गोपनीय 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.	COPYRIGHT AND CONFIDENTIAL	सामग्री सूची संख्या को अधिकृतित करना है SUPERSEDES INVENTORY NO.	निष्कर्ष एवं हस्ताक्षर SIGN & DATE	संस्थान क्रय विनिर्देश (हीप : हरिद्वार)		0503.206	
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c l a u s e n o.	Property of Rubber	Grade - I Acid & Alkaline Resistant			Grade - II Heat Resistant			Grade - III Oil Resistant			Grade - IV Oil Resistant for hydraulic system		
		Type			Type			Type			Type		
		Soft	Medium Hard	Hard	Soft	Medium Hard	Hard	Soft	Medium Hard	Hard	Soft	Medium Hard	Hard
5.9	Specific compression set on aging (in %) not more than	-	-	-	-	-	-	-	-	-	-	-	-
5.9 (a)	In mineral oil (Servo prime 46 of IOC or equivalent in 72 hrs. at 100°C	-	-	-	-	-	-	-	-	-	-	-	-
5.9 (b)	In air during 24hrs at 70°C	-	-	-	-	-	-	-	-	-	-	-	-
5.10	Coefficient of acid & alkaline resistance after being kept in 20% solution for 24 hrs. at 27°C	-	-	-	-	-	-	-	-	-	-	-	-
5.10 (b)	In Sulphuric & HCL Acid min.	0.75	0.75	0.75	-	-	-	-	-	-	-	-	-
5.10 (c)	In caustic alkali min.	0.75	0.75	0.75	-	-	-	-	-	-	-	-	-



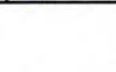
निर्माणकर्ता WORKED BY	ASHISH KUMAR	10/10/23
जांचकर्ता CHECKED BY	PRATIBHA GUPTA	10/10/23

दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		0503.206 पृष्ठ 09 का 05 Page 05 of 09	
मावरी सूची संख्या INVENTORY NO.	<p>5.11 BREAKING LOAD OF COTTON FABRIC Breaking load of the cotton fabric used for the articles with fabric insert shall not be less than 12 Kg/cm2 width.</p> <p>5.12 ADHESION For rubber insertion jointing, the adhesion between rubber plies and fabric plies shall be such that the rate of separation shall not exceed 25 mm per minute under a load of 4Kg. when subjected to adhesion test as per IS: 3400 Part - V.</p> <p>5.13 RESISTANCE TO SOLVENT The material shall have long wearing characteristics, resistance to oil, fuels, grease, lubricants and solvents, coupled with excellent resistance to atmospheric oxidation.</p> <p>5.14 Nature of rubber shall be identified as Neoprene rubber by Flame Test / Infra-red spectrometer test.</p> <p>6.0 TEST METHODS</p> <p>6.1 TEST STRENGTH AND ELONGATION Tensile strength and elongation of the rubber shall be tested as per IS: 3400 Part - I, on dumbbell type test piece.</p> <p>6.2 HARDNESS Hardness will be measured by Shore-A durometer (BS ISO 48: 2010)</p> <p>6.3 COEFFICIENT UNDER ACCELERATED AGEING Coefficient under accelerated ageing is determined as per IS: 3400 Part-IV at temperature and time mentioned in the specification.</p> <p>6.4 SWELLING IN OIL BY WEIGHT The determination of % swelling is carried out on the laboratory test piece of size 20x20x3 mm. The test piece is weighed to an accuracy of 0.01 gm and kept immersed in mobil oil for 24 hours at temperature of 27°C. After this, the test piece is removed from oil, washed and dried for one hour at room temperature and then weighed again. Then, percentage of swelling is determined.</p> <p>At least, three readings are taken.</p>				
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			जांचकर्ता CHECKED BY PRATIBHA GUPTA		10/10/23

चिह्नक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)	0503.206 पृष्ठ 09 का 06 Page 06 of 09			
मासिक सूची संख्या INVENTORY NO.	SUPERSEDES INVENTORY NO.	<p>6.5 SPECIFIC COMPRESSION SET IN AGEING</p> <p>Testing of rubber for aging consists in compression of the rubber test specimen by 30%, its exposure to pre-determined conditions (at high temperature in various media) and determination of its compression set.</p> <p>6.6 BREAKING LOAD OF COTTON FABRIC</p> <p>The breaking load of cotton fabric shall be determined as per clause 8.1 and 9.1 to 9.4 of IS-1969.</p> <p>6.7 ADHESION OF COTTON FABRIC TO THE RUBBER</p> <p>It shall be tested as per IS: 3400 Part-V by Dead load method on a strip.</p> <p>7. SAMPLE FOR TESTING</p> <p>Supplier shall supply test samples along with the supply. The samples shall have the same composition and shall be made by the same as the original product.</p> <p>7.1 SAMPLE FOR TESTING</p> <p>Solid cylinder $\varnothing 29.5 \pm 0.5 \times 12.5 \pm 0.5$ mm.....3 nos. (for Grade IV only). Sheet 150 X 150 X 3 mm.....2 nos. 1 no. additional O-ring of each size, in case the supply is of O-rings</p> <p>A complete set of test samples to be supplied along with the supply.</p>				
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स्वत्वाधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत हीवी इलेक्ट्रिकल्स लिमिटेड की संपत्ति है। इसका प्रयोग एवं प्रसारण के बिना या इसके बिना किसी भी प्रकार से बिना लिखित अनुमति के नहीं किया जा सकता है।						
चिह्नक एवं हस्ताक्षर SIGN & DATE	Sandeep 9/12/23					
मासिक सूची संख्या INVENTORY	REV. NO. 04		निर्माणकर्ता WORKED BY	ASHISH KUMAR		10/10/23
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सुपरसेड INVENTORY NO	<p>8.0 ROUTINE TESTS The tests/checks as mentioned in clause 3.0, 4.0, 5.4, 5.9 & 5.14 shall be carried out as routine tests.</p> <p>9.0 TYPE TESTS The tests as mentioned in clause 5.1 to 5.3 & 5.5 to 5.13 shall be carried out as type tests.</p> <p>10.0 INSPECTION & CERTIFICATE OF GUARANTEE The customer's representative shall be provided with all the facilities to witness the testing and conformity to this specification of the material at the manufacturer work. The vendor shall furnish the guarantee period with test certificate indicating the following along with each consignment of the rubber articles.</p> <ul style="list-style-type: none"> i) Purchase Specification No. ii) BHEL order no. iii) Supplier's Reference. iv) Batch No. / Lot No. and date of manufacture. v) Test result of routine test as per clause 8.0 against each batch. vi) Test values obtained/certificate with clause 9. (not older than 2 years on the date of supply) vii) A certificate that the test samples supplied belong to the same material as that of the main supply. <p>11.0 PACKING & MARKING All the rubber sheets etc. to be well preserved with the French chalk powder, wrapped with wax paper and then packed in polyethylene bags. O-rings or other small gaskets shall be packed individually in separate packing. Items are to be then packed in boxes so as to protect them from moisture, heat, and mechanical damage during transit and storage, the boxes shall be marked with the following markings:</p> <ul style="list-style-type: none"> i) Name of the manufacturer. ii) Name of articles and drawing nos. iii) Grade and type of rubber. iv) No. of Batch. v) Net weight and tare. vi) Date of manufacture. 				
कॉपीराइट और गोपनीयता 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.					
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सामग्री सूची संख्या INVENTORY	REV. NO. 04		निर्माणकर्ता WORKED BY	ASHISH KUMAR	 10/10/23
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सुपरसेड्स INVENTORY NO.	vii) Specification no. viii) BHEL order no. ix) Supplier should print their firm name, monogram, month and year of manufacture on every meter of length of cord. If gasket or other items are there, then minimum at 2 places.				
मासकी सूची संख्या को अतिरिक्त करना है	12.0 REJECTION BHEL Haridwar reserves the right under its condition of purchase to reject any material which does not conform to this specification. The supplier shall replace the material free of cost within the period of guarantee, in case, the material is found defective and does not conform to this specification In no case, this period of guarantee shall be less than 12 months from date of consignment.				
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.	13.0 ACCEPTANCE CRITERIA The items shall be accepted by BHEL on the basis of the following: - -Compliance certificate furnished by the supplier. -Test certificate furnished by the supplier as per Clause no.10. -Testing carried out by BHEL on sample as mentioned in preface.				
स्वत्वाधिकार एवं गोपनीय उपरोक्त में ही यह सूचना प्रारंभ होती है कि यह दस्तावेज़ बिरला भारती लिमिटेड की संपत्ति है। इसका प्रयोग अन्य किसी भी उद्देश्य के लिए न किया जाय। इस दस्तावेज़ को बिना लिखित अनुमति के किसी अन्य व्यक्ति को न देना।	14.0 STORAGE The finished rubber items shall be stored at ambient temp. not exceeding 30°C & not below 15°C. Condensation, moist conditions shall be avoided and humidity generally shall not exceed 80%. Exposure to direct sunlight, strong artificial light, and ultraviolet light shall be avoided. Contact with liquid or semi-solid materials shall be avoided. Under the recommended storage conditions, the shelf life is 5 years.				
दिनांक एवं हस्ताक्षर SIGN & DATE Sandeep 9/12/13	15.0 INDENTING INFORMATION While indenting the rubber moulding items, following information shall be provided by the indenter: <ul style="list-style-type: none"> i) Name of article ii) Drawing no. iii) Grade and Type of Rubber iv) Number of pieces required v) Any other instructions 				
मासकी सूची संख्या INVENTORY P-708	REV. NO. 04	16.0 METHOD OF DESIGNATION IN DOCUMENTS The material for the rubber moulded articles shall be designated on all engineering drawings and documents as below:			
		निर्माणकर्ता WORKED BY	ASHISH KUMAR		10/10/23
		जांचकर्ता CHECKED BY	PRATIBHA GUPTA		10/10/23

दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)	0503.206 पृष्ठ 09 का 09 Page 09 of 09		
SUPERSEDES INVENTORY NO. मासवी नुसरी संख्या को अतिरिक्तित करत है	<p>16.1 For rubber moulded articles:</p> <p>Heat resistant rubber mouldings Gr. II Type A PS 0503.206</p> <p>16.2 For rubber moulded articles with cotton fabric insert:</p> <p>Oil resistant rubber moulding with fabric insert Gr. III Type-B PS:0503.206</p> <p>The position of cotton fabric plies should be shown clearly on the drawing.</p> <p>16.3 For rubber moulded articles with metal insert:</p> <p>Heat resistant rubber mouldings with metallic insert Gr. II Type C 0503.206</p> <p>The position of metallic insert should be clearly shown on the drawing and the specification of the metal should also be indicated with surface finish on the surface to be used for bonding of the rubber. Requirement of adhesion strength should be included in the technical requirements.</p> <p>17.0 CROSS REFERRED STANDARDS IS: 3400 Part 1, IV & V, IS-1969, BS ISO 48:2010.</p>				
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स्वाधिकार एवं गोपनीय उपरोक्त सूचना भारत हेवी इलेक्ट्रिकल्स लिमिटेड की संपत्ति है अथवा प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी प्रकार के हित में हितधारक की या किसी अन्य					
दिनांक एवं हस्ताक्षर SIGN & DATE <i>Sandeep 9/12/23</i>					
मासवी नुसरी संख्या INVENTORY P-708	REV. NO. 04		निर्माणकर्ता WORKED BY ASHISH KUMAR		10/10/23
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CORPORATE PURCHASING SPECIFICATION

AA59002

Rev No. 02

PAGE 1 of 3

SHEET RUBBER JOINTING - Gr: II, TYPE: A

1.0 GENERAL:

This specification governs the quality requirements of Sheet Rubber Jointing having a hardness of 50 to 65 IRHD

2.0 APPLICATION:

Used as gaskets between flanges and similar joints subjected to low steam pressure up to 350 kN/m².

3.0 COMPLIANCES WITH NATIONAL STANDARDS:

The material shall comply with the requirements of the following national standards and also meet the requirements of this specification.

IS: 638 – 1979 : Sheet Rubber Jointing and Rubber Insertion Jointing.
Gr: II, Type: A

4.0 DIMENSIONS AND TOLERANCES:

4.1 Sizes:

Length x Width x Thickness of the sheet shall be stated in BHEL order.

Gaskets and mouldings shall be supplied as per BHEL drawings.

Preferred thicknesses are:

2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, and 16 mm.

4.2 Tolerances:

Unless otherwise stated in the order / drawings, tolerances on length, width and thickness shall be as follows:

4.2.1 On Length and Width:

±3 mm.

4.2.2 On Thickness :

Up to and including 8 mm thick : ± 10%

Above 8 mm thick : ± 7.5%

Revisions:

Cl 32.11.82 of MOM of MRC – CPO

APPROVED:

INTERPLANT MATERIAL RATIONALISATION
COMMITTEE – MRC(CPO+NM)

Rev No.02

Amd No.

Reaffirmed

Prepared

Issued

Dt. of 1st Issue

Dt:15-02-2004

Dt:

Year:2013

HEP, Bhopal

Corp.R&D

January, 1990

9/11/13

C-5-958

AA59002

Rev No. 02

PAGE 2 of 3

CORPORATE PURCHASING SPECIFICATION



5.0 FINISH :

Material shall have smooth finish.

6.0 FREEDOM FROM DEFECTS:

All ingredients of the mix shall be free from grit and extraneous matter. The selection and processing of the ingredients shall be such that the vulcanizate is free from surface, imperfections, blisters, porosity, voids, inclusions flow marks, inadequate joint of moulding blank and other defects which would impair the satisfactory performance.

The material shall not develop excessive bloom on storage under normal temperature conditions.

7.0 CHEMICAL COMPOSITION:

Sheets shall be made out of vulcanizates based on natural or synthetic rubber or a blend thereof reinforced only with carbon black, vulcanized with sulphur/organic accelerator, activated with stearic acid and rubber containing at least 4 parts per hundred of zinc oxide and 2 parts per hundred of a suitable antioxidant.

No factive or other extender, reclaimed or ground vulcanised rubber shall be used.

8.0 TEST SAMPLES:

Four samples of sheet, two of size 150 x 150 x 2.0 mm thickness, one of size 150 x 150 x 6.0 mm thickness and one of size 150 x 150 x 10 mm prepared from same batch and vulcanized to the same degree as the consignment concerned shall be supplied for testing.

9.0 PROPERTIES:

When tested in accordance with the Indian Standards shown against each, the test samples shall show the following properties.

9.1 HARDNESS (IS: 3400, Part II):

50 to 65 IRHD.

Test shall be done on 10 mm thick test sheet.

9.2 Tensile Strength (IS : 3400, Part I, Dumb - bell):

7.0 N/mm², minimum.

9.3 Elongation At Break (IS: 3400, Part I, Dumb - bell):

460 percent, minimum.

9.4 Compression Set (IS:3400, part X):

Compression set at 100°C for 72 hours on samples dia 29.0 ± 0.5 and thickness 12.5 ± 0.5 mm shall be 35 percent, maximum.

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CORPORATE PURCHASING SPECIFICATION

AA59002

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PAGE 3 of 3

9.5 Accelerated Ageing For 72 Hours At 100°C :

9.5.1 Change In Tensile Strength (IS: 3400, Part I, Dumb - bell):

+10%, -25%, max. of the value at clause 9.2

9.5.2 Change In Elongation At Break (IS: 3400 Part I, Dumb - bell):

+10%, -35%, max. of the value at clause 9.3

9.6 Resistance To Bending (IS: 638, Cl. 3.7):

There shall be no visible signs of cracking of the surfaces.

10.0 TEST CERTIFICATES:

Unless otherwise stated, three copies of test certificates shall be supplied giving the following information:

In addition, the supplier shall ensure to enclose one copy of the test certificate along with their despatch documents for quick clearance of the material.

AA59002, (Rev. 02): SHEET RUBBER JOINTING - Gr: II, TYPE: A

BHEL Order No.

Manufacturer's /Supplier's name and trade mark, if any,

Drawing No. & Item No. if any:

Test results of Clauses 4.0 and 9.0

11.0 KEPING PROPERTY:

When stored under cover in a dry place under normal storage conditions, the material shall retain the properties prescribed in this specification for a period of not less than 24 months after the date of manufacture, which shall be subsequent to the date of placing the order.

12.0 PACKING AND MARKING:

Material shall be suitably packed to prevent damage from contamination and handling during transit. Each package shall be legibly marked with the following information:

AA59002: SHEET RUBBER JOINTING - Gr: II, TYPE: A

BHEL Order No.

Manufacturer's / Supplier's Name.

Trade Mark, if any.

Batch No.

Size and Quantity.

13.0 REFERRED STANDARDS (Latest Publications Including Amendments):

1) IS:638

2) IS:3400

CS-958 9/11/13



CORPORATE PURCHASING SPECIFICATION

AA 598 03

Rev. No. 03

PAGE 1 OF 4

CHLOROPRENE RUBBER SHEETS, GASKETS AND MOULDINGS 60 IRHD

1.0 GENERAL :

This specification governs the quality requirements of Chloroprene Rubber Sheets, Gaskets and Mouldings having a hardness of 60 IRHD.

2.0 APPLICATION:

Used as gaskets and mouldings in switchgear, steam turbines, water turbines, turbo-generators, traction machines, etc.

3.0 COMPLIANCES WITH NATIONAL STANDARDS:

The material shall comply, in general, with the requirements of the following national standard and also meet the requirements of this specification.

BS : 2752 - 1990, Gr.: C 60 : Chloroprene Rubber Compounds

And also shall meet the additional requirement of clause 10.5 of this specification.

4.0 DIMENSIONS AND TOLERANCES:

4.1 Sizes:

Length x Width x Thickness of the sheet shall be stated in BHEL order.
Gaskets and mouldings shall be supplied as per BHEL drawings.

Preferred thicknesses for sheets and gaskets are 1, 1.6, 3, 5, 6, 10, 12, 15 and 20mm.

4.2 Tolerances:

Unless otherwise stated in the order / drawing, tolerances on length, width and thickness shall be as follows:

4.2.1 On Length and Width: ± 1 mm

4.2.2 On Thickness:

<u>Nominal thickness, mm</u>		Tolerance, \pm mm
Over	up to & incld.	
--	6	0.25
6	12	0.50
12	--	0.80

Revisions :


Cl 32.7 C (iv) of MOM of MRC-CPO

APPROVED :

INTERPLANT MATERIAL
RATIONALISATION COMMITTEE-MRC (CPO)

Rev. No. 03	Amd.No.	Reaffirmed	Prepared	Issued	Dt. of 1st Issue
Dt.:15.02.2004	Dt :	Year :	BHOPAL	Corp. R&D	JULY, 1980

23-870

AA 598 03	CORPORATE PURCHASING SPECIFICATION	
Rev. No. 03		
PAGE 2 OF 4		

5.0

FINISH:
Material shall have a smooth finish.

6.0

FREEDOM FROM DEFECTS:
All ingredients of the mix shall be free from grit and extraneous matter. The selection and processing of the ingredients shall be such that the vulcanizate is free from surface imperfections, blisters, porosity, voids, inclusions, flow marks, inadequate joint of moulding blank and other defects which would impair satisfactory performance.

7.0

CHEMICAL COMPOSITION:
Sheets, gaskets and moulding shall be made at slow crystallization rate from vulcanizates based on chloroprene polymer reinforced only with carbon black, vulcanized with a metallic oxide and rubber containing at least 2 parts per hundred of a suitable antioxidant.

8.0

IDENTIFICATION:
The material, when identified by infra-red spectra photometer or by any other convenient method shall be of chloroprene copolymer.

9.0

TEST SAMPLES:
Three samples of sheets of the following sizes prepared from the same batch and vulcanized to the same degree as the consignment concerned shall be submitted for testing.
150 x 150 x 2 ± 0.15 mm thickness : two sheets
150 x 150 x 6.3 ± 0.15 mm thickness : one sheets

10.0

PROPERTIES:
When tested in accordance with the Indian standards / British standards shown against each, the test samples shall show the following properties:

10.1

Hardness (BS 903: Part A 26: Method N, 2 Plies, 6.3 mm + 2mm with the thicker ply on top):
60 + 5, - 4 IRHD

10.2

Tensile strength (IS:3400, Part I, Dumb-bell) :
13 N/mm², minimum

10.3

Elongation at Break (IS:3400, Part I, Dumb-bell):
250% , minimum

10.4

Compression set at 70⁰C (IS: 3400, Part X):
For 72 hours + 0, - 2, hours: 25%, maximum.



