

**TECHNICAL SPECIFICATION  
BANARAS LOCOMOTIVE WORKS, VARANASI**

INDEX

SPEC. NO.  
MISC - 401

**PURCHASE SPECIFICATION  
FOR CRITICAL HARDWARE OF HHP  
LOCOMOTIVES**

SHEET

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DATE

24.12.2015

**1. GENERAL**

This specification covers development and supply of critical hardware items for HHP locomotives.

**2. APPLICATION:-**

This specification covers manufacture and supply of critical hardware which are being used for critical application and having close accuracy dimensional and geometrical features along with special heat treatment and metallurgical aspect. Its manufacturing involves quality forging followed by critical machining including thread rolling and heat treatment. The qualification of threads of these hardware is to be maintained as per Engineering Test Instruction (ETI)-506. The accuracy level on the certain geometrical/dimensional parameters such as pitch diameter, major & minor diameter, thread lead error, root radius, thread length, thread quality, roundness & angularity of threads and thread concentricity about bolt axis etc should be maintained as per the drawing and specification.

**3. COMPLIANCE WITH STANDARDS**

The Hardware items shall comply with the following specifications:

1. ETI – 506 (Specification for quality control of critical fasteners)
2. A. I – 2400 (specification for general tolerance)
3. A.I – 1975 (Specification for part identification)
4. EMS - 82
5. EMS – 155
6. GM – 300M
7. GM – 280M
8. SAE – 4140H
9. SAE – 3140
10. AISI – 1075
11. AISI – 8642H
12. AMS – 6302 & 6304

**4. SUBMISSION OF TENDER QUOTATION:**

The supplier shall submit clause-wise comments on this specification.

- 1) List of machines/Equipment available for manufacture.
- 2) List of Equipment available for carrying out test as detailed in specifications.
- 3) Past performance.
- 4) Quality assurance programme including machines/equipment to be used in the manufacture/testing.
- 5) Deviation in the technical specifications shall be clearly brought out by the tenderer in the quote.

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Revision R1: Specification Revised.

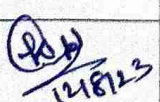
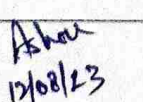
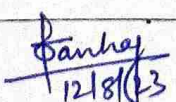
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
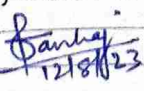
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<p><b>5. SCOPE:-</b> The scope of work shall includes:-</p> <ol style="list-style-type: none"> <li>Submission of quality assurance plan (QAP) separately for each of the hardware items before offering for prototype inspection.</li> <li>Manufacture and supply of hardware items after the approval of quality assurance plan (QAP).</li> <li>Inspection of the prototype samples will be carried out by representative of CDE at firms' premises.</li> <li>Manufacture and supply balance quantity after approval of prototype samples.</li> </ol> <p><b>6. INFRASTRUCTURE REQUIRED:</b></p> <ol style="list-style-type: none"> <li>The successful bidder must have QS 9000/ISO 9000 certified company for manufacture of hardware items.</li> <li>The firm must have in-house following infrastructural facilities:-               <ol style="list-style-type: none"> <li>Hot forging facility with 300 ton forging press capacity or higher along with induction heater for billet heating or cold forging facility up to M-42.</li> <li>CNC turning center machining facility.</li> <li>Center-less grinding machining facility.</li> <li>Power Press Machine</li> <li>Thread rolling facility.</li> <li>Phosphate treatment and plating facility.</li> <li>Magna-flux testing facility.</li> <li>Continuous heat treatment facility performing normalizing, hardening &amp; tempering along with temperature controls, data logging and history recording with SCADA control software.</li> <li>Complete metallurgical testing facility including spectrometer for chemical analysis, UTM machine for tensile testing, Impact testing, microscope with image analyzer, profile projector and hardness testing etc.</li> <li>Complete inspection facility for measurement of close accuracy dimensional and geometrical parameters including the following:                   <ul style="list-style-type: none"> <li>➤ Pitch diameter,</li> <li>➤ Major &amp; minor diameter,</li> <li>➤ Thread lead error,</li> </ul> </li> </ol> </li> </ol>				
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<ul style="list-style-type: none"> <li>➤ Root radius,</li> <li>➤ Thread length,</li> <li>➤ Thread quality,</li> <li>➤ Roundness &amp; angularity of threads,</li> <li>➤ Thread concentricity about bolt axis etc.</li> </ul>			
<p><b>7. INSPECTION AT MANUFACTURER WORKS:</b></p> <p>a) BLW authorized representative to be constituted by CDE/BLW, shall undertake inspection of prototype at firm's premises. Number of pieces to be inspected by representative of CDE/BLW as prototype shall be at the sole discretion of CDE/BLW and would depend on process getting fully established leading to defect free products. Balance quantity shall be inspected by CQAM/BLW.</p> <p>b) Qualification of threads should be as per Engineering Test Instruction (ETI) - 506.</p> <p>c) Inspecting officer of BLW shall at their discretion, witness some or all the tests as stated above at any stage in the production of the component. The supplier shall provide all necessary facilities free of cost and responsibility to the Inspecting Officer for the purpose of testing/inspection. The supplier shall make available all production records connected with the production.</p> <p>d) The supplier will submit following test certificates separately for each of the hardware item during prototype inspection:</p> <ul style="list-style-type: none"> <li>➤ Chemical composition test certificate.</li> <li>➤ Mechanical properties test certificate.</li> <li>➤ Microstructure test certificate with photograph.</li> <li>➤ Hardness check report.</li> <li>➤ Tensile test piece for cross check at BLW.</li> <li>➤ Layout dimensional check reports as per drawings.</li> <li>➤ Heat treatment process documentation.</li> </ul> <p>e) At least two weeks clear notice will be given by the supplier to BLW while issuing call letter for prototype inspection.</p> <p><b>8. IDENTIFICATION MARKING:</b> Identification marking should be done on each item.</p> <p><b>9. PACKING CONDITION:</b> The following conditions will be applied for packing:</p> <ul style="list-style-type: none"> <li>➤ Threaded area must be cleaned before packing.</li> <li>➤ Suitable anti rust must be applied before packing.</li> </ul>			
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- Each hardware item should be packed separately.
- Thread of each hardware item should be protected by plastic cap separately as to ensure that there is no damage during transit & handing.
- Final packing will be done wooden box separately.
- The following information will be provided on the wooden box:
  - BLW purchase order no.
  - Item description & part no.
  - Year of manufacturing
  - Manufacturer details

**10. TRANSPORTATION:**

The hardware items shall be transported with suitable arrangement so as to ensure that there is no damage during transit and delivery.


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
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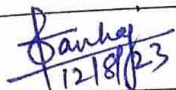
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