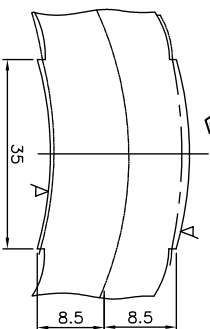


[illegible]

VIEW OF GROOVE
ALONG 'X'
AT ONE PLACE


[illegible]

ADDITIONAL INFORMATION
3.TWD.095.036 (ALT.-03)

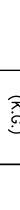
TYPE OF PRODUCT
OR
NAME OF CUSTOMER/PROJECT

**TRACTION MOTOR
HS15250A**

**TRACTION MOTOR
HS15250A**

 भारत भारी इलेक्ट्रिकल्स लि. भारत भारी इलेक्ट्रिकल्स लि. BHARAT HEAVY ELECTRICALS LTD. BHOPAL			NO. OF VAR.
NAME	SIGN	DATE	
DRN. S.D.BHAGAT	—sd—	06/10/10	
CHD. D.K.	—sd—	06/10/10	
APPD. SANAND	—sd—	06/10/10	

DISTRIBUTION OF PRINTS

INVENTORY NO.											
REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHECKED			CHECKED			CHECKED			CHECKED
04	19.05.13	APPROVED	03	21.02.13	APPROVED	02	06.09.12	APPROVED	01	09.07.11	APPROVED
ZONE		CRITICAL TO QUALITY		ZONE		IN BOM WT. 24KG. WAS 28KG.		ZONE		IN NOTE 2 IMPACT WAS IMPACT & ZONE NOTE-4,7 & DRG. UPDATED.	
DIMENSIONS ARE "O" MARKED & NUMBERED.NOTE-8 ADDED.											
(TCM33+)											
TITLE											
COMMUTATOR VEE RING											
DEPT. TIME											
UNTL. DIMS. GR.											
											
SCALE											
WEIGHT (K.G.)											
24.00											
REF. TO ASSY. DRG.											
ITEM NO.											
1 439 42 60 051											
007											
DRAWING NO.											
REV.											
3 439 42 60 055											
04											
SHT. NO.											
NO. OF SHT.											
01											

NOTE:-

1. ALL DIMENSION ARE IN mm^{10046}
2. DIA. 343.125 & DIA 242+0. SHALL BE CONCENTRIC TO EACH OTHER WITHIN+0.03 MM
3. MATL.-TO IS:1875/71 CLASS-4 OR IS:7283-74,MATL. COMPOSITION TO IS:5517.69,GR C-45 (CARBON STEEL FORGING TO SPECN NO. TM10457.
4. FROM RAW MATERIAL DRG.NO. 34394260053
5. a) MATERIAL SHALL BE HEAT TREATED.
b) MECH. PROPERTIES SHALL BE AS FOLLOWS.

YIELD POINT	$\geq 50\text{KG/mm}^2$	TENSILE STRENGTH	$\geq 70\text{KG/mm}^2$
ELONGATION	$\geq 17\%$	REDUCTION OF AREA	$\geq 45\%$
HARDNESS	HB220~260*	IMPACT VALUE	$\geq 8\text{KG m/cm}^2$

5. FINISHED PRODUCT SHALL BE COATED WITH ANTI-RUST VARNISH/COMPOUND TO PROTECT THE MATERIAL FROM RUSTING.
6. STAMP HERE TRADE IDENTIFICATION MARK.
7. METALLURGICAL TESTING FOR PROTO TYPE SUPPLIES SHALL BE CARRIED OUT BY BHFL AND FOR BULK SUPPLIES, METALLURGICAL TEST SHALL BE DONE BY a) BHFL OR b) NABL OR BHFL APPROVED LABORATORY TO BE WITNESSED BY REPRESENTATIVE OF BHFL ZONAL INSPECTION CELL IN CASE OF (b)
8. ALL 5 NOS. "◇" MARKED DIMENSION ARE CRITICAL TO QUALITY (CTQ) & SL.NO. OF CTQ DIMENSION ARE INSCRIBED IN ◇ e.g.◇9.

