



**TECHNICAL SPECIFICATION FOR GRAPHITE ALLOY BUSHINGS/BEARINGS
TFS:1001A/REV.02**

1.0 Scope:

Design, manufacture and supply of Graphite alloy bushings/bearings used in low speed rotating shafts of tilt mechanism and damper assembly of windboxes / burners. Bushings shall be supplied in machined condition to meet the dimensional requirements as per the Variant or Style # indicated in the enquiry.

2.0 Items

Item No.	Item Description	Material Code	Reference Drawing
Item 1	Graphite Alloy Damper Bearing	970380010000	4-45-320-01618A
Item 2	Graphite Alloy Bushing	970380020000	3-45-000-01273A/Var 03
Item 3	Graphite Alloy Bushing	970380030000	3-45-000-01283A/Var 08
Item 4	Graphite Alloy Bushing	970380040000	3-45-000-01283A/Var 09

3.0 Purpose

Graphite alloy bushings are used in shafts, where maintenance of bushings/bearings is remote.

4.0 Technical parameters

Material	Graphite alloyed with metal
Mechanical Properties	Tensile Strength: Approx. 6000 psi Compressive Strength: Approx. 21000 psi Hardness: Scleroscope scale 40-50 Apparent density: Approx. 2.3 g/cc Coefficient of thermal expansion: Approx. 5.6×10^{-6} mm/mm °C
Working temperature	400 °C
Features	Self-lubricating, dimensionally stable at all working temperature conditions, low coefficient of friction, shall work without any lubrication
Dimensions	Shall be as per the specified variant of BHEL drawing against the material code specified in the above table.

Prepared	Checked	Approved
Dheeraj Kumar	Venkateswarlu M	G Saravanakumar



5.0 Packing

Vendor shall use liberal packing material for shipment with proper handling instructions.

6.0 Documents required

Vendor shall submit point-wise confirmation to the specification.

7.0 Inward Inspection

Visual inspection

Dimensional check

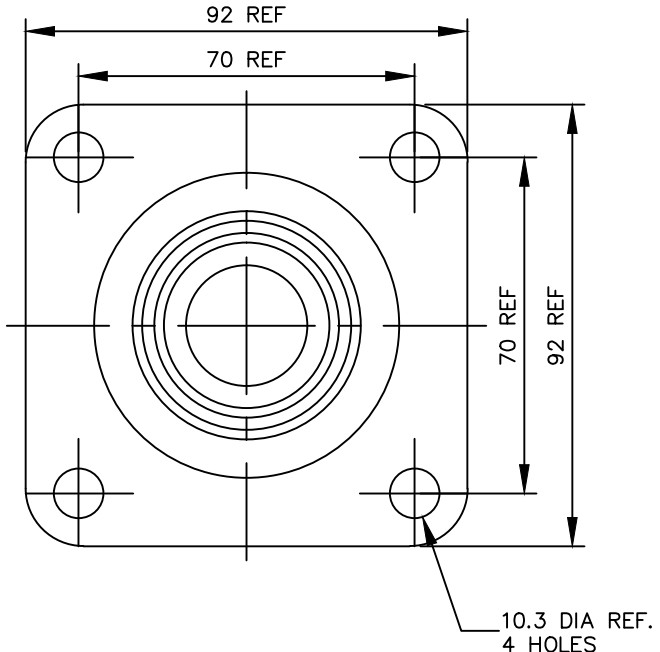
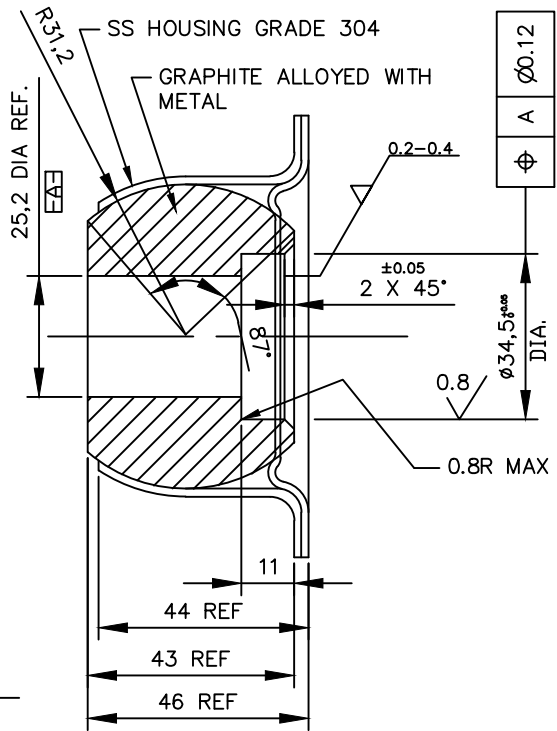
Check for any damages

