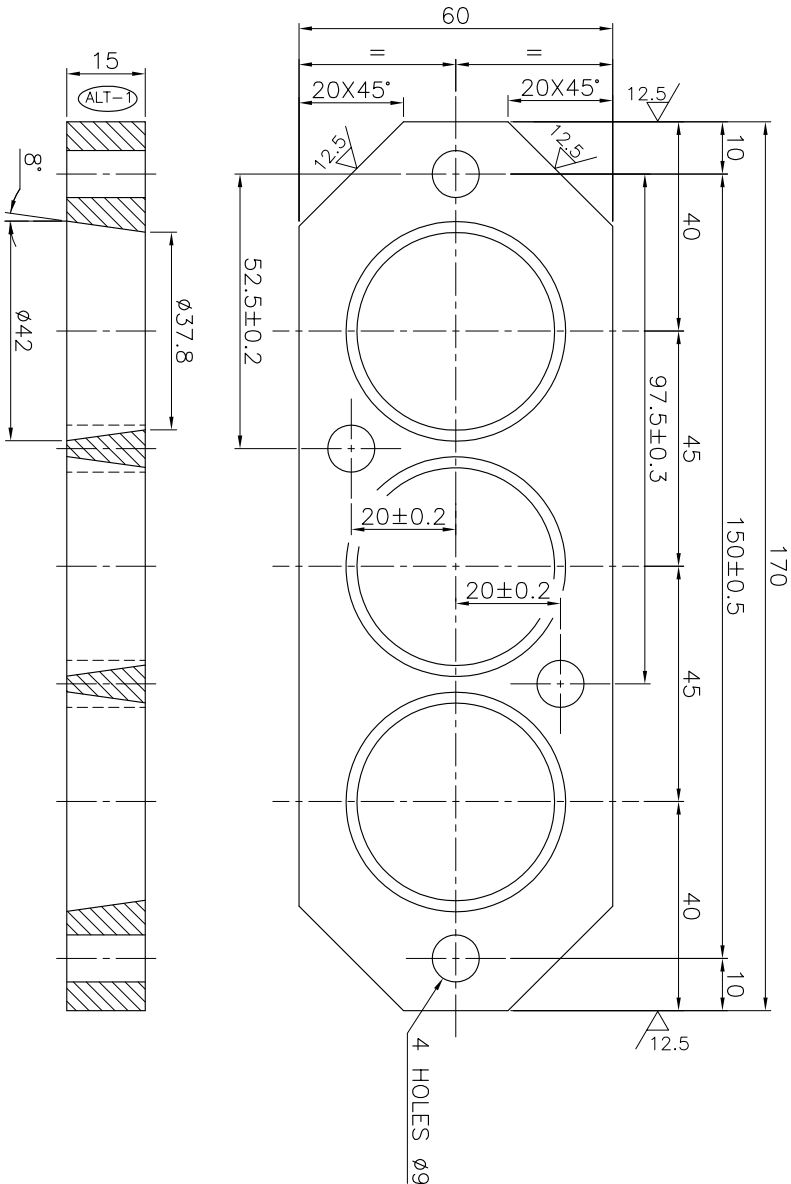


DRG. NO. 3 445 12 64 051

<u>TOOL LIST</u>		
IT. NO.	TOOL NO.	DESCRIPTION
1.	1605078	DRILL J/G FOR 4 HOLES



NOTES:-

1. REMOVE ALL SHARP EDGES.
2. THIS IS A COMMON DRAWING OF 6FRA6068 AND 6FXA7059.
- THE C&D NO. FOR 6FXA7059 IS 5890/008.


[illegible]

ADDITIONAL INFORMATION  
3TWD.096.037, ALT.2  
STATUS OF DRAWING

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT	6FRA-6068


SURFACE ROUGHNESS R <sub>a</sub> mm ISO 3073 67	GRADE NUMBER	
	N1	N2
0.025	0.05	0.1
0.05	0.1	0.2
0.1	0.2	0.4
0.2	0.4	0.8
0.4	0.8	1.6
0.8	1.6	3.2
1.6	3.2	6.3
3.2	6.3	12.5
6.3	12.5	25
12.5	25	50
25	50	100

DISTRIBUTION OF PRINTS  
TME- 1 TXM- 3  
TNX- 1

			
BHARAT HEAVY ELECTRICALS LTD. BHOPAL			
NAME	SIGN	DATE	NO. OF
A.K.J.	-sd-	7.9.10	VAR.
D.K.	-sd-	7.9.10	
A.S.	-sd-	7.9.10	
APPD			

REV.	DATE	ALTERED	SDB
02	29.07.21	CHECKED	ABHIJIT <i>ABHIJIT</i>
		APPD.	ABHIJIT <i>ABHIJIT</i>

REV.	DATE	ALTERED	AKJ
		CHECKED	DK
01	17.06.11	APPD.	SANTO

DEPT. T.M.E.	GRADE OF UN.TOL.	SCALE	WEIGHT(K.G.)	REF.TO ASSY.DRG.	ITEM NO.	NO.OF ITEM
CODE	DIM. $\phi$ /M/F					
	TY200070	NTS	0 445 10 64 051		018	001

IN BOM SPEC. OF ITEM 001  
MODIFIED.