TOOL LIST			
IT. NO.	TOOL NO.	DESCRIPTION	
	1414151	DOUBLE ANGLE GAUGE	
	1414152	SINGLE ANGLE GAUGE 38° WITH 2 R	
	1414153	DEPTH / RAD GAUGE 10,5 R X 31 LG	
	1414155	113 SNAP GAUGE	
	1414156	45 LG. LGTH GAUGE	
	1414158	GROOVING TOOL	
	1407389	SINGLE PT. RAD. PROFILE GROOVING TOOL	
	1407390	SINGLE PT. RAD. GROOVE PROFILE TOOL	
	1414269	PROFILE DOVETAIL GROOVING TOOL	
	1571049	PIN GAUGE -320	
	1414167	CALLIPER GAUGE 261,00-0,2	
	1571255	TOOL FOR DOVETAIL 6 DEG. (RH)	
	1571256	TOOL FOR DOVETAIL 6 DEG. (RH)	
	1571257	DOVETAIL CHECKING GAUGE	
	1579378	PIN GAUGE 242 ₀ *0,046	

SIZE A3



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**SPECIFICATION FOR INNER / OUTER BEARING STOPPERS COMMUTATOR NUT,
DISC SPRING AND COMMUTATOR VEE RING**

1. FOREWARD :

The tenderers may please note that BHEL do not undertake to supply them drawings for forged profile necessary drawings for fixture, toolings templates and for process details. BHEL may, however comment suggest alteration / modifications to the suppliers drawings and methods, if required, during the manufacture, testing / inspection of the prototypes and / or use of the materials in BHEL's production.

2. SCOPE :

This specification covers the manufacturing, testing, inspection, packing and supply of fully machined or forged components viz inner /outer bearing stopper (PE & CE), Comm. Vee ring, Comm. Nut & disc spring.

3. SPECIFICATION :

The forging shall conform to the specification mentioned in the drawings of individual item.

4. MANUFACTURING :

All forging shall be manufactured from killed steel produced by the open hearth, electric, basic-oxygen or combination of these process, or any other suitable method which will meet the requirement of the standard.

5. CHEMICAL COMPOSITION :

The chemical composition analysis of steel forging when made in accordance with IS:228'59 shall be as per specification mentioned in the drawings of individual item.

6. MECHANICAL PROPERTIES :

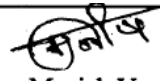
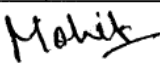
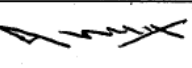
Should as per grade of specification mentioned in the drawing.


7. DIMENSIONAL TOLERANCES :


All the forgings shall be free from harmful defects and unless otherwise mentioned in the drawing. The forging tolerances shall conform to the following.

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Revision Details: As per revision sheet			Distribution	Qty.	Approved:  Manish Verma (Sr.DGM/TME)		
Rev. No.	Date of Rev.	Reaffirmed Year	TME	1	 Prepared: Mohit Parothia Engineer/TME	 Checked: Anurag Sharma Manager/TME	Date of 1 st Issue 09.03.11
			TXM	1			
			TNX	1			
00	09.03.11	Feb 2022	QTM	2			