Prepared	Checked	Approved
Dheeraj Kumar	Venkateswarlu M	G Saravanakumar

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REV	DATE	ALTERED :DHEERAJ KUMAR
01	12.11.2014	CHD & APPD:G SARAVANAKUMAR
RADIUS OF BEARING ADDED		

FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER PLANT STD. NO TP 023 0299



- NOTE:
1. ALL DIMENSIONS ARE MILLIMETERS
 2. UNSPECIFIED TOLS : DIMS ±0.8
 3. REFER ASSLY DRAWING NO 2-45-000-01392A
 4. TECHNICAL SPECIFICATION REFER TFS:1001A

	DAMPER BEARING				0.500
VARIANT NUMBER	DESCRIPTION	STD	MATERIAL CODE	A/C/P	UNIT WEIGHT
			MATERIAL SPECN	UNIT	QUANTITY



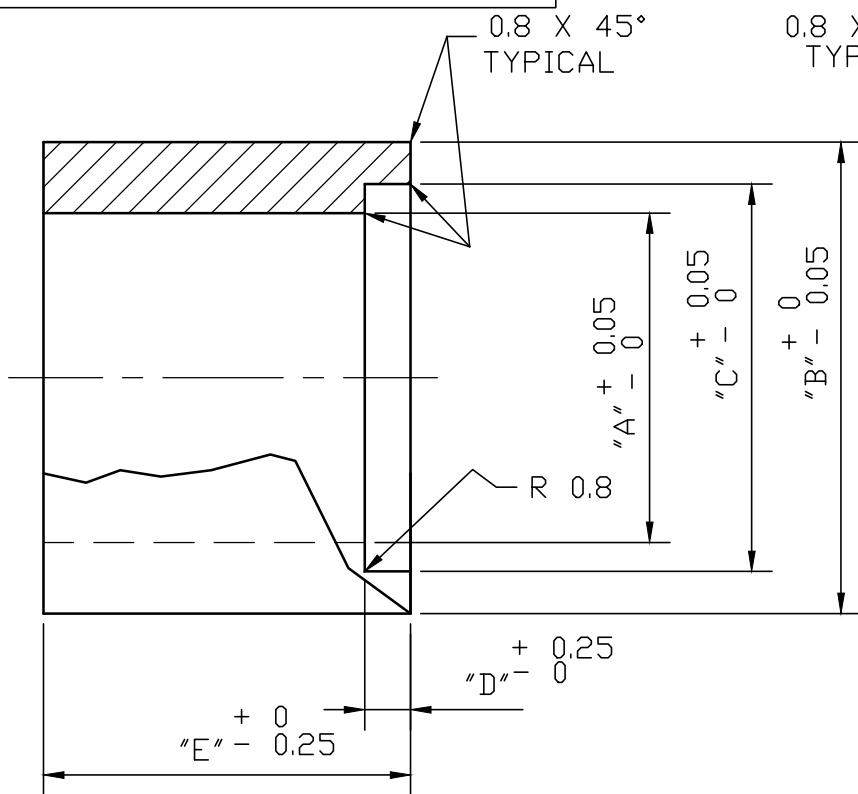
Bharat Heavy Electricals Ltd
 UNIT: HIGH PRESSURE BOILER PLANT
 TIRUCHIRAPALLI - 620014

