Bharat Heavy Electricals Limited
(A Government of India Undertaking)
Boiler Auxiliaries Plant
Indira Gandhi Industrial Complex

RANIPET – 632 406- INDIA

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ENQUIRY NO. :5250515E
ENQUIRY DATE : 20/09/2016
DUE DATE : 15/10/2016

Sub: Requirement of Bush as detailed bellow.

Sl No	Description	Quantity (In Nos)	Delivery Requirement
001	Material Code R55433960000 SINTERED BLADE SHAFT BUSH D186; AS PER DRG NO:4-55-328-02963 & BHEL TCD:RTF:321.	256	30.12.2016

Ranipet	Technical Delivery Conditions (TDC) For BLADE SHAFT BUSH COPPER BASE (SINTERED BRONZE)	Doc.Ref.	TDC:RTF:321
		Rev.No.	00
		Date:	19 08 2015
		Page No.	01 OF 02

1.0 SCOPE

1.1 This TDC specifies the requirements for supply of Blade Shaft Bush.

1.2 Ref: DIN 1705-Cast material 2.1052, BHEL APPROVED Drawing.

Base: Copper –Tin

The self lubricating properties of this alloy are obtained by the addition of solid lubricant. The solid lubricant is homogeneously and finely distributed throughout the structure. The material has low ductility. The material is suitable for use with conventional lubricants.

2.0 Chemical properties

Element	C	Sn	P	Sn	Pb	Zn	Ni	Fe	CU
Required Value (%)	0.8-1	12-13	0.15-0.2	12-13	0.010-0.05	0.030-0.05	0.010-0.05	0.033-0.05	Remaining value

3.0 Mechanical properties

Tensile strength (N/mm^2)	80 (Min)
Compressive strength (N/mm^2)	360 (Min)
Young's Modulus (N/mm^2)	49000 (Min)
Hardness	60 HB (Min)

4.0 Physical properties

Coefficient of linear thermal expansion (1/K)	$18X10^{-6}$
Density (g/cm^3)	Approx. 6.8
Temperature range (°C)	-100 to 350

Prepared by	Reviewed by	Signature	Approved by
19.08.2015	ENGG(Fans)		19/08/15 (Head / QA)
	QC (Proc)		
	MPL		
	Purchase		
	QA		

Issued by Quality Assurance

5.0 Tribological Properties

Solid lubricant, graphite	% By weight	6
	% By volume	18 to 19
Limit value pU (dry running)		1.5 W/mm^2
Coefficient of friction	Dry	0.15 to 0.22
	Water	0.13 to 0.18

6.0 Inspection

6.1 Dimension and surface finish should be as per approved Drawing.
6.2 Weight of the individual Bush shall be submitted by the vendor, to be checked for drawing requirement.
6.3 Visual inspection: No linear crack is permitted.

7.0 Surface requirement, marking and painting.

7.1 Surface to be protected.
7.2 Melt No./Heat No., specification and maker's emblem shall be stamped or Stenciled on each component.

8.0 Test Certificate

8.1 Guarantee and Test Certificate are to be submitted by the vendor.
8.2 Test certificate in English shall be submitted for following properties as per 3.1 of EN 10204 (Pl see Cl.2.0 above) Melt No. / Heat No. wise.

