

TD-106-1 Rev No. 5 Form No.		PRODUCT STANDARD PULVERISERS HYDERABAD		Product STD NO.	BA89018																		
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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. <u>TECHNICAL SPECIFICATION FOR MANUFACTURING & QUALITY CONTROL OF LEAD BRONZE BUSHING FOR SUPPORT BEARING OF WET BALL MILL</u> 1.0 PURPOSE: 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 wet ball mills. 2.0 GUARANTEED CHARACTERISTICS: The guaranteed characteristics should be as follows: GRADE: CuSn10 Pb10 <u>CHEMICAL COMPOSITION:</u> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">ELEMENT</th> <th style="width: 40%;">CHEMICAL COMPOSITION %</th> <th style="width: 45%;"></th> </tr> </thead> <tbody> <tr> <td>Sn</td> <td>9.0 - 11.0</td> <td rowspan="2">Total impurities shall be less than 1.0% with</td> </tr> <tr> <td>Pb</td> <td>8.0 - 11.0</td> </tr> <tr> <td>Zn</td> <td>< 2.0</td> <td rowspan="2">Fe < 0.25% Si < 0.01% Al < 0.01% & S= nil,</td> </tr> <tr> <td>Ni</td> <td>< 2.0</td> </tr> <tr> <td>P</td> <td>< 0.30</td> <td rowspan="2">And $\frac{(Sn + Zn/2) \times 100}{(Cu + Sn + Zn)} > 8.5$</td> </tr> <tr> <td>Cu</td> <td>Rest</td> </tr> </tbody> </table>						ELEMENT	CHEMICAL COMPOSITION %		Sn	9.0 - 11.0	Total impurities shall be less than 1.0% with	Pb	8.0 - 11.0	Zn	< 2.0	Fe < 0.25% Si < 0.01% Al < 0.01% & S= nil,	Ni	< 2.0	P	< 0.30	And $\frac{(Sn + Zn/2) \times 100}{(Cu + Sn + Zn)} > 8.5$	Cu	Rest
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Revisions: Refer to record of revisions:		Prepared: K PAVAN	Approved: CHANDRA MOHAN	Date: 18.03.2020																			

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MECHANICAL PROPERTIES:

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

The bushings shall be centrifugal castings.

3.0 MANUFACTURING 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 their 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 dispatch to avoid damage in transmit & in storage.

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

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

8.0 Reference documents given along with this specification.

VAR NO.	DRG.NO.	MATL. CODE	MILL
01	2-62-216-00005 BEARING SHELL CASTING	BA9789018010	WBM 4074
02	2-62-216-00006 BEARING SHELL CASTING	BA9789018029	WBM 3262

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APPENDIX -A INSPECTION AND ACCEPTANCE CONDITIONS.						
KIND OF INSPECTION	CRITERIA REFERENCES	INSPECTION METHODS	CRITERIA	INSPECTION FREQUENCY	SUPPORT DOCUMENT	
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	100% of the surfaces for each centrifuged wheel or bushing.		Certificates
			Severity levels			
			Operating face			
			Linear and aligned	AR-LR (3) (4)	AR-LR 2 (3) (4)	
			Non linear	SR 1 (3) (4)	SR 2 (3) (4)	

1. According to NF A00 001 – see appendix –C

2. Test samples taken iN a length allowance or extra thickness of the part.

3. These criteria do not concern the indicators given by the lead.

4. See appendix.

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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				
			Isolated	Cumulated	Isolated	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)	33
		0	1	3 (5)	6 (5)	10 (5)	16 (5)	25 (5)	40 (5)	33	
		0	2	5 (5)	10 (5)	16 (5)	25 (5)	40 (5)	33		

1. In a frame of 105 x 148mm.
2. The indication is linear if $L \geq 3$ with L : length and l : 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. Thickness of the casting.
5. Presence of Lumina. Value doubled on rough casting.

[illegible]