DRN	NAME	SIGNATURE	DATE
CHD	BIMAL.C	-sd-	15-03-2011
APPD	GSK	-sd-	15-03-2011
	MTP	-sd-	15-03-2011

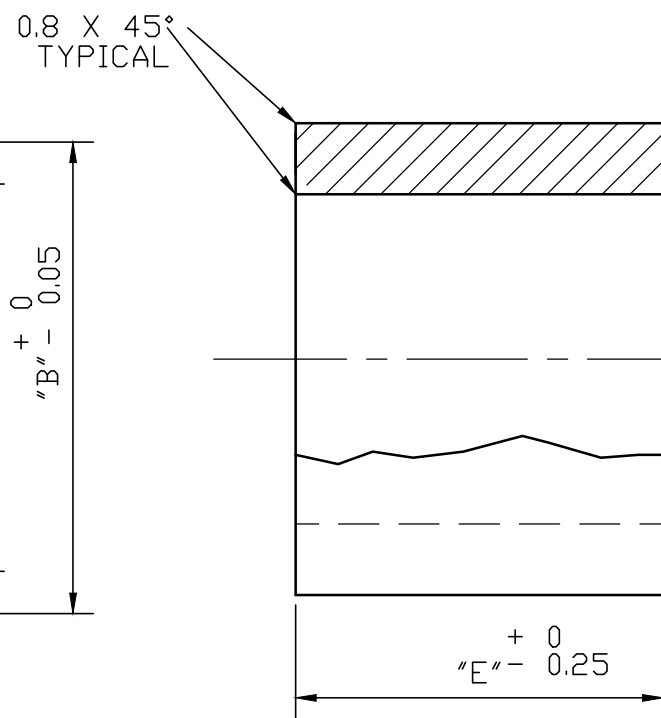
DEPT	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE	WEIGHT (Kg)	REF TO ASSY / OLD DWG
FS			N.T.S		
CODE	129				
TITLE				DRAWING NO :	REV
SELF ALIGNING FLANGE DAMPER BEARING				4-45-320-01618A	01