CORPORATE PURCHASING SPECIFICATION

AA 598 03

Rev. No. 03

PAGE 3 OF 4

10.5 Ageing in Oil:

Two test specimens each of 25 mm wide and of suitable length shall be cut from each sheet in the sample from widely separated positions. The specimens shall be aged in Servo prime 32 of IOC or its equivalent for 72 hours at 70°C.

10.5.1 Change in Volume: 10%, maximum

10.5.2 Oil Absorption (Calculated on the Original Weight of the Specimen): 15%, maximum

11.0 TYPE TESTS:

Whenever specified, the following type tests shall be conducted as per the test method specified against each and the norms of acceptance shall be as specified below:

11.1 Volume Change (BS 903: Part A 16: Volumetric Method, Liquid B, 22 Hours At 40°C):

70%, maximum.

11.2 Resistance To Heat Ageing For 168 Hours At 70°C (IS: 3400, Part IV):

11.2.1 Change In Hardness (BS 903: Part A 26 : Method N):

+ 7, IRHD maximum, when measured on 2 plies each of 2 mm thickness before and after ageing.

11.2.2 Change in Tensile Strength (IS:3400, Part I, Dumb-bell):

-12%, maximum of the value obtained at clause 10.2.

11.2.3 Change In Elongation At Break (IS:3400, Part I, Dumb-bell):

-20% , maximum of the value obtained at clause 10.3

11.3 Adhesion To And Corrosion Of Metals (BS 903: Part A 37: Method A):

There shall be no corrosion or pitting of the metals and the material shall not adhere to the metal surface or show any sign of liquid exudation. Discolouration of the metal surfaces shall not be considered to be objectionable.

12.0 TEST CERTIFICATES:

Unless otherwise stated, three copies of test certificates shall be supplied giving the following information:

In addition, the supplier shall ensure to enclose one copy of the test certificate along with their despatch documents for quick clearance of the material.


AA 598 03, Rev. 03: Chloroprene Rubber Sheets, Gaskets & Mouldings, 60 IRHD BHEL Order No.

Manufacturer/s / Supplier/s name and trade mark, if any

Batch No

Date of manufacture

Test results of clauses 4.0, 8.0, 10.0 and 11.0.

AA 598 03	CORPORATE PURCHASING SPECIFICATION	
Rev. No. 03		
PAGE 4 OF 4		

13.0 KEPING PROPERTY:

When stored under cover in a dry place under normal storage conditions, the material shall retain the properties prescribed in this specification for a period of not less than 24 months after the date of manufacture, which shall be subsequent to the date of placing the order.

14.0 PACKING AND MARKING:

Material shall be suitably packed to prevent damage from contamination and handling during transit.

Each package shall be legibly marked with the following information:

AA 598 03 : Chloroprene Rubber Sheets, Gaskets & Mouldings, 60 IRHD

BHEL Order No.

Manufacturer's / Supplier's Name.

Trade Mark, if any.

Batch No.

Drawing No. & Item No, if any


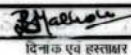
Size and Quantity.

15.0 REFERRED STANDARDS (Latest Publications Including Amendments):

1. IS: 3400

2. BS 903

3. BS 2752

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD	ST 24001 / HW7240197 पृष्ठ 9 का 1 Page 1 of 9																																
सामग्री सूची संख्या को अतिरिक्तित्व देना है SUPERSEDES INVENTORY NO.	<div style="font-size: 2em; font-weight: bold;">O - RINGS</div>																																		
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स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इतना प्रकट एवं अग्रजम्ब रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न लिया जाए।																																			
सामग्री सूची संख्या INVENTORY NO. P-1966	दिनांक एवं हस्ताक्षर SIGN & DATE 25/3/03	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> <tr> <td>अनुवादक TRANSLATED BY</td> <td>K.C.RAO</td> <td>नाम NAME</td> <td>दिनांक एवं हस्ताक्षर SIGNATURE & DATE</td> </tr> <tr> <td>निर्माणकर्ता WORKED BY</td> <td>A.SHAH</td> <td></td> <td>Sd/- 16/11/79</td> </tr> <tr> <td>जांचकर्ता CHECKED BY</td> <td>A.K.SAXENA</td> <td></td> <td>Sd/- 19/11/79</td> </tr> <tr> <td>पर्यवेक्षणकर्ता SUPERVISED BY</td> <td>M.R.KHETRAPAL</td> <td></td> <td>Sd/- 02/12/79</td> </tr> <tr> <td colspan="2" style="text-align: center;">स्वीकृति (K.L. KHURANA) sd/- 20/12/79</td> <td colspan="2" style="text-align: center;">ST</td> </tr> <tr> <td colspan="2" style="text-align: center;">APPROVED (ENGG. DEVELOPMENT MANAGER)</td> <td colspan="2"></td> </tr> <tr> <td>निर्माण PREPARED: STE</td> <td>जारी ISSUED: STE-TG</td> <td colspan="2">दिनांक DATE: 20.12.79</td> </tr> </table>						अनुवादक TRANSLATED BY	K.C.RAO	नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE	निर्माणकर्ता WORKED BY	A.SHAH		Sd/- 16/11/79	जांचकर्ता CHECKED BY	A.K.SAXENA		Sd/- 19/11/79	पर्यवेक्षणकर्ता SUPERVISED BY	M.R.KHETRAPAL		Sd/- 02/12/79	स्वीकृति (K.L. KHURANA) sd/- 20/12/79		ST		APPROVED (ENGG. DEVELOPMENT MANAGER)				निर्माण PREPARED: STE	जारी ISSUED: STE-TG	दिनांक DATE: 20.12.79	
अनुवादक TRANSLATED BY	K.C.RAO	नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE																																
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सहमत विभाग AGREED DEPT. TSX	नाम NAME L.B.MALHOTRA	दिनांक एवं हस्ताक्षर DATE & SIGNATURE 	REAFFIRMED REV.NO. 19 SHUBHAM Dt. 08.10.20 R. RAWAT C./A.TSX (STE) - 20-185.																																



PRODUCT STANDARD

STEAM TURBINE ENGINEERING

 © HW 724 01 97
ST 24001

PAGE 2 OF 04

O-RINGS

VITON

- SCOPE:** This product standard deals with O-Rings of Viton, which are press-moulded, precision jointless O-Rings.
- DESIGNATION:** The O-Ring with internal diameter $d_1=4$ mm, thickness of ring $d_2=1.5$ mm and size number 001 shall be designated as:
 - In description column: O-Ring 4x1.5
 - In drawing No. column: ST 24001.001
- DIMENSIONS:** All dimensions in mm.

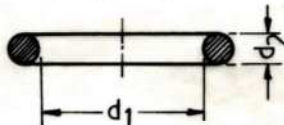


TABLE -1

d ₁		d ₂		Size	d ₁		d ₂		Size	d ₁		d ₂		Size
Dia.	Tole.	Dia.	Tole.	Number.	Dia.	Tole.	Dia.	Tole.	Number.	Dia.	Tole.	Dia.	Tole.	Number.
4		1.5	±0.08	001	38	±0.4	3		029	125		4		057
5	±0.3	2.5		002	40		3	±0.1	030	129	±1.0	4	±0.12	058
6		3	±0.1	003	43	±0.6	3		031	135		4		059
8		2	±0.08	004	45		3		032	140		3	±0.1	060
9.5		2.4		005	49		3	±0.1	033	145		4		061
11	±0.3	2.5	±0.08	006	50	±0.6	3		034	150	±1.0	4	±0.12	062
11.3		2.4		007	50		4	±0.12	035	155		4		063
12		1.5		008	52		3	±0.1	036	159		6		064
12		3	±0.1	009	55		4	±0.12	037	160	±1.0	3	±0.1	065
12.3	±0.3	2.4		010	57.2	±0.6	5.7		038	160		4		066
14.3		2.4	±0.08	011	59		3	±0.1	039	165	±1.5	4	±0.12	067
15.3		2.4		012	60		4	±0.12	040	170		4		068
16		3	±0.1	013	64		3	±0.1	041	175		5		069
17.3	±0.3	2.4	±0.08	014	67	±0.6	4	±0.12	042	180	±1.5	4	±0.12	070
18		3	±0.1	015	71		4		043	185		5		071
18.3		2.4	±0.08	016	74		3	±0.1	044	190		4		072
19.3		2.4	±0.08	017	75	±0.6	4	±0.12	045	195		4	±0.12	073
20	±0.4	3	±0.1	018	80		3	±0.1	046	200	±1.5	3	±0.1	074
20.3		2.4		019	85	±0.9	4	±0.12	047	204		4	±0.12	075
22		1.5	±0.08	020	90		4		048	205		5		076
22		3	±0.1	021	94		3	±0.1	049	212		4		077
22.2	±0.4	3		022	100	±0.9	4	±0.12	050	220	±1.5	5	±0.12	078
22.3		2.4	±0.08	023	104.2		5.7		051	228		4		079
25		3	±0.1	024	108		3	±0.1	052	235		5		080
25.3		2.4	±0.08	025	112	±0.9	4		053	238		5		081
28	±0.4	3		026	115		4	±0.12	054	245	±1.5	5	±0.12	082
30		3	±0.1	027	120	±1.0	4		055	250		4		083
34		3		028	124.2		5.7		056	250		8	±0.15	084

Table contd. on page-3

Revision : 19

Date : 08.10.20

Distribution Qty.

Approved :

ENGG. DEV. MANAGER

Prepared

Issued

Date

STE (TG)
HARDWAR

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SL 1966



PRODUCT STANDARD

STEAM TURBINE ENGINEERING

 HW 7240197
ST 24001.

