



TD-106-1 Rev No. 5  Form No.		<b>PRODUCT STANDARD</b> <b>PULVERISERS</b> <b>HYDERABAD</b>		<b>Product</b> <b>STD NO.</b>	<b>BA50075</b>																		
				Rev No <b>02</b>																			
				Page <b>1</b> of <b>6</b>																			
<div style="display: flex; justify-content: space-between;"> <div style="width: 15%;"> <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> </div> <div style="width: 85%; text-align: center;"> <p><b><u>TECHNICAL SPECIFICATION FOR MANUFACTURING &amp; QUALITY CONTROL OF LEAD BRONZE BUSHING FOR SUPPORT BEARING OF TUBE MILL.</u></b></p> <p><b>1.0 <u>PURPOSE:</u></b></p> <p>The present specification defines the required quality and the general conditions for manufacture, inspection and acceptance of the bushings made from lead bronze centrifuged wheels intended for support bearings of tube mills.</p> <p>To these requirements have to be added the specifications which the manufacturer normally meets in order to ensure the required quality and guarantee its material, taking into account, its modes of operation and its experience.</p> <p><b>2.0 <u>GUARANTEED CHARACTERISTICS:</u></b></p> <p>The guaranteed characteristics should be as follows:</p> <p>GRADE : CuSn10 Pb10</p> <p><b><u>CHEMICAL COMPOSITION:</u></b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">ELEMENT</th> <th style="width: 40%;">CHEMICAL COMPOSITION %</th> <th style="width: 10%;"></th> <th style="width: 30%;"></th> </tr> </thead> <tbody> <tr> <td>Cu</td> <td>Rest</td> <td rowspan="6" style="text-align: center; vertical-align: middle;">:</td> <td rowspan="6">           Total impurities shall be less than 1.0% with             Fe &lt; 0.25% Si &lt; 0.01%            Al &lt; 0.01% &amp; S= nil,             And <math>(Sn + Zn/2) \times 100</math>  <math>\frac{\quad}{(Cu + Sn + Zn)} &gt; 8.5</math> </td> </tr> <tr> <td>Sn</td> <td>9.0 - 11.0</td> </tr> <tr> <td>Pb</td> <td>8.0 - 11.0</td> </tr> <tr> <td>Zn</td> <td>&lt; 2.0</td> </tr> <tr> <td>Ni</td> <td>&lt; 2.0</td> </tr> <tr> <td>P</td> <td>&lt; 0.30</td> </tr> </tbody> </table> </div> </div>						ELEMENT	CHEMICAL COMPOSITION %			Cu	Rest	:	Total impurities shall be less than 1.0% with  Fe < 0.25% Si < 0.01% Al < 0.01% & S= nil,  And $(Sn + Zn/2) \times 100$ $\frac{\quad}{(Cu + Sn + Zn)} > 8.5$	Sn	9.0 - 11.0	Pb	8.0 - 11.0	Zn	< 2.0	Ni	< 2.0	P	< 0.30
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<b>Revisions:</b>  <b>Refer to record of revisions:</b>		<b>Prepared:</b> G.S.N.M. RAO	<b>Approved:</b> JKG	<b>Date:</b> 06.11.95																			

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**MECHANICAL PROPERTIES:**

Tensile strength	Yield Strength	Elongation
22 Kg/mm <sup>2</sup>	14 Kg/mm <sup>2</sup>	6%

The bushings shall be continuous/centrifugal castings.

3.0 **MANUFACATURING CONDITIONS:**

3.1 **GENERAL:**

The manufacture of the parts is carried out according to the drawings and according to the present specification.

The wheels are centrifuged and rough machined according to the dimensions given on the drawings.

3.2 **MARKING:**

The bushings or centrifuged wheels are marked after having been machined according to the indications on the drawings, in order to ensure the identification and their tracing. The marking will comprise on the two parallel edges.

- drawing number and item.
- serial number of the wheel.
- supplier's identification marks.

These marks shall ensure the traceability with the heat mark and shall appear on all inspection documents.


4.0 **INSPECTION AND ACCEPTANCE CONDITIONS:**

See Table in Appendix A.