3-45-000-01283A

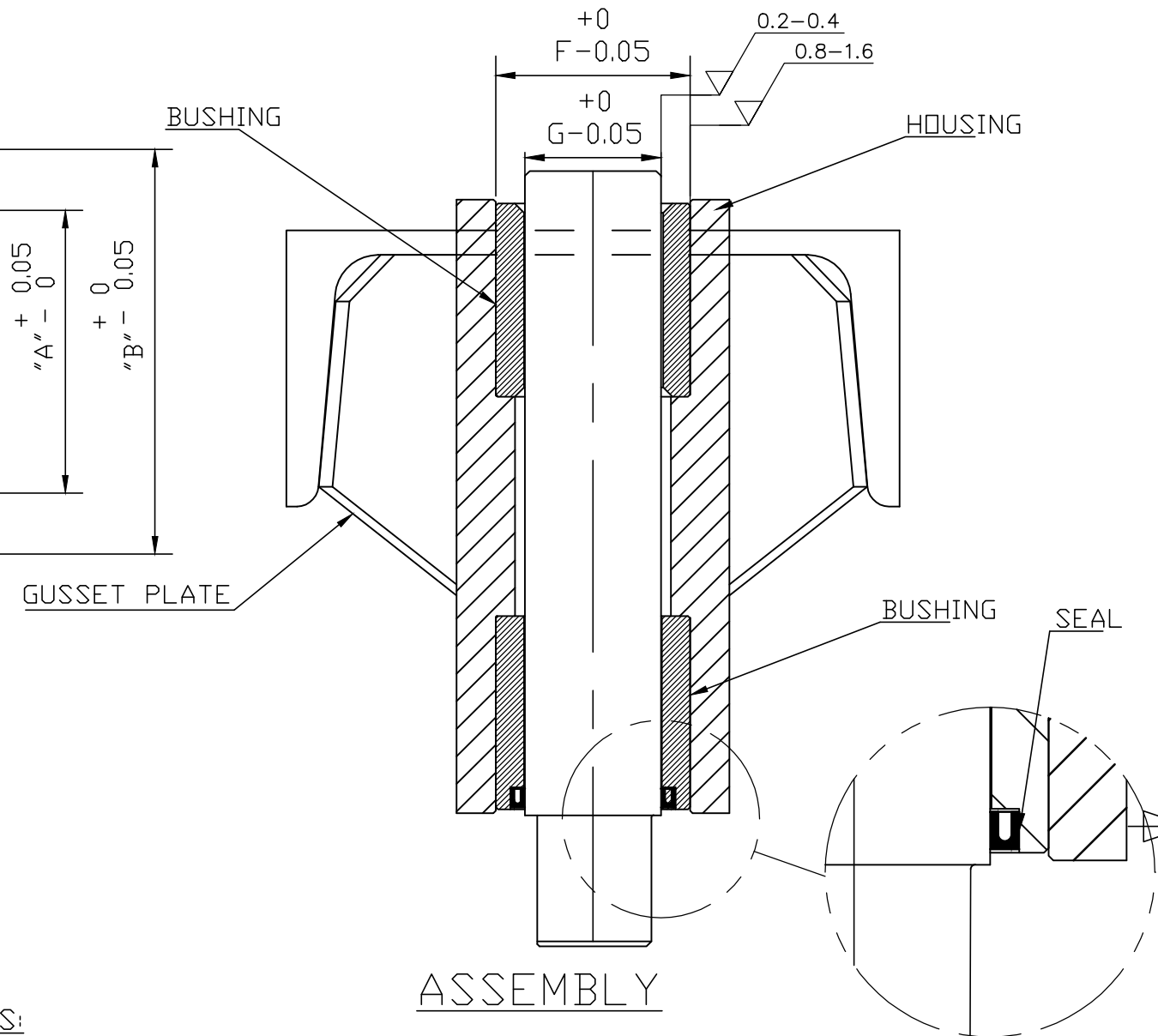
DRAWING NO.



STYLE NO. B



STYLE NO. A



ASSEMBLY


VARIANT NO.	STY. NO.	DIM. "A"	DIM. "B"	DIM. "C"	DIM. "D"	DIM. "E"	DIM. "F"	DIM. "G"
01	A	36.7	52.7	----	----	50.3	52.4	35.76
02	A	51.3	73.4	----	----	50.8	70	50.76
03	B	51.3	73.4	60.2	7.1	57.1	70	50.76
04	A	25.3	35.1	----	----	44.5	34.8	24.36
05	A	38.6	60.7	----	----	50.3	60.4	37.66
06	B	38.6	60.7	47.5	7.1	50.3	60.4	37.66
07	A	38.6	60.7	----	----	69.3	60.4	37.66
08	A	45	63.8	----	----	63.5	63.5	44.42
09	B	45	63.8	53.9	7.1	63.5	63.5	44.42

NOTES:

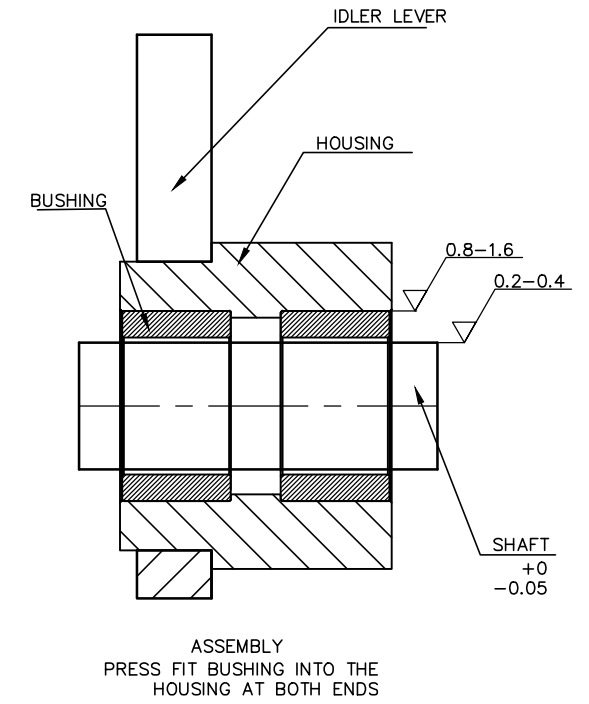
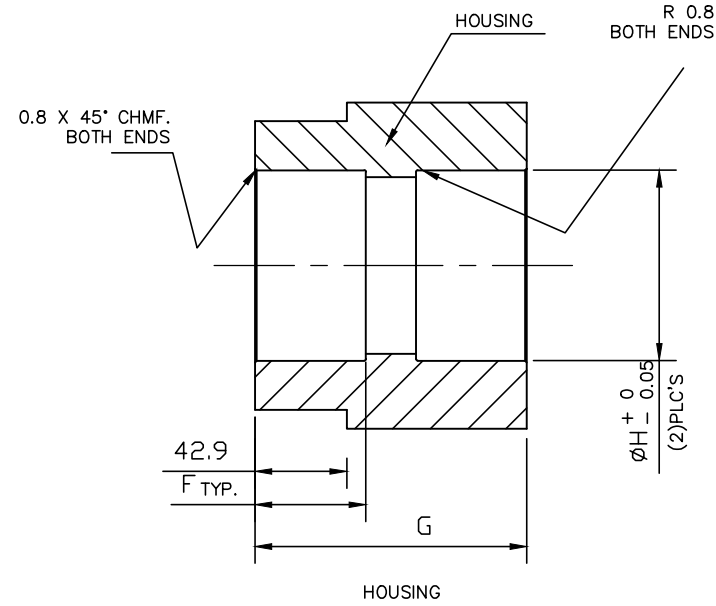
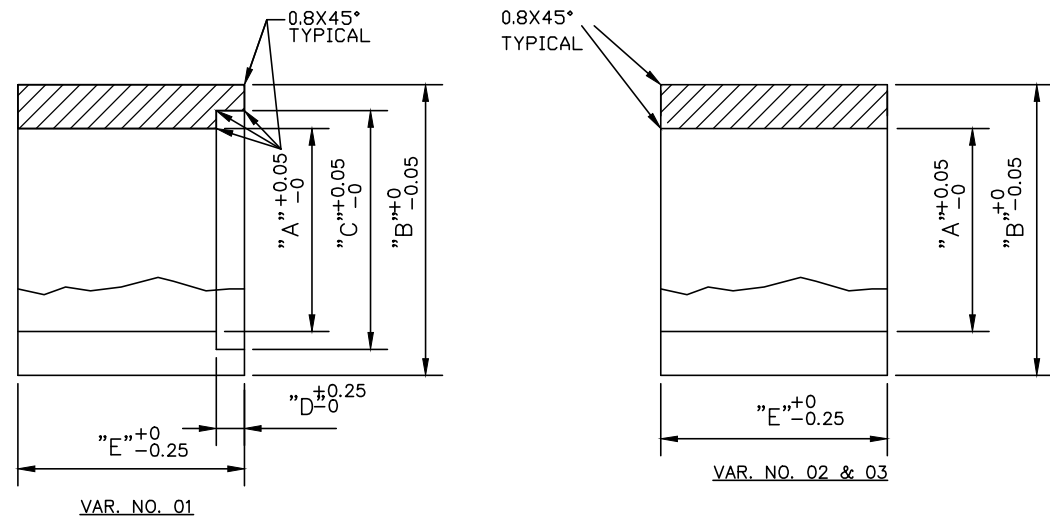
1. ALL DIMENSIONS ARE IN mm.
2. UNSPECIFIED TOLERANCES: DIMS ± 0.8 ; ANGLES $\pm 0^\circ - 15'$