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CONTD. FROM PAGE - 2

d ₁		d ₂		Size	d ₁		d ₂		Size	d ₁		d ₂		Size
Dia.	Tol.	Dia.	Tol.	Number	Dia.	Tol.	Dia.	Tol.	Number	Dia.	Tol.	Dia.	Tol.	Number
255		4		085	395	±2.0	5	±0.12	102	640	±3.2	8	±0.15	119
260	±1.5	5	±0.12	086	400	±2.0	4		103	655	±3.3	4	±0.12	120
265		5		087	415		5	±0.12	104	660	±3.3	12		121
280		5		088	420	±2.1	5		105	680	±3.4	12	±0.18	122
285	±1.5	4	±0.12	089	435		12	±0.18	106	700	±3.5	10	±0.15	123
285		6		090	438	±2.2	4		107	730	±3.6	4		124
297		4		091	450		5	±0.12	108	770	±3.8	4	±0.12	125
315	±1.5	4	±0.12	092	485	±2.4	5		109	800	±4.0	12	±0.18	126
315		5		093	495	±2.5	4	±0.12	110	820	±4.1	12	±0.18	127
330	±1.6	4		094	500		5		111	837	±4.2	4	±0.12	128
345	±1.7	5	±0.12	095	530		4	±0.12	112	870	±4.5	12	±0.18	129
355	±1.8	4		096	530	±2.7	12	±0.18	113	902	±4.5	4	±0.12	130
360	±1.8	4		097	540		4	±0.12	114	970	±4.8	12	±0.18	131
367		3.5	±0.12	098	560	±2.8	5	±0.12	115	1002	±5.0	4	±0.12	132
380	±1.9	4		099	580	±2.9	12	±0.18	116	1025	±5.1	12		133
380	±1.9	10	±0.15	100	600	±3.0	4	±0.12	117	1100	±5.5	12	±0.18	134
385		12	±0.18	101	600	±3.0	10	±0.15	118	1240	±6.2	12		135
193	±1.5	6	±0.12	136	35.2	±0.4	3	±0.1	137	74.2	±0.6	5.7	±0.12	138
78	±0.6	3	±0.1	139	203	±1.5	3	±0.1	140	142	±1.0	4	±0.12	141
425	±2.1	4	±0.12	142	40	±0.6	3	±0.1	143	128	±1.0	5	±0.12	144

Dimensions of O Rings which are not covered in the table 1 should preferably be chosen from the following table.

d ₂	Preferable value of d ₁	Last digit for d ₁
2	< 100	Upto 100: 2, 4, 5, 6, 8, 0
3	80 - 200	
4	150 - 400	
5	300 - 600	
8	> 600	Above 100: 2, 5, 8, 0
10	> 800	
12	> 1000	

4. MATERIAL & RANGE OF APPLICATION :-

TABLE - 2

VITON O-RINGS SHOULD BE RESISTANT TO FATS, OILS AND FIRE RESISTANT FLUID.

MATERIAL	RANGE OF APPLICATION	TEMP'R - LIMITS, °C	SHORE 'A' HARDNESS	PRESSURE bar		QUALITY
VITON	General purpose sealing Machine components Flanges etc.	-20 to +160	80-85	STATIC	DYNAMIC	Quality mark 'B' according to DIN 3770. See Table-3.
				≤ 160	≤ 63	

* MAX. SHORT DURATION TEMP. CAN BE + 180°C

TABLE-1. CONTD

d ₁		d ₂		Size	d ₁		d ₂		Size	d ₁		d ₂		Size
Dia	Tol.	Dia.	Tol.	No.	Dia	Tol.	Dia	Tol.	No.	Dia.	Tol.	Dia	Tol.	No.
132	±1.0	3	±0.12	144	79.2	±0.6	5.7	±0.12	148	83.2	±0.8	5.7	±0.14	152
530		5		145	84.2		5.7		149	94.2		5.7		153
590	±2.7	5		146	8.3	±0.3	2.4	±0.08	150	510	±4.0	6.0	±0.14	154
71	±0.6	3	±0.12	147	70	±0.63	3	±0.1	151	154	±1.0	3.0	±0.1	155
785	±3.5	8	±0.15	157	692	±0.6	5.7	±0.12	159	115	±1.0	3.0	±0.12	156
430	±2.1	5.3	±0.12	158										

CONTD. ON PAGE-4

REV. 19

SIGN. DATE

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SIGN & DATE

INVENTORY No.



PRODUCT STANDARD
STEAM TURBINE ENGINEERING

HW 7240197
ST 24001

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CONTD. FROM PAGE-4

TABLE-1. CONTD.

d1			d2			SIZE NO	d1			d2			SIZE NO
DIA	TOLE.	DIA	TOLE.	DIA	TOLE.		DIA	TOLE.	DIA	TOLE.			
12	±0.3	2	±0.08	159	124	±1.0	3	±0.1	167				
115	±1.0	3	±0.10	160	456	±3.2	5.3	±0.13	168				
105	±0.9	4	±0.12	161	67	±0.6	2.5	±0.1	169				
60	±0.6	3	±0.10	162	55	±0.6	3	±0.1	170				
55	±0.6	2	±0.08	163	82	±0.7	4	±0.12	171				
32	±0.4	2	±0.08	164	51	±0.6	4.5	±0.12	172				
12	±0.3	2.5	±0.08	165	69.2	±0.6	5.7	±0.12	173				
10	±0.3	2	±0.08	166	350	±1.7	4	±0.12	196				
20	±0.2	1.5	±0.08	174									
4	±0.14	1	±0.07	175									
5	±0.15	1.5	±0.08	176									
7	±0.16	2	±0.08	177									
8	±0.16	1.5	±0.08	178									
10	±0.17	2	±0.08	179									
12	±0.19	1	±0.07	180									
12	±0.19	2	±0.08	181									
12	±0.19	2.5	±0.08	182									
14	±0.19	2	±0.08	183									
16	±0.20	1.5	±0.08	184									
17	±0.21	2	±0.08	185									
20	±0.22	2	±0.08	186									
32	±0.32	2	±0.08	187									
40	±0.38	2	±0.08	188									
55	±0.50	2	±0.08	189									
60	±0.64	2.5	±0.08	190									
60	±0.64	3	±0.01	191									
80	±0.69	2.5	±0.08	192									
100	±0.84	2.5	±0.08	193									
105	±0.88	4	±0.12	194									
115	±0.95	3	±0.10	195									
350	±1.7	4	±0.12	196									
595	±4.00	7	±0.15	197									
460	±3.2	4	±0.12	198									
525	±3.6	4	±0.12	199									
				200									

NOTE:- FOR SIZE NO. 201 ONWARDS, REFER SH. No. 05.

NOTE:- FOR SIZE NO. 201 ONWARDS, REFER SH. No. 05.

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KUN 678-02

SIGN & DATE

INVENTORY No.

SIGN & DATE

SUPERSEDES INVENTORY No.



PRODUCT STANDARD
STEAM TURBINE ENGINEERING

HW 7240197
ST 24001

PAGE 5 OF 9

CONTINUATION OF TABLE-1

d ₁	ALLOW. TOLE.	d ₂ / SIZE NO.					d ₁	ALLOW. TOLE.	d ₂ / SIZE NO.					d ₁	ALLOW. TOLE.	d ₂ / SIZE NO.				
		1.8 ± 0.08	2.65 ± 0.09	3.55 ± 0.10	5.3 ± 0.13	7 ± 0.15			1.8 ± 0.08	2.65 ± 0.09	3.55 ± 0.10	5.3 ± 0.13	7 ± 0.15			1.8 ± 0.08	2.65 ± 0.09	3.55 ± 0.10	5.3 ± 0.13	7 ± 0.15
1.5	± 0.13	201	261	321	381	441	36.5	± 0.35	501	561	621		741	165	± 1.31	801	861	921	981	1041
2	± 0.13	202					37.5	± 0.36		562	622			170	± 1.34			922	982	
2.24	± 0.13	203					38.7	± 0.37		563	623			175	± 1.36			923	983	
2.5	± 0.13	204					40	± 0.38		564	624	684		180	± 1.41			924	984	
2.8	± 0.14	205					41.2	± 0.39			625	685		185	± 1.44			925	985	
3.15	± 0.14	206					42.5	± 0.40			626	686		190	± 1.46			926	986	
3.55	± 0.14	207					43.7	± 0.41			627	687		195	± 1.51			927	987	
3.75	± 0.14	208					45	± 0.42			628	688		200	± 1.55			928	988	
4	± 0.14	209					46.2	± 0.43			629	689		206	± 1.59			929	989	1049
4.5	± 0.14	210	270	330	390	450	47.5	± 0.44	510	570	630	690	750	212	± 1.63	810	870	930	990	1050
4.87	± 0.15	211					48.7	± 0.45			631	691		218	± 1.67			931	991	1051
5	± 0.15	212					50	± 0.46			632	692		224	± 1.71			932	992	1052
5.15	± 0.15	213					51.5	± 0.47			633	693		230	± 1.75			933	993	1053
5.3	± 0.15	214					53	± 0.48			634	694		236	± 1.78			934	994	1054
5.6	± 0.15	215					54.5	± 0.50			635	695		243	± 1.83			935	995	1055
6	± 0.15	216					56	± 0.51			636	696		250	± 1.88			936	996	1056
6.3	± 0.15	217					58	± 0.52			637	697		258	± 1.93			937	997	1057
6.7	± 0.16	218					60	± 0.54			638	698		265	± 1.98			938	998	1058
6.9	± 0.16	219					61.5	± 0.55			639	699		272	± 2.02			939	999	1059
7.1	± 0.16	220	280	340	400	460	63	± 0.56	520	580	640	700	760	280	± 2.08	820	880	940	1000	1060
7.5	± 0.16	221					65	± 0.58			641	701		290	± 2.14			1001	1061	
8	± 0.16	222					67	± 0.59			642	702		300	± 2.21			1002	1062	
8.5	± 0.16	223					69	± 0.61			643	703		307	± 2.25			1003	1063	
8.76	± 0.17	224					71	± 0.63			644	704		315	± 2.30			1004	1064	
9	± 0.17	225					73	± 0.64			645	705		325	± 2.37			1005	1065	
9.5	± 0.17	226					75	± 0.66			646	706		335	± 2.43			1006	1066	
10	± 0.17	227					77.5	± 0.67			647	707		345	± 2.49			1007	1067	
10.6	± 0.18	228					80	± 0.69			648	708		355	± 2.56			1008	1068	
11.2	± 0.18	229					82.5	± 0.71			649	709		365	± 2.62			1009	1069	
11.8	± 0.19	230	290	350	410	470	85	± 0.73	530	590	650	710	770	375	± 2.68	830	890	950	1010	1070
12.5	± 0.19	231					87.5	± 0.75			651	711		387	± 2.76			1011	1071	
13.2	± 0.19	232					90	± 0.77			652	712		400	± 2.84			1012	1072	
14	± 0.19	233	293				92.5	± 0.79			653	713		412	± 2.91				1073	
15	± 0.20	234	294				95	± 0.81			654	714		425	± 2.99				1074	
16	± 0.20	235	295				97.5	± 0.83			655	715		437	± 3.07				1075	
17	± 0.21	236	296				100	± 0.84			656	716		450	± 3.15				1076	
18	± 0.21		297	357			103	± 0.87			657	717		462	± 3.22				1077	
19	± 0.22	238	298	358			106	± 0.89			658	718		475	± 3.30				1078	
20	± 0.22		299	359			109	± 0.91			659	719		487	± 3.37				1079	
21.2	± 0.23		300	360	420	480	112	± 0.93	540	600	660	720	780	500	± 3.45	840	900	960	1020	1080
22.4	± 0.24		301	361			115	± 0.95			661	721		515	± 3.54				1081	
23.6	± 0.24		302	362			118	± 0.97			662	722		530	± 3.63				1082	
25	± 0.25		303	363			122	± 1.00			663	723		545	± 3.72				1083	
25.8	± 0.26		304	364			125	± 1.03			664	724		560	± 3.81				1084	
26.5	± 0.26		305	365			128	± 1.05			665	725		580	± 3.93				1085	
28	± 0.28		306	366			132	± 1.08			666	726		600	± 4.05				1086	
30	± 0.29		307	367			136	± 1.10			667	727		615	± 4.13				1087	
31.5	± 0.31		308	368			140	± 1.13			668	728		630	± 4.22				1088	
32.5	± 0.32		309	369			145	± 1.17			669	729		650	± 4.34				1089	
33.5	± 0.32	250	310	370	430	490	150	± 1.20	550	610	670	730	790	670	± 4.46	850	910	970	1030	1090
34.5	± 0.33		311	371			155	± 1.24			671	731								
35.5	± 0.34		312	372			160	± 1.27			672	732								