5.0 **DOCUMENTS:**

All the inspection documents requested in Appendix A. These documents shall include:

- Recording of dimensions for each centrifugal wheel/bushing.
- Chemical analysis certificates.
- Mechanical test certificates.
- Liquid penetrant testing certificates.

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6.0 **PACKING:**

The castings shall be properly packed and despatch to avoid damage in transmit & in storage.

7.0 While submitting the offer, following documents should be enclosed with the quotation.


- Complete foundry equipment and management details.
- Reference list of similar type of supplies.
- Quality plan for production.

8.0 Reference documents given along with this specification.

VAR NO.	DRG.NO.	MATL. CODE	MILL
01	2-62-109-50245 BEARING SHELL	BA9750075013	BBD 4772
02	2-62-108-50151 BEARING SHELL	BA9750075021	BBD 4760
03	2-62-103-50312 BEARING SHELL	BA9750075030	BBD 3448

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<b>APPENDIX -A</b> <b>INSPECTION AND ACCEPTANCE CONDITIONS.</b>						
KIND OF INSPECTION	CRITERIA REFERENCES	INSPECTION METHODS	CRITERIA	INSPECTION FREQUENCY	SUPPORT DOCUMENTS	
Dimensional	Drawings.	Instruments	The centrifuged wheels and / or the bushings must comply with the drawing indications.	Each wheel or bushing	Dimensional readings	
Aspect		Visual	No Foundry defect detrimental to the parts function is tolerated (shrinkage Cavities, cracks, cold lap pores...)	Each wheel or bushing		
Surface condition.	Drawings.	Visotactile or roughness meter.	The surface conditions must comply with the drawing indications.	Each wheel or bushing		
Chemical analysis	This standard (pt.2)	Spectro or chemistry.	The heat analysis must comply with the values guaranteed by the standard of the product in reference.	Each heat	Specific certificates	
Tensile test	-D0-		The maximum tensile strength and the yield point must comply with values guaranteed by the standard of the product in reference (2).	Each Wheel	certificates	
Liquid penetrant test.	Appendix - B		Indications	Severity levels	100% of the surfaces for each centrifuged wheel or bushing.	Certificates
				Operating face		
			Linear and aligned	AR-LR (3) (4)		
			Non linear	SR 1 (3) (4)		
<div> <div> <p>1. According to NF A00 001 – see appendix –C</p> <p>2. Test samples taken iN a length allowance or extra thickness of the part.</p> <p>3. These criteria do not concern the indicators given by the lead.</p> <p>4. See appendix.</p> </div> </div>						

# PRODUCT STANDARD

## PULVERISERS

### HYDERABAD

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## APPENDIX -B

### LIQUID PENETRANT TEST CRITERIA COPPER ALLOY CASTINGS.

LEVEL	001	01	1	2	3	4	5				
Size of the smallest indication taken into account	0.3		1.5		2			3			
SR (2) Non linear indications	(1) Maximal number of	5	8	8	12	16	20				
	Maximal size of indication.	1	3 6 (4)	5 10 (4)	8 16 (4)						
LR (2)	Ordering of indications.	Isolated or cumulated	Isolated	Cumulated	Isolated	Cumulated	Cumulated				
			Cumulated	Cumulated	Cumulated	Cumulated	Cumulated				
AR (2) Linear and aligned indications.	Maximal lengths of indications (mm) (1)	0	1	2 (5)	4 (5)	6 (5)	10 (5)	16 (5)	25 (5)	40 (5)	60 (5)
		0	1	3 (5)	6 (5)	10 (5)	16 (5)	25 (5)	40 (5)	60 (5)	100 (5)
		0	2	5 (5)	10 (5)	16 (5)	25 (5)	40 (5)	60 (5)	100 (5)	160 (5)

1. In a frame of 105 x 148mm.
2. The indication is linear if  $L \geq 3$  1 with L: length and 1: width of the indication.
3. The indications are aligned if numbering of 3 or more and if the distance between them is less than 2 mm – non linear – or if less than the greater of the indications. The length taken into account is the distance between the beginning of the first indication and the end of the last one.
4. Presence of Lumina.
5. Value doubled on rough casting.

[illegible]