<p style="writing-mode: vertical-rl; transform: rotate(180deg);"> 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 </p>		PRODUCT STANDARD TME DIVISION, BHOPAL	TM 10457
		TME/2011	PAGE 02 OF 05
		<p> For drop and process forging : IS:3469'1974 (Pt.2) For upset forging : IS:3469'1974 (Pt.3) Weight & Quantity tolerance: IS:3469'1974 (Pt.1) </p> <p> 8. <u>HEAT TREATMENT</u> : The normalising temperature should be as per table-2 of IS:2004'1991 for those items which are as per IS:2004'1991 for other as per drawing. </p> <p> 9. <u>RAW MATERIAL IN BRIEF PROCESS METHOD</u> </p> <ul style="list-style-type: none"> i) Full precaution shall be taken to avoid hydrogen flaking shrinkage and cracks during heat treatment / annealing. ii) Total wall thickness of maximum 5mm. shall be kept on forged profile for proof machining and then final machining. iii) These materials shall be finally machined to the dimensions and profiles shown in the relevant drawings. <p> 10. <u>TEST AND TEST METHOD</u> </p> <p> 10.1 The supplier shall offer the prototype (two Nos.) for inspection and test at his works with prior intimation to BHEL. They should provide all necessary facilities for inspection and testing. After the test it is considered necessary by the authorised representative of BHEL Inspecting authority to carry out further additional test or trials of the prototype at BHEL, the supplier will arrange the same by quickest means. </p> <p> 10.2 The supplier shall provide all facilities to the inspecting officers at his works, to inspect and test the equipment at various stages of manufacture. </p> <p> 10.3. Testing and approval of the design drawing and prototype by the purchaser shall in no way absolve the supplier of his responsibility under the terms of contact for the item supplied. </p> <p> 10.4 The sampling for test for forged items will be as follows : <ul style="list-style-type: none"> i) Dimension checks : 20% of the offered quantity (suppliers should check themselves 100%) ii) Mechanical Test : Minimum 2 test pieces or 3% of offered quantity which ever more, selected random. </p>	



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<p>a) Tensile</p> <p>b) Elongation</p> <p>c) Hardness</p> <p>d) Bend test</p> <p>e) Deflection test for disk spring</p> <p>iii) Chemical composition</p> <p>iv) Grain flow / grain structure</p> <p>v) Magniflux test / Die – penetrate test</p> <p>vi) Ultrasonic test or radiographic test</p>	<p style="font-size: 3em;">}</p>	<p>Values as per relevant drawing</p>
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14. INFORMATION REQUIRED WITH TENDER.

- i) Details of forged facilities available with tenderers for undertaking the job.
- ii) Details of machining and testing facilities available.
- iii) Details of heat treatment facilities which is to be followed at various stages.
- iv) Details of availability of correct grade steel with them and the source from which the material has been is proposed to be obtained.
- v) The percentage of reduction in forging to be offered by them.
- vi) Quality assurance plan : Must be submitted as per annexure -1
- vii) Clause wise comments have to be furnished by the tenderer. Vague comments like noted and understood are not accept. Compliance have to be clearly stated. Otherwise BHEL reserve the right to reject the offer.

QAP to be submitted by the vender shall cover the following aspects :-

1. Index page
2. Copy of ISO 9001 certificate from NABCB registered body.
3. Organization chart clearly bringing out the quality control set up.
4. Qualification of the personal manning only the quality control set up.
5. List of M&P and testing facilities.
6. Process flow chart indicating step-by step process of manufacture of an item or a family of items for which the process is same.
7. Details of sub vendors.

Name of item	Sub Vendors	ISO Status	Inspection plan of sub Vendors

The sub vendors should have all the requisite infrastructure of manufacturing and Testing Facilities, preferably under one roof.

8. **Quality Assurance System:-**Inspection and testing plan with formats to be filled up for:-
Incoming material
Process control
Product control



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This must be furnished in the following format :

Subject / Product Process	Sample size & its frequency of inspection	Parameters of inspection	Mode of inspection /equipment used	Acceptance limit /criteria specified value as per Drg. / Specification	Format No. where records will be kept

NOTE :

- i) Sample formats used for recording must be submitted.
- ii) General ISO9001 documents not to be submitted in QAP.
- iii) Firm must not depend only on TC for incoming material.
- iv) Record of SN 7.8 above shall be checked during inspection at firm's premises.
- v) QAP has to be specified for each product based on relevant Specification/Drawing.

15. This spec. is equivalent to CLW spec. no. 4TMS.095.001 Rev. no.01.

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