REV. 19

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SUPERSEDES
INVENTORY NO.

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DIN 3771

SIGN & DATE

INVENTORY NO.
4- 1966



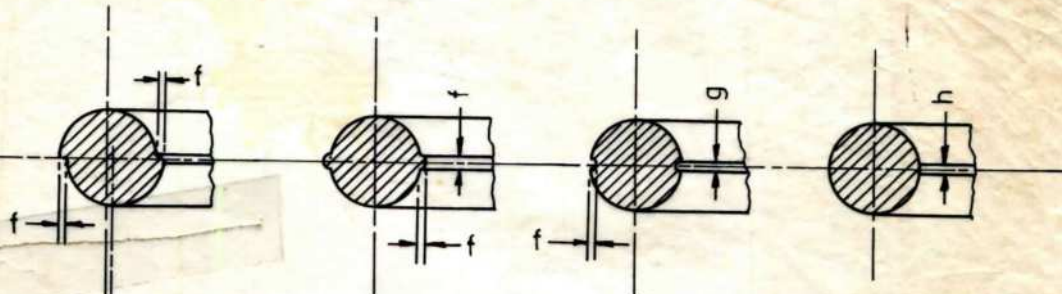
PRODUCT STANDARD
STEAM TURBINE ENGINEERING

HW 7240197
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PAGE 6 OF 9

5. QUALITY (Quality mark):-

The quality shall be according to the quality mark B' as per DIN 3770



IMPACT-OFFSET

CREST-FORMATION

NOTCHING

TRIM-FLATS

TABLE 3

TYPE OF DEFECT	PERMISSIBLE DEFECT SIZE FOR RING (Thickness d_2)		
	UPTO 2.5	UPTO 6.3	OVER 6.3
Impact offset, Crest formation Depth of notching f	0.03	0.09	0.15
Width of notching g	0.015	0.045	0.075
Deburring width h	0.4	0.7	1.0
Extent of defects like air-bubble, Flow mark in circumferential direction, Blisters, Vulcanised flash, Pores & Similar defects. 0.15	0.15	0.3	0.6
Surface roughness R_a in μm	0.4	0.63	1.0
Spots / stains	Permissible		

If similar or different defects come in one O' Ring, none of the defects shall be allowed to exceed the permissible defect size.

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STEAM TURBINE ENGINEERING

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TLV

9007 01/02

SIGN & DATE

INVENTORY No.

6.0 Material Specification :- This standard deals with
press moulded, precision, round, jointless O-Rings.

6.1 Material :- Fluoroelastomer (e.g. Viton E-60C of Du Pont)
having good resistance to operating medium, temperature
and ageing.

6.2	<u>Material Properties</u>	DIN	ASTM
	Shore - A Hardness	80-85	53505
	Density (gm./cm ³)	1.8-2.5	53479
	Tensile Strength (N/mm ²)	≥ 10	53504
	Elongation at break point (%)	≥ 150	53504
	<u>Ageing at 100°C for 168 hours</u>	53508	D572
	Change in shore-A Hardness	≤ +5	
	Change in Tensile strength (N/mm ²)	± 2.5 max.	
	Change in elongation at break point (%)	≤ -25	

Compression Set


a. 96 hours at 80°C in Water (%)	≤ 30	53517	-
b. 22 hours at 200°C in Air (%)	≤ 15	-	D395


Water Absorption

96 hours at 80°C in water (%)	≤ 1.5	53517	-
-------------------------------	-------	-------	---

Ageing at 175°C for 70 Hours in Fire Resistant Fluid:-

		DIN	ASTM
Change in Shore A Hardness	≤ -15	53521	D471
Change in Tensile Strength (%)	≤ -25		
Change in Elongation at break point (%)	≤ -20		
Increase in Volume (%)	≤ 20		
Compression Set, B (%)			
Standard Reading	≤ 20		
18 Hours cool	≤ 25		

समग्री सूची संख्या INVENTORY NO.	P-1966	REV. NO. 19	निर्माणकर्ता WORKED BY	B.S.GUPTA	16/03/03	जांचकर्ता CHECKED BY	B.S.GUPTA	16/03/2003	हस्ताक्षर एवं दिनांक SIGN & DATE	25/3/03	स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रयोग एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि उपर्युक्त के हित में होकर प्रयोग हो न किया जाए।	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.	समग्री सूची संख्या को अतिरिक्त करना है	SUPERSEDES INVENTORY NO.	हस्ताक्षर एवं दिनांक SIGN & DATE	<div style="text-align: center;">  <p>उत्पाद मानक</p> <p>PRODUCT STANDARD</p> </div>	ST 24001 HW7240197	पृष्ठ 9 का 8 Page 8 Of 9
<p>7.0 <u>Development of new vendors :-</u></p> <p>Vendors at the time of submitting technical offer against developmental enquiry are required to furnish 2 Nos. of test slabs of 150mm x 150mm x 3mm and 3 Nos. of test buttons of sizes dia 29 ± 0.5mm x height 12.5 ± 0.5 mm for carrying out test as per clause 6.2 of this standard. The samples should clearly exhibit the name of suppliers.</p> <p>In addition to the above, vendors should also furnish test results as per clause 6.2 for scrutiny of the offer by BHEL.</p> <p>8.0 <u>Delivery Conditions :-</u></p> <p>8.1 After placement of order, supplier shall furnish the followings along with main supply at an additional cost to be mentioned in the offer separately for carrying out random testing in BHEL. Test slabs, test buttons and additional O-rings for testing shall be of same batch as that of supplied material.</p> <p>a. 2 Nos. of test slabs of at least 150 mm x 150 mm x 3 mm.</p> <p>b. 3 Nos. of test buttons of dia 29 ± 0.5mm x height 12.5 ± 0.5 mm as per IS:3400 point 10.</p> <p>c. 2 Nos. of additional O-ring of size dia 30mm X 3.55mm.</p> <p>Non- conformity to stipulated properties shall make the supplies liable for rejection. Even after random testing of O-rings, the supply may be rejected if hidden defects are found at later stage.</p> <p>8.2 Acceptance of test samples does not absolve the supplier from the responsibility of quality of the remaining O-rings of their supply.</p> <p>8.3 <u>Packing & Delivery :-</u></p> <p>O-rings are to be packed in such way that they are neither soiled nor damaged during transportation and storage. O-rings which are older than 2 years need not be supplied.</p>																		

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक		ST 24001 HW7240197	
		PRODUCT STANDARD		पृष्ठ 9 का 9 Page 9 of 9	
समूची सूची संख्या INVENTORY NO. P-1966	SUPERSEDES INVENTORY NO.	8.4 Identification Every supply must be identified as under: <ul style="list-style-type: none"> i) Product Identification ii) Name of manufacturer iii) Date of Manufacture iv) Batch No. v) Quantity vi) Product Standard No. vii) Self Life or Storage Life 			
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bhaat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.		8.5 Storage O-rings are to be stored in cool, dry and dirt free environment and should be kept away from bright light.			
स्वत्वाधिकार एवं गैर-निर्माण इस प्रलेख में दी गई सूचना भारत में की इलेक्ट्रिकल्स की सम्पत्ति है इकाई प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि इसकी के बिना से हानिकारक हो न किया जाए।		8.6 TC & GC are required along with supply. 9.0 This standard is prepared based on standard KUN 678.02 BL1 and TLV 9007/ 01/02 9.1. Cross referred standards :- DIN 3770, 53479, 53504, 53505, 53508 , 53517, 53521. ASTM- D297, D 395, D412, D471, D572, D1415. KUN 678.02 BLATT-1, TLV 9007 01/02			
दिनांक SIGN & DATE 15/3/03	REV. NO. 19				
निर्माणकर्ता WORKED BY B.S.GUPTA	जांचकर्ता CHECKED BY B.S.GUPTA	15/3/03	16/3/03		

विवरण के लिए देखें मानक संख्या HW0425199, (FOR DETAILS REFER PLANT STANDARD HW0425199)

ANNEXURE-V
(F/T237/24/2168/C)

