



PRODUCT STANDARD  
TME DIVISION, BHOPAL

TM 10457

TME/2011

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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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					 Manish Verma (Sr.DGM/TME)		
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	<p>For drop and process forging : IS:3469'1974 (Pt.2) For upset forging : IS:3469'1974 (Pt.3) Weight &amp; Quantity tolerance: IS:3469'1974 (Pt.1)</p>		
	<p>8. <b><u>HEAT TREATMENT</u></b> : 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. <b><u>RAW MATERIAL IN BRIEF PROCESS METHOD</u></b></p> <ul style="list-style-type: none"><li>i) Full precaution shall be taken to avoid hydrogen flaking shrinkage and cracks during heat treatment / annealing.</li><li>ii) Total wall thickness of maximum 5mm. shall be kept on forged profile for proof machining and then final machining.</li><li>iii) These materials shall be finally machined to the dimensions and profiles shown in the relevant drawings.</li></ul>		
	<p>10. <b><u>TEST AND TEST METHOD</u></b></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 :</p> <ul style="list-style-type: none"><li>i) Dimension checks : 20% of the offered quantity (suppliers should check themselves 100%)</li><li>ii) Mechanical Test : Minimum 2 test pieces or 3% of offered quantity which ever more, selected random.</li></ul>		



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a) Tensile  
b) Elongation  
c) Hardness  
d) Bend test

e) Deflection test for disk spring

iii) Chemical composition  
iv) Grain flow / grain structure  
v) Magniflux test / Die – penetrate test  
vi) Ultrasonic test or radiographic test

Values as per relevant drawing

ALT.1

- do  
- do  
-100% of the offered quantity  
-5% of the offered quantity of finished components at random

**11. INSPECTION**  
Bulk inspection of all the items shall be carried out at the manufacturers premises by BHEL inspector. All metallurgical test shall be carried out by the authorised representative of a) BHEL or (b) NABL approved laboratory, In case of b) it should be in presence of representative of BHEL inspection cell. The cost of inspection & testing including cost of material consumed in testing shall be borne by the supplier. The manufacturers shall also produce test certificate as recorded by them along with their product offered for inspection.

**12. MARKING :**  
Each component shall individually marked on suitable location with supplier's name / identification mark, SI. No. before offering the material to the inspector.

**13. PACKING**  
The packing component shall be suitably packed to prevent transit /long storing damage. For this purpose the following precautions to be taken in sequence.

- i) The component shall be coated with antirust varnish / compound after inspection and passed .
- ii) Varnished component shall be properly wrapped in polythene paper followed by corrugated paper
- iii) The wrapped equipment shall be finally sealed in thick polythene bag.
- iv) The sealed components shall be finally packed in wooden crate /box fitted with saw dust to prevent transit damage of machined surface.



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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
<b>NOTE :</b> <ul style="list-style-type: none"> <li>i) Sample formats used for recording must be submitted.</li> <li>ii) General ISO9001 documents not to be submitted in QAP.</li> <li>iii) Firm must not depend only on TC for incoming material.</li> <li>iv) Record of SN 7.8 above shall be checked during inspection at firm's premises.</li> <li>v) QAP has to be specified for each product based on relevant Specification/Drawing.</li> </ul> <p>15. This spec. is equivalent to CLW spec. no. 4TMS.095.001 Rev. no.01.</p>					

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