MATERIAL SPECIFICATION
GRAPHITE IMPREGNATED WITH METAL ALLOY

REV 01	DATE 06.11.14	ALTERED : DHEERAJ CHD & APPD: GSK
ZONE	ASSEMBLY VIEW ADDED DIMENSIONS "F", AND "G" ADDED	

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT			
 Bharat Heavy Electricals Ltd UNIT: HIGH PRESSURE BOILER PLANT TIRUCHIRAPALLI - 620014			
DEPT FS	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE NTS
CODE 129	WEIGHT (Kg) ---	REF TO ASSY / OLD DWG	
TITLE			REV
BUSHING (GRAPHITE ALLOY)			01
DRAWING NO :			
3-45-000-01283A			

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VARIANT NUMBER	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO	MATERIAL CODE	A/C/P	UNIT	UNIT WEIGHT	QTY
					VAR NO	MATERIAL SPECN		DI	QUANTITY	
	03	GRAPHITE ALLOY BUSHING; OD89.3 / ID64							0.003	
	02	GRAPHITE ALLOY BUSHING; OD57.4 / ID38.5							0.002	
	01	GRAPHITE ALLOY BUSHING; W/SEAL; OD57.4/ID38.5							0.002	

VAR. NO.	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"
01	38.5	57.4	47.5	7	59	61	145	57
02	38.5	57.4	----	----	50	52	127	57
03	64	89.3	----	----	50	52	127	88.9

NOTES:

- ALL DIMENSIONS ARE IN mm.
- UNSPECIFIED TOLERANCES: DIMS ±0.8; ANGLES ±0°-15'

REV 01	DATE 06.11.14	ALTERED : DHEERAJ
		CHD & APPD: GSK
ZONE	HOUSING AND ASSEMBLY VIEWS ADDED DIMENSIONS "F", "G" AND "H" ADDED	

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TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT



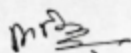
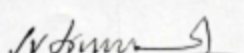
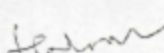
Bharat Heavy Electricals Ltd
UNIT: HIGH PRESSURE BOILER PLANT
TIRUCHIRAPALLI - 620014

DEPT FS	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE N T S	WEIGHT (Kg)	REF TO ASSY / OLD DWG
CODE 129					
TITLE IDLER BUSHING					DRAWING NO : 3-45-000-01273A
					REV 01

DRN	NAME G S K	SIGNATURE -sd-	DATE 31.12.2010
CHD	G S K	-sd-	31.12.2010
APPD	M T P	-sd-	31.12.2010

SPECIFICATION FOR COPPER GRAPHITE BUSHING

1. Item Name & BHEL material code : Copper Graphite Bushing
Code: 97 038 180
2. Drawing Number : ABB- CE Drawing: B-907-4177
3. Application : Serves as a bearing bushing for the movement of guide tube of fuel oil gun retract mechanism.
4. Material : Copper Graphite
5. Dimensions : 105.23 mm OD x 73.48 mm ID x 12.7 mm Thickness. All four edges (Corners) chamfered to 0.75 mm.
6. Tolerance on Dimensions: + 0.00 mm, -0.05 mm on OD and ID
7. Certificates : Material certificate and certificate on dimensional compliance shall be produced along with each lot of supply.
8. Marking : Name sticker with item name and BHEL material code shall be affixed on to each pocket.
9. Packing : Individually sealed in polythene covers and placed in card board boxes. Bulk quantity to be seaworthy packed in wooden boxes with shock pads and well protected against ingress of water and transit damages.
10. Inward Inspection : Verify name stickers; verify material certificate; check dimensional correctness at random.

PREPARED**M.Anbazhagan****CHECKED****S.V.Sivaramulu****APPROVED****C.Palanisamy****DATE****24.03.2004****REVISIONS:** Rev.01: Spec. revisited & converted to soft copy.