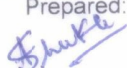
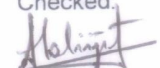

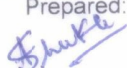
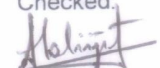

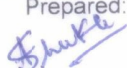
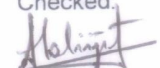
100L LISI WAS NOT ON.

(TCM-334)


## **THRUST CARRYING PIECE**

DRAWING NO.	REV.
3 445 12 64 051	02


739491/2022/HEP-TXM20500

	<b>PRODUCT STANDARD</b> <b>TME DIVISION, BHOPAL</b>		<b>TM 11495 Rev.01</b>																			
	TME/2011		Page 01 of 03																			
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"> <b>COPYRIGHT AND CONFIDENTIAL</b>  The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD.  It must not be used directly or indirectly in any way detrimental to the interest of the company </p>	<p align="center"> <b><u>SPECIFICATION FOR GENERAL STRUCTURAL STEEL FOR COMPONENTS OF</u></b>  <b><u>3PHASE TRACTION MOTOR TYPE 6FRA-6068 / 6FXA-7059</u></b> </p>																					
	<p><b>1.0 SCOPE :</b></p> <p><b>1.1</b> The material covered by this specification are required to be used in manufacture of 3-phase Traction Motor type 6FRA-6068 / 6FXA-7059. The material shall comply with this specification instructions in chemical composition, mechanical properties and all other listed requirements.</p> <p><b>2.0 Governing Standard :</b></p> <p><b>2.1</b> The material shall conform to <del>IS: 2062 '92 Grade Fe 410 WB</del> IS:2062-2011, Gr.250BR (Killed) or latest version.</p> <p><b>3.0 Technical Requirement:</b></p> <p><b>3.1 Chemical Composition:</b></p> <p>The chemical composition shall be generally specified in <del>IS:2062 '92 Gr. Fe 410 WB</del> IS:2062-2011, Gr.250BR (Killed) or latest version. The material when supplied shall have the following chemical composition.</p> <table border="1" data-bbox="399 1205 1257 1433"> <thead> <tr> <th></th> <th></th> <th>Variation over the Max. specified limit in %</th> </tr> </thead> <tbody> <tr> <td>C</td> <td>0.22 (Max)</td> <td>0.02</td> </tr> <tr> <td>Mn</td> <td>1.50 (Max)</td> <td>0.05</td> </tr> <tr> <td>P</td> <td>0.045 (Max)</td> <td>0.005</td> </tr> <tr> <td>S</td> <td>0.045 (Max)</td> <td>0.005</td> </tr> <tr> <td>Si</td> <td>0.4 (Max)</td> <td>0.03</td> </tr> </tbody> </table> <p><b>3.2 Mechanical Properties :</b></p> <p><b>3.2.1 Mechanical Properties Test :</b></p> <p>The mechanical properties shall be generally specified in <del>IS:2062 '92 Gr. Fe 410WB</del> IS:2062-2011, Gr.250BR (Killed) or latest version. The material when supplied shall have the following mechanical properties.</p>						Variation over the Max. specified limit in %	C	0.22 (Max)	0.02	Mn	1.50 (Max)	0.05	P	0.045 (Max)	0.005	S	0.045 (Max)	0.005	Si	0.4 (Max)	0.03
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Revision : 01  Date:  28/07/2021	Distribution  TXM QMX TME TSD	Qty.  1 1 1 1	<table border="1"> <tr> <td colspan="2" data-bbox="708 1688 979 1778"> Approved :     28/07/21  (Manish Verma) </td> <td data-bbox="979 1688 1219 1897"> Prepared:     (Abhishek Shukla) </td> <td data-bbox="1219 1688 1369 1897"> Checked:     (Abhijit Jain) </td> <td data-bbox="1219 1688 1369 1897"> Date  28.07.2021 </td> </tr> </table>		Approved :   28/07/21 (Manish Verma)		Prepared:   (Abhishek Shukla)	Checked:   (Abhijit Jain)	Date  28.07.2021													
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	<b>PRODUCT STANDARD</b> <b>TME DIVISION, BHOPAL</b>	<b>TM 11495 Rev.01</b>  <b>Page 02 of 03</b>																											
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<p style="writing-mode: vertical-rl; transform: rotate(180deg);"> <b>COPYRIGHT AND CONFIDENTIAL</b>  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 </p>	Tensile Strength - 410 N/mm <sup>2</sup> (min) Yield Strength - <20mm(t) = 250N/mm <sup>2</sup> (min) 20-40mm(t) = 240 N/mm <sup>2</sup> (min) >40mm(t) = 230 N/mm <sup>2</sup> (min) Elongation - 23% Impact Strength - 27 J Bend test (Internal dia) – 2t (min)																												
	<b>4.0 Test and Test Methods</b>																												
	<b>4.1 Sampling :</b>  The sampling for the tests shall be as follows :																												
	<table border="1"> <thead> <tr> <th>Sl. No.</th> <th>TESTS</th> <th>No. of Samples for Test in Prototype Test</th> <th>No. of Samples for Test in Routine Test</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Dimension</td> <td>100% of offered Qty.</td> <td>20% of offered Qty.</td> </tr> <tr> <td>2</td> <td>Concentricity (If called in drawing)</td> <td>-do-</td> <td>-do-</td> </tr> <tr> <td>3</td> <td>Chemical analysis</td> <td>2 nos. or 4% whichever is more, test piece from test coupon in each heat treatment batch.</td> <td>2 nos. or 4% whichever is more, test piece from test coupon in each heat treatment batch.</td> </tr> <tr> <td>4</td> <td>Tensile Strength yield strength &amp; Elongation %</td> <td>-do-</td> <td>-do-</td> </tr> <tr> <td>5</td> <td>Impact Test</td> <td>2 nos. or 4% whichever is more, test piece from test coupon in each heat treatment batch.</td> <td>2 nos. or 4% whichever is more, test piece from test coupon in each heat treatment batch.</td> </tr> <tr> <td>6</td> <td>Bend Test</td> <td>-do-</td> <td>-do-</td> </tr> </tbody> </table>	Sl. No.	TESTS	No. of Samples for Test in Prototype Test	No. of Samples for Test in Routine Test	1	Dimension	100% of offered Qty.	20% of offered Qty.	2	Concentricity (If called in drawing)	-do-	-do-	3	Chemical analysis	2 nos. or 4% whichever is more, test piece from test coupon in each heat treatment batch.	2 nos. or 4% whichever is more, test piece from test coupon in each heat treatment batch.	4	Tensile Strength yield strength & Elongation %	-do-	-do-	5	Impact Test	2 nos. or 4% whichever is more, test piece from test coupon in each heat treatment batch.	2 nos. or 4% whichever is more, test piece from test coupon in each heat treatment batch.	6	Bend Test	-do-	-do-
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6	Bend Test	-do-	-do-																										
	<b>4.2</b> Metallurgical test certificate for prototype and bulk supplies shall be from raw material manufacturer (Mill TC) / NABL approved laboratory.  <b>4.3 Freedom from defects</b>  <b>4.3.1</b> All finished components shall be reasonably free from surface flows, laminations, rough / lagged and imperfect edges and all other harmful defects.  <b>4.3.2</b> Minor surface defects may be removed by the manufacturer by grinding provided the thickness is not reduced locally by more than 4% below the minimum specified thickness.																												