Record of revisions

Rev No.	Clause revised	Revision made	Date
00	--	Original Issue	19 08 15

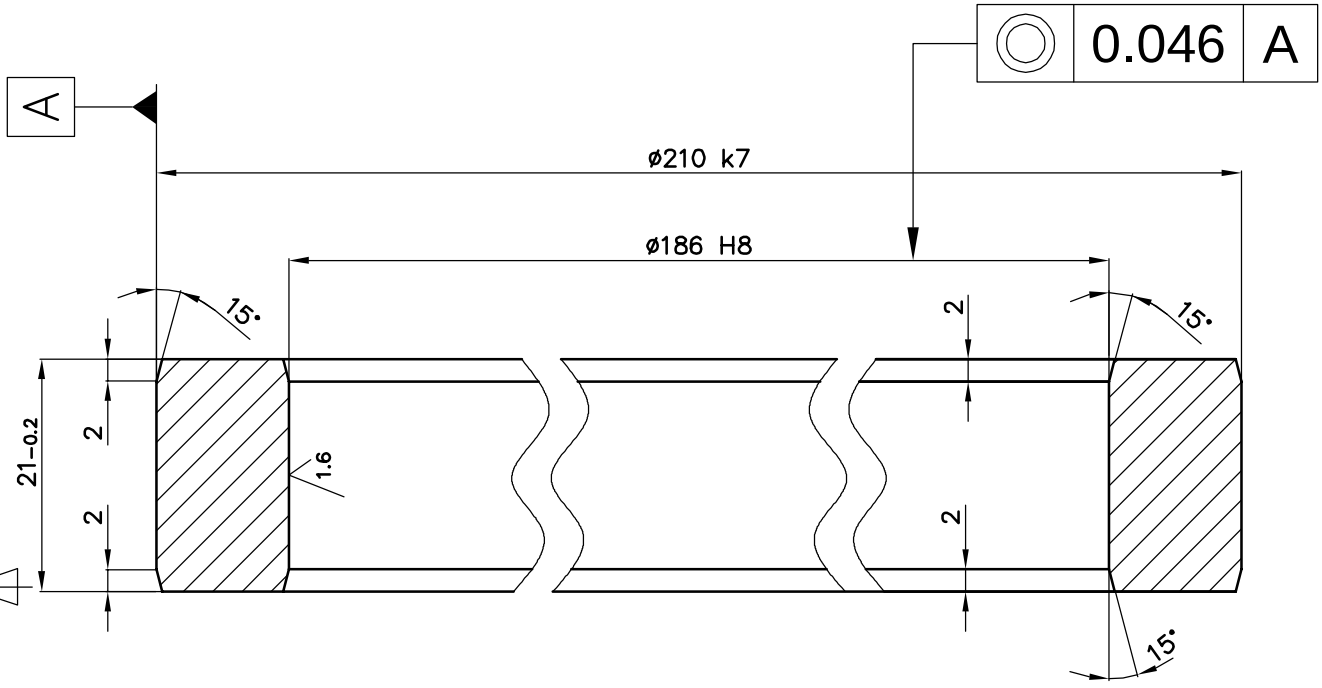
REV	DATE	ALTERED
		CHECKED

ALL DIMENSIONS ARE IN MILLIMETRES

FOR PRODUCTION

REF. PR:QA:590 FOR PAINTING
REF. PR:QA:500 FOR UNTOL. DIMNS.
REF. APPLICABLE GMS FOR MATCODE&SPEC.

3.2 1.6



DIMENSION	TOLERANCE
186 H8	+0.072 +0.000
210 k7	+0.050 +0.004

ITEM NO.	DESCRIPTION	STD	MATL. CODE / MATL. SPECN.	A / C	UNIT / DI	UNIT WT. / QTY
01	BLADE SHAFT BUSH D 210 / D186x21		961620186000 / H-Cu-Sn 86.13/6-1 T2			1.060 / 1

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: BOILER AUXILIARIES PLANT,
RANIPET – 632 406.

	NAME	SIGN	DATE	NO.OF VAR
DRN	DHANA	–Sd/–	13.09.15	
CHD	A.V.N	–Sd/–	14.09.15	
APPD	A.V.N	–Sd/–	16.09.15	

DEPT	GRADE OF UNTOL.DIM	SCALE	WEIGHT (KG).	REF. TO ASSY./OLD DRG.	ITEM NO.	NO. OF ITEMS
FANS	PR: QA: 500	N.T.S	1.060	V7015530		
CODE 864						

TITLE	CARD CODE	DRAWING NO.	REV
BLADE SHAFT BUSHING D186	U 01	4-55-328-02963	

Size A4