Drawings

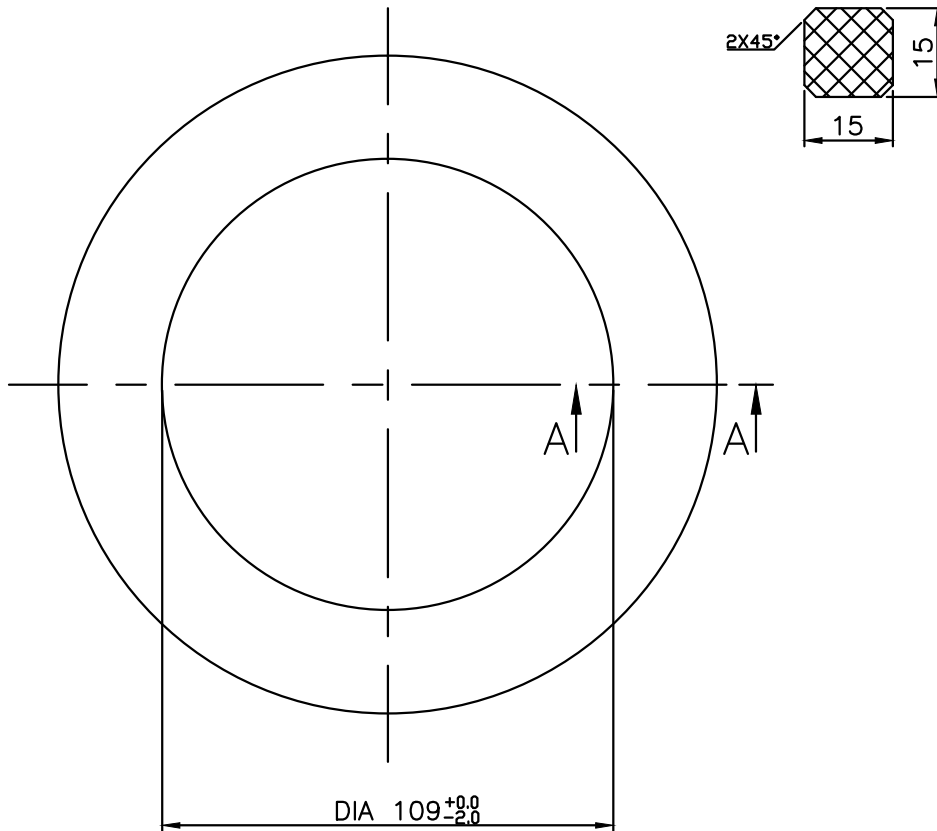
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3. 41650370045 REV: 00
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6. 41660170013 REV: 02
7. 41660170077 REV: 00
8. 41660170076 REV: 00
9. 41650170296 REV: 02

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p'yaoga nahim ik'ya j'aa j'aa kmpal ko iht maom haindr h'nterest of the company.]

saamaga/1 salucanaa Baart hoval
INVENTORY NO.
saamaga/1 salucanaa Baart hoval
REFERENCE DRG. NO.
saamaga/1 salucanaa Baart hoval
DATE

p'qama kaoNa p'xaopNa/FIRST ANGLE PROJECTION		mm.		p'p~ Djal 39 (bal)	
REV.	DATE	REV.	DATE	REV.	DATE
01	01.02.12	01	01.02.12	01	01.02.12
HXE-12-F0059		HXE-12-F0059		HXE-12-F0059	
DRG. SUPERSEDED IN AUTO CAD.		DRG. SUPERSEDED IN AUTO CAD.		DRG. SUPERSEDED IN AUTO CAD.	
maSalinaMga 'ee0230208 ema MACHINING - AA0230208 m		vaoliDMGga 'ee0621104 kl EaoNal bal WELDING-CLASS 'B' OF AA0621104		gaOsa kiTMga 'ee0621101 kl saarNal 3 GAS CUTTING-TABLE 3 OF AA0621101	

SECTION-AA



Baart hoval [laoiT/kl'sa ilaimaToD? ranipur, hardwar
BHARAT HEAVY ELECTRICALS LIMITED,
RANIPUR, HARDWAR

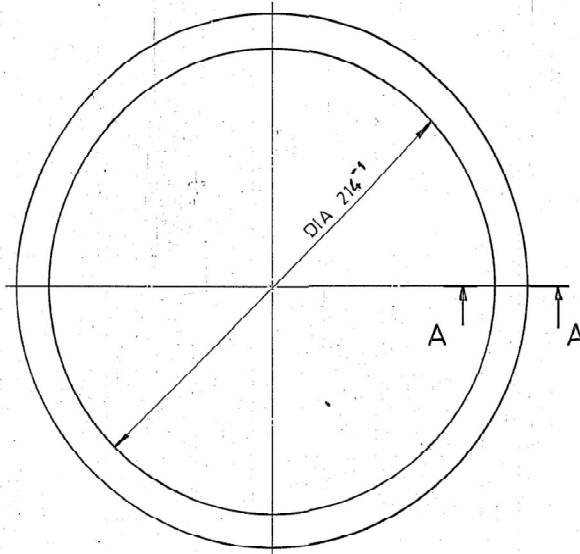
ivaBaaga DEPTT.	HT eOsaomJar Aiba* HXE	Anaup/SCALE N.T.S.	Baar ik'ga'a* Asaombalal AiBaklp ka saMaga-EmasMle k No. OF ITEMS	Maaga-EmasMle k No. OF ITEMS	Maaga-EmasMle k No. OF ITEMS
kaol/4222			0.18	01660170003	20
SalYg/TITLE VITON PACKING			kaD-koaD\ CARD CODE	AiBaklp saMaga-EmasMle k No. OF ITEMS	01
			7	41660170025	22 23 24
			pRYz saMaga-EmasMle k No. OF ITEMS	01	pRYz saMaga-EmasMle k No. OF ITEMS

A4 saaj A4 SIZE

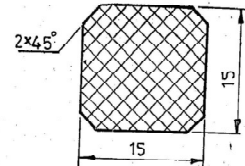
FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm)

Form DG-38

57007-10-991-3
DRAWING NO.



SECTION - AA
SCALE 2:1

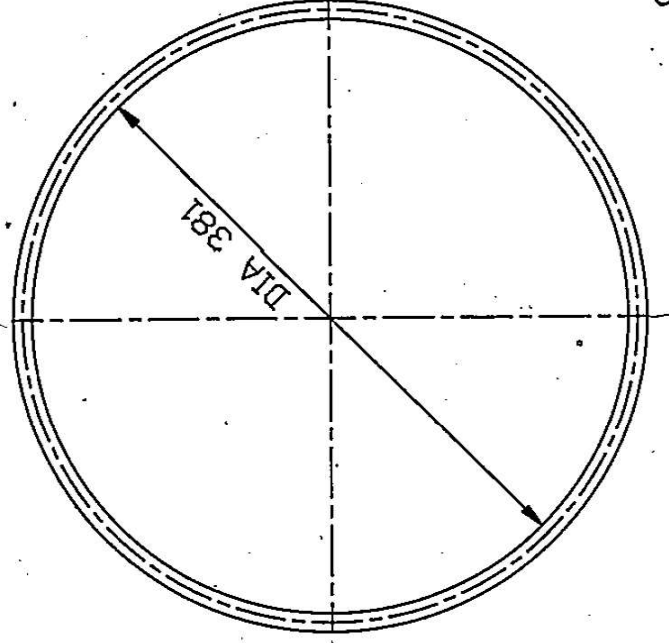


VAR. 00		REMARKS	ITEM NO.	DESCRIPTION	DRAWING NO.	W96716601066		035
CARD TYPE-3		CARD TYPE-1		CARD TYPE-2				
GMS/GR-SP. NO. 0-166-01-70002				STATUS OF DRG.				
AGREED DEPT.				NAME SIGN. DATE NO. OF VAR.				
				TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT				
				BHARAT HEAVY ELECTRICALS LTD. RANIPUR - HARDWAR.				
				DRN. NAME A.P. SAINI SIGN. DATE 19-5-84 NO. OF VAR. CHD. I. RAM 27.8.85 APPD. V.K.S. 9-11-85 73/74				
REV DATE ALTERED RHE				DEPT. GRADE OF UNTOLDIM SCALE WEIGHT (Kg) REF. TO ASSY. DRG.				ITEM NO. OF ITEMS
02 13-5-99 CHECKED HXE-99-61				01 16-12-93 CHECKED HXE-93-134				24
MATERIAL SPEC. 0503-206 (S-II) TYPE-B CHANGED TO 0503-206 (S-II) TYPE-B				IN MATERIAL SPEC. COLUMN Gr-II, TYPE-B ADDED				75/77
				TITLE PACKING				REV.
				CARD CODE 3-166-01-70045				122/23/24
				SHEET NO. 1				NO. OF SHEETS- 1

SIZE A3

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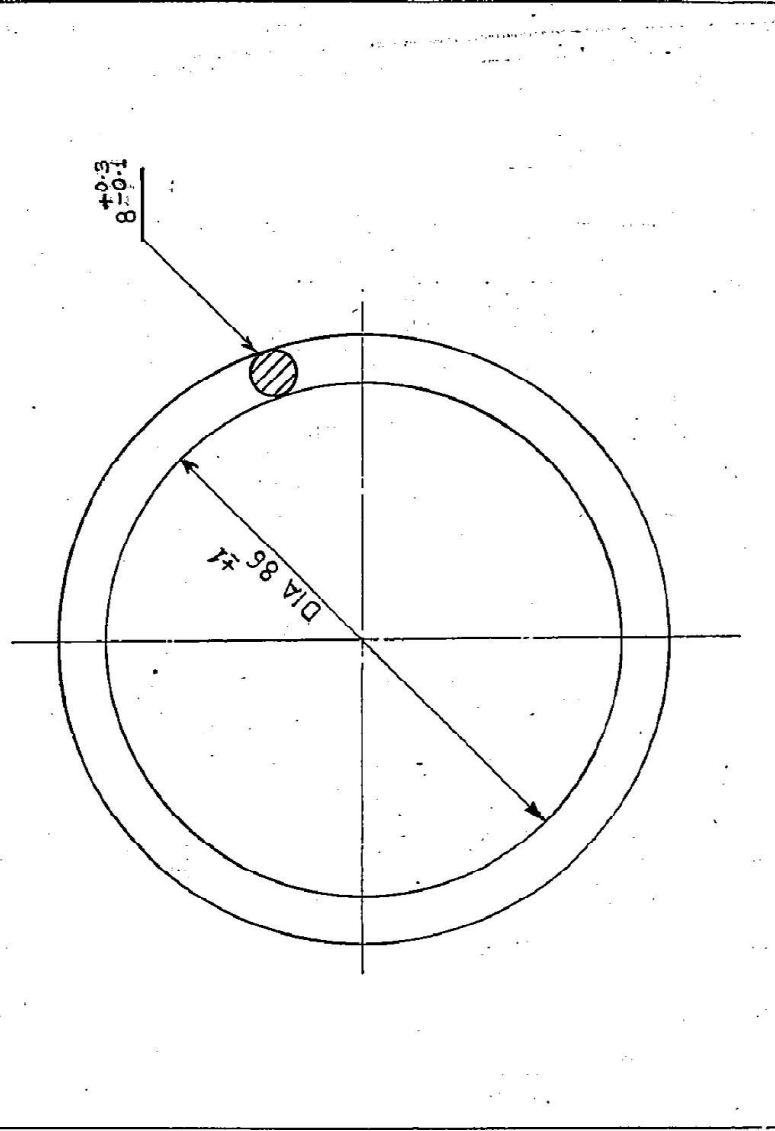
CHECKED	CHECKED	1-165-03-70029	OF DRG.
VAR.00			
AGREED DEPT.	NAME	SIGN	DATE