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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	<b>5.0 <u>Marking :</u></b>  Each components shall be legibly marked with the following information.  i) Grade of Steel ii) Number of identification mark, by which it can be traced from which metal it was made. iii) Manufacturer's name, Sl. No. and batch No. etc.		
	<b>6.0 <u>Information for tenderer</u></b>  <b>6.1</b> The tenderers shall study carefully the drawing and specifications before they submit their offers.  <b>6.2</b> The tenderers shall note that BHEL do not undertake to supply drawings for jigs and fixtures, tooling's, templates and / or process sheets or any other such details.  <b>7.0 <u>Deviations:</u></b>  While submitting the offer the tenderer shall furnish a list of deviations, if any, from this specification / concerned drawing.  <b>8.0 <u>Packing :</u></b>  <b>8.1</b> The components shall be suitably packed to prevent transit / long storing damage. <b>8.2</b> The components shall coated with antirust varnish / compound after inspection. <b>8.3</b> Varnished components shall be wrapped in polythene paper followed by corrugated paper. <b>8.4</b> The wrapped components shall finally be sealed in the polythene bag. <b>8.5</b> The sealed components shall be finally packed in wooden box filled with saw dust to prevent transit damage of machined surface.  <b>9.0 <u>Ultrasonic Test:</u></b>  Supplier shall use ultrasonic tested plates before manufacturing the tension bars, cross piece and accessory bars. The plates shall be free from any internal harmful defects/ cracks. The test results/ records to be shown to the inspecting authority. However during prototype and routine test, ultrasonic test to be carried out on 100% offered quantity at firm's premises. The cost of such tests to be borne by the suppliers. Firm shall provide all facilities free of cost to the inspecting authority at his works.  <b>10.0 <u>Reference:</u></b>  This specification is equivalent to CLW's specification no. 4TMS.096.055 ALT.-5.		