DIA 10

O-RING		W97716503286		040	
DESCRIPTION		ST24001		UNIT-WEIGHT	
ITEM NO	29	31	MATERIAL CODE	45	A
75	25	27	29	34	
65					
REMARKS.		VAR.		MATERIAL SPECN	
58	59	32	33	46	54
CARD TYPE-3		CARD TYPE-1		CARD TYPE-2	
28		28		28	
Bharat Heavy Electricals Ltd.		NAME		SIGN	
HARDWAR		DRN.		DATE	
29/11/90		R.M. GOPAL		29/11/90	
CHD.		P.K.G.		29-1-90	
APPD.		K.N.M.		7.8.91	
REF. TO ASSY DRG.		1-165-03-70029		ITEM NO.	
0.40		0.40		005	
SCALE		1:1		NO. OF ITEMS	
GRADE OF UNTOLDIM.		C/M/F		75	
DEPT. HXE		4-222		77	
CODE		4-222		REV.	
TITLE		DRAWING NO.		4-165-03-70045	
00		00		00	

CHECKED		01-1-93		CHECKED	HAE-93-12		NEW DRG. ADDED.		AGREED		NAME		SIGN		DATE		
GRADE OF UNTOL DIM: M/G-C/M/FAA0230208										WELDING - T'0610003							
										GAS CUTTING - T'AA0621101							



O-RING		W97716503308		00		ST 24001		005	
REMARKS	ITEM NO.	DESCRIPTION	VAR.	MATERIAL CODE	45	A	C	UNIT WEIGHT	
65	75 25 27 29	59 59 32 33 46	51 55 56 57 66						71
CARD TYPE: 3		28		CARD TYPE-1		28		CARD TYPE-2	

BHARAT HEAVY ELECTRICALS LTD.		NAME		SIGN		DATE		NO. OF	
HARDWARE		DRN.		B. SINGH		31-12-91		VAR.	
		CHD.		P. GUPTA		31-12-92			
		APPD.		K. N. M.		31-12-91		73 74	
DEPT. H.X.E.		SCALE		WEIGHT (KG)		REF. TO ASSY DRG.		ITEM NO.	
CODE 6222		1:1		0.05		1-165-03-70029		40	
TITLE		O-RING		CARD CODE		DRAWING NO.		REV.	
						4-165-03-70052		01	

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DOC REV NO.: 0

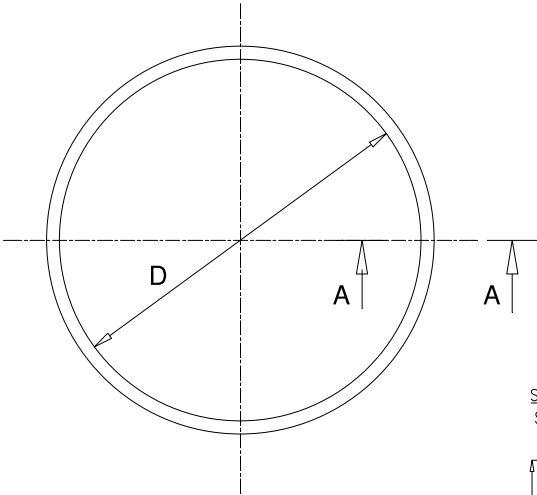
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FIRST ANGLE PROJECTION

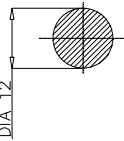
(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)

DRAWING NO. 31650170262



SECTION A-A
SCALE 20:1



VAR	D	WT.
00	1028	0.43
01	999	0.40
02	1100	0.45

TECHNICAL REQUIREMENTS: -

(1) MATERIAL IS TO CONFORM PRODUCT STANDARD ST 24001 VITON 700 RUBBER O-RING

CBOM NO.		STATUS OF DRG.	
01650170021			
AGREED DEPT.	NAME	SIGN	DATE
WT	MANISH	Sd.	-----

TYPE OF PRODUCT
OR
NAME OF CUSTOMER/ PROJECT
660/800 MW

GRADE OF UNTOL. DIM.: -		
M/CG- V/g/M/f AA 0230208		
WELDING- X/B/g/p-AA621104		
GAS CUTTING-T3'AA0621101		



BHARAT HEAVY ELECTRICALS LTD.
HARDWAR

DRN	NAME	SIGN	DATE	NO. OF VAR.
CHD	M.SINGH	Sd.	17.05.23	-
APD	JHAMENDER	Sd.	17.05.23	-
APD	N.PRAKASH	Sd.	17.05.23	73, 74

REV.	DATE	ALTERED
		CHECKED

REV.	DATE	ALTERED
		CHECKED

DEPT. HXE
CODE 4222



SCALE N.T.S
WEIGHT(Kg.) --

REF. TO ASSY. DRG.
01650170021

TITLE
O-RING

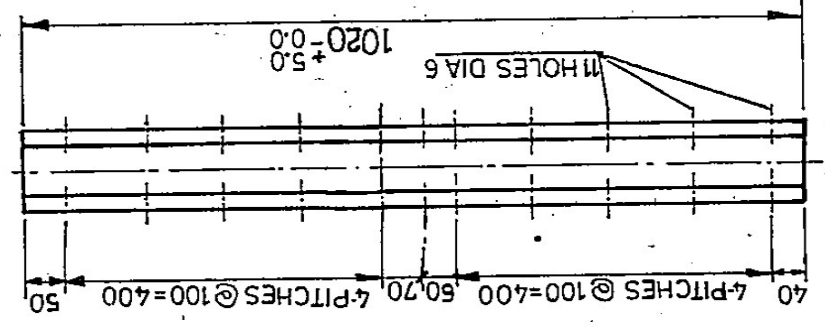
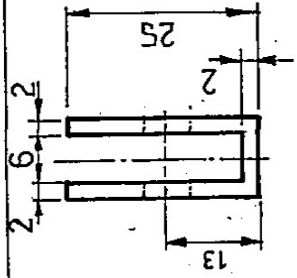
DRAWING NO.
31650170262

SHEET NO. 01 NO. OF SHEETS 01

SIZE A3

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REV	DATE	ALTERED	BY	REV	DATE	ALTERED	BY
01	16/12/93	CHECKED	13594	02	13/5/94	CHECKED	13594
HXE-93-134				HXE-99-611			
IN MATERIAL SPECN COLUMN				MATERIAL SPEC. D503.203 G.I.I.			
G.I.I, TYPE-B ADDED.				TYPE B CHANGED TO D503.206			
				G.I.I TYPE B.			
				AGREED			
				DEPT.			
				NAME			
				SIGN			
				DATE			



M.F

0-166-01-70002		0-166-01-70002		0-166-01-70002	
AGREED		NAME		SIGN	
DEPT.					
DATE					
HXE-93-134		HXE-99-611		D503.203 G.I.I.	
IN MATERIAL SPECN COLUMN		TYPE B CHANGED TO		D503.206	
G.I.I, TYPE-B ADDED.				G.I.I TYPE B.	
REMARKS		ITEM NO.		DESCRIPTION	
75 25 27 29		58 59 32 33 46		4-PITCHES @ 100=400	
CARD TYPE-3		CARD TYPE-1		CARD TYPE-2	
DEPT. HXE		GRADE OF UNTOLODIM.		SCALE	
CODE 4222		C/M/F		N.T.S.	
TITLE		WEIGHT (KG)		REF. TO ASSY DRG.	
0-166-01-70002		0.22		0-166-01-70002	
CARD CODE		CARD CODE		DRAWING NO.	
1		3		4-166-01-70013	
REV.		REV.		REV.	
75 77		75 77		75 77	
ITEM NO.		ITEM NO.		ITEM NO.	
22		22		22	
DATE		DATE		DATE	
27.8.85		27.8.85		27.8.85	
SIGN		SIGN		SIGN	
GARG R.K		GARG R.K		GARG R.K	
DRN.		DRN.		DRN.	
CHD.		CHD.		CHD.	
APPD.		APPD.		APPD.	
SAXENA VK		SAXENA VK		SAXENA VK	
VAR.		VAR.		VAR.	
45 A		45 A		45 A	
C		C		C	
MATERIAL SPECN		MATERIAL SPECN		MATERIAL SPECN	
54 55 56 57 66		54 55 56 57 66		54 55 56 57 66	
UNIT WEIGHT		UNIT WEIGHT		UNIT WEIGHT	
71		71		71	
W96716601058		W96716601058		W96716601058	
00		00		00	
0503.206		0503.206		0503.206	
G.I.I		G.I.I		G.I.I	
TYPE-B		TYPE-B		TYPE-B	
02		02		02	

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स्वाधिकार एवं गोपनीय
इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स लिमिटेड की
संपत्ति है। इसका प्रत्यक्ष या अप्रत्यक्ष रूप में किसी भी तरह
प्रयोग नहीं किया जाए जो कंपनी के हित में हानिकार हो।

संदर्भित अभिकल्प संख्या
REFERENCE DRG. NO

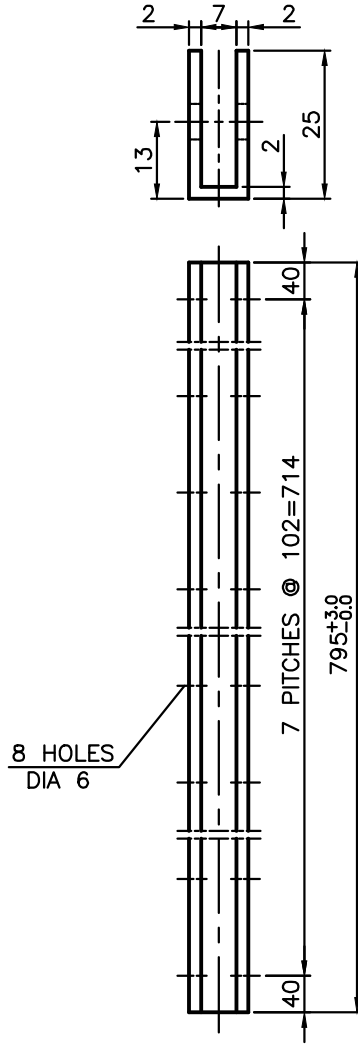
हस्ताक्षर और दिनांक/SIGN & DATE

सामान्य सूची संख्या
INVENTORY NO.

प्रथम कोण प्रक्षेपण/FIRST ANGLE PROJECTION सभी विमाएं मिलीमीटर में हैं।/ALL DIMENSIONS ARE IN mm.

फ़ॉर्म 39 (बी)
FORM 39 (B)

संशोधन REV.	दिनांक DATE	संशोधनकर्ता ALTERED BY जांचकर्ता CHD	संशोधन REV.	दिनांक DATE	संशोधनकर्ता ALTERED BY जांचकर्ता CHD	सी.बी.ओ.एम./C.B.O.M. 01660170027	अभिकल्प का स्तर STATUS OF DRG. U
						सहमत विभाग AGREED DEPTT.	नाम/NAME SIGN.
						WT.	sd/-
मशीनिंग - एए0230208 एम MACHINING - AA0230208 m			वेल्डिंग - एए0621104 की श्रेणी बी WELDING-CLASS 'B' OF AA0621104			गैस कटिंग - एए0621101 की यारणी 3 GAS CUTTING-TABLE 3 OF AA0621101	



भारत हेवी इलेक्ट्रिकल्स लिमिटेड, रानीपुर, हरिद्वार
BHARAT HEAVY ELECTRICALS LIMITED,
RANIPUR, HARDWAR

विभाग
DEPTT.



अनुपात/SCALE

भार कि.गा.
WEIGHT (KG)
0.11

नाम/NAME	हस्ताक्षर/SIGN	दिनांक/DATE	वैकल्पिक संख्या No. of Var.
निर्माणकर्ता DRN ANIL	sd/-	08.03.16	
जांचकर्ता CHD ASHISH	sd/-	08.03.16	
स्वीकृतकर्ता APCD R.BANSAL	sd/-	08.03.16	

कोड/CODE 4222



1:1

0.11

असेम्बली अभिकल्प का संदर्भ
REFER TO ASSLY. DRG.
01660170027

नग क्रमांक
ITEM NO.
06

शीर्षक/TITLE

U-GASKET

कार्ड कोड
CARD
CODE

अभिकल्प संख्या/DRAWING NO.
41660170077

पृष्ठों की संख्या
NO. OF
ITEMS
00

पृष्ठ संख्या/Sheets No. 01 पृष्ठों की संख्या/No. of Sheets 01

A4 साइज़ /A4 SIZE

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यह दस्तावेज़ एवं गोपनीय
इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स लिमिटेड की
सम्पत्ति है। इसका प्रत्यक्ष या अप्रत्यक्ष रूप में किसी भी तरह
प्रयोग नहीं किया जाए जो कंपनी के हित में हानिकार हो।

संदर्भित अभिकल्प संख्या
REFERENCE DRG. NO

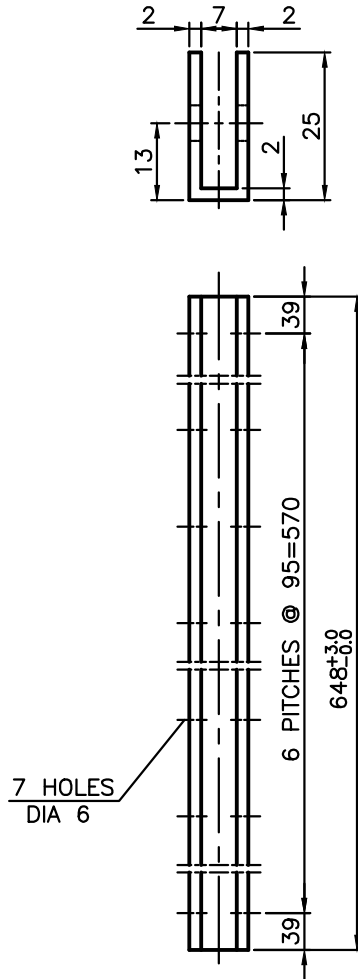
हस्ताक्षर और दिनांक/SIGN & DATE

सामान सूची संख्या
INVENTORY NO.

प्रथम कोण प्रक्षेपण/FIRST ANGLE PROJECTION सभी विमाएं मिलिमीटर में हैं।/ALL DIMENSIONS ARE IN mm.

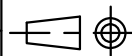
फ़ॉर्म 39 (बी)
FORM 39 (B)

संशोधन REV.	दिनांक DATE	संशोधनकर्ता ALTERED BY जांचकर्ता CHD	संशोधन REV.	दिनांक DATE	संशोधनकर्ता ALTERED BY जांचकर्ता CHD	सी.बी.ओ.एम. C.B.O.M. 01660170026	अभिकल्प का स्तर STATUS OF DRG. U
						सहमत विभाग AGREED DEPTT.	नाम/NAME SIGN.
						WT.	sd/-
मशीनिंग - एए0230208 एम MACHINING - AA0230208 m			वेल्डिंग - एए0621104 की श्रेणी बी WELDING-CLASS 'B' OF AA0621104			गैस कटिंग - एए0621101 की सारणी 3 GAS CUTTING-TABLE 3 OF AA0621101	



भारत हेवी इलेक्ट्रिकल्स लिमिटेड, रानीपुर, हरिद्वार
BHARAT HEAVY ELECTRICALS LIMITED,
RANIPUR, HARDWAR

विभाग
DEPTT.



अनुपात/SCALE
1:1

भार कि.गा.
WEIGHT (KG)
0.1

नाम/NAME	हस्ताक्षर/SIGN	दिनांक/DATE	वैकल्पिक संख्या No. of Var.
निर्माणकर्ता DRN.	ANIL	sd/-	08.03.16
जांचकर्ता CHD	ASHISH	sd/-	08.03.16
स्वीकृतकर्ता ACPD	R.BANSAL	sd/-	08.03.16

कोड/CODE 4222



अनुपात/SCALE
1:1

भार कि.गा.
WEIGHT (KG)
0.1

असेम्बली अभिकल्प का संदर्भ
REFER TO ASSLY. DRG.
01660170026

नग क्रमांक
ITEM NO.
06

शीर्षक/TITLE

U-GASKET

कार्ड कोड
CARD
CODE

अभिकल्प संख्या/DRAWING NO.
41660170076

पृष्ठों की संख्या
NO. OF
ITEMS
00

पृष्ठ संख्या/Sheets No. 01 पृष्ठों की संख्या/No. of Sheets 01

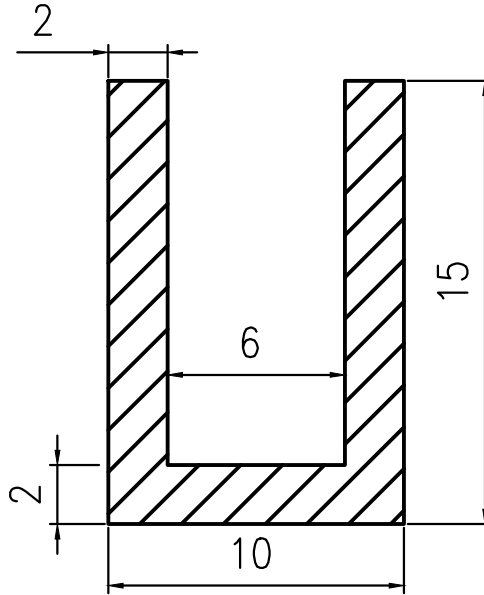
A4 साइज़ /A4 SIZE

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FIRST ANGLE PROJECTION


(ALL DIMENSIONS ARE IN mm) FORM DG 39(B)

REV	DATE	ALTERED	RAJESH	REV	DATE	ALTERED	RAJESH	CBOM No.			STATUS
02	15.01.21	CHECKED	D.K.YADAV	01	23.07.20	CHECKED	D.K.YADAV	01650170017			OF DRG
HXE-21-F0009				HXE-20-F0024				AGREED	NAME	SIGN	DATE
VAR. 02 ADDE. LENGTH UPDATED IN VAR. 00 . & 01 .				VAR. 01 ADDED.				DEPT.	WT.	MANISH	Sd-22.03.18
								</			



50/ THE REST

VAR.	LENGTH (M)	WT. (KG)
00	33.6	3.0
01	20.2	2.0
02	22.22	2.2

INVENTORY No.	DEPT. HXE CODE 4222	 BHARAT HEAVY ELECTRICALS LTD HARDWAR	DRN	NAME	SIGN	DATE	No. OF OF VAR
			CHD	D.K.YADAV	Sd.	15.02.18	
			APD	N.PRAKASH	Sd.	15.02.18	
			SCALE	WEIGHT(Kg)	REF.TO ASSY.DRG.	ITEM No.	
		N.T.S.	SEE TABLE	11650170030	-	-	
TITLE			DRAWING No.			REV.	
U-GASKET			41650170296			02	
			SHEET No. 01			No.OF SHEETS	01

SIZE A4