

	Bharat Heavy Electricals Ltd Boiler Auxiliaries Plant Ranipet-632 406	EDC/GATES & DAMPERS TECHNICAL SPECIFICATION
SPECIFICATION NO: GDRS:013	REV NO:02	PAGE NO 01 OF 05

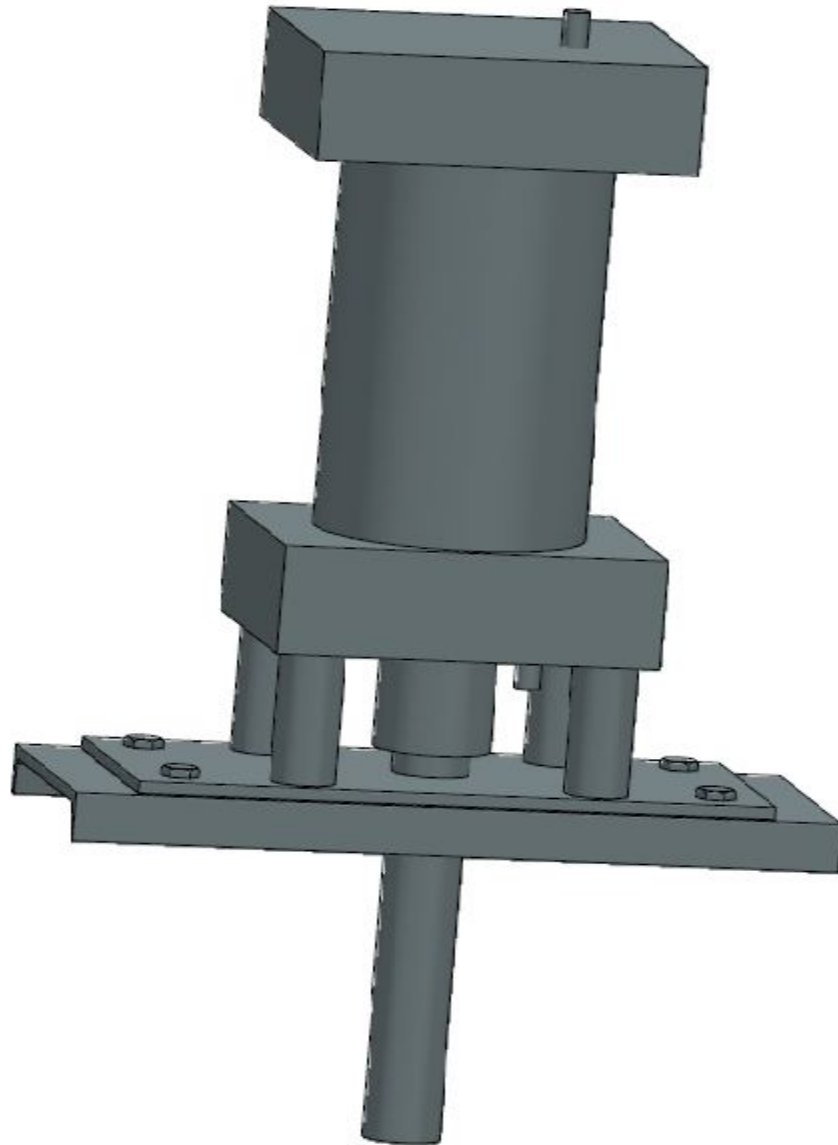
1	Item	Air cylinder with Plunger	Vendor / Acceptance / Comments
2	Scope of supply	Air cylinder with Mounting Plate & Mounting Supporting Bolts, Bellow, lock nut, metallic dummy caps, as per drawing shown in Page 05 of 05 .	
3	Application	Actuator for Guillotine type shut off Gate used at the Hot air & Cold air duct of coal mill inlet.	
4	Type	Heavy duty, Double acting; 100% Fail safe for quick closing/opening of Guillotine gate.	
5	Frequency of Operation	Cylinder will be either open/close position for prolonged period.	
6	Operating Medium	Compressed Air 3 to 7 kg/cm ² filtered & lubricated.	
7	Dimension	Ref page no 05 of 05 .	
8	Working Environment	Under Mating Flange beneath the Gate Frame channel, it is exposed to 300° C Ash Content Air.	
9	Mounting	Flange mounted, Piston rod, extension in the downward direction & retraction in the upward direction.	
10	Bore & Stroke	As per Enquiry.	
11	Ports	1" NPT with counter boring of 2mm depth with metallic plug.	
12	Cylinder Head	Made up of IS 2062 or better material (Vendor to specify).	
12(a)	Plunger	Plunger (dia 10 mm) mounted on both heads of cylinder is pushed outward by 20 mm against spring action when the piston reaches towards the ends. Otherwise plunger is normally retracted inside the cylinder. Material of Plunger Pin: SS304 or better material (Vendor to specify).	
13	Cylinder barrel	1) Seamless steel tube, hard chrome plated & mirror finished. Material - ASME SA 106 GR B or better material 2) Chrome plating thickness: 20-30 microns minimum.	

02	05.01.19	Sl.nos.1,12,13,14 revised	SURESH	ASHWIN DHINAKAR
01	05.04.14	Sl no 18, temperature altered	SURESH	V. KESAVAN
00	04.12.13	Fresh Release	SURESH	V. KESAVAN
REV	DATE	DESCRIPTION	PREPARED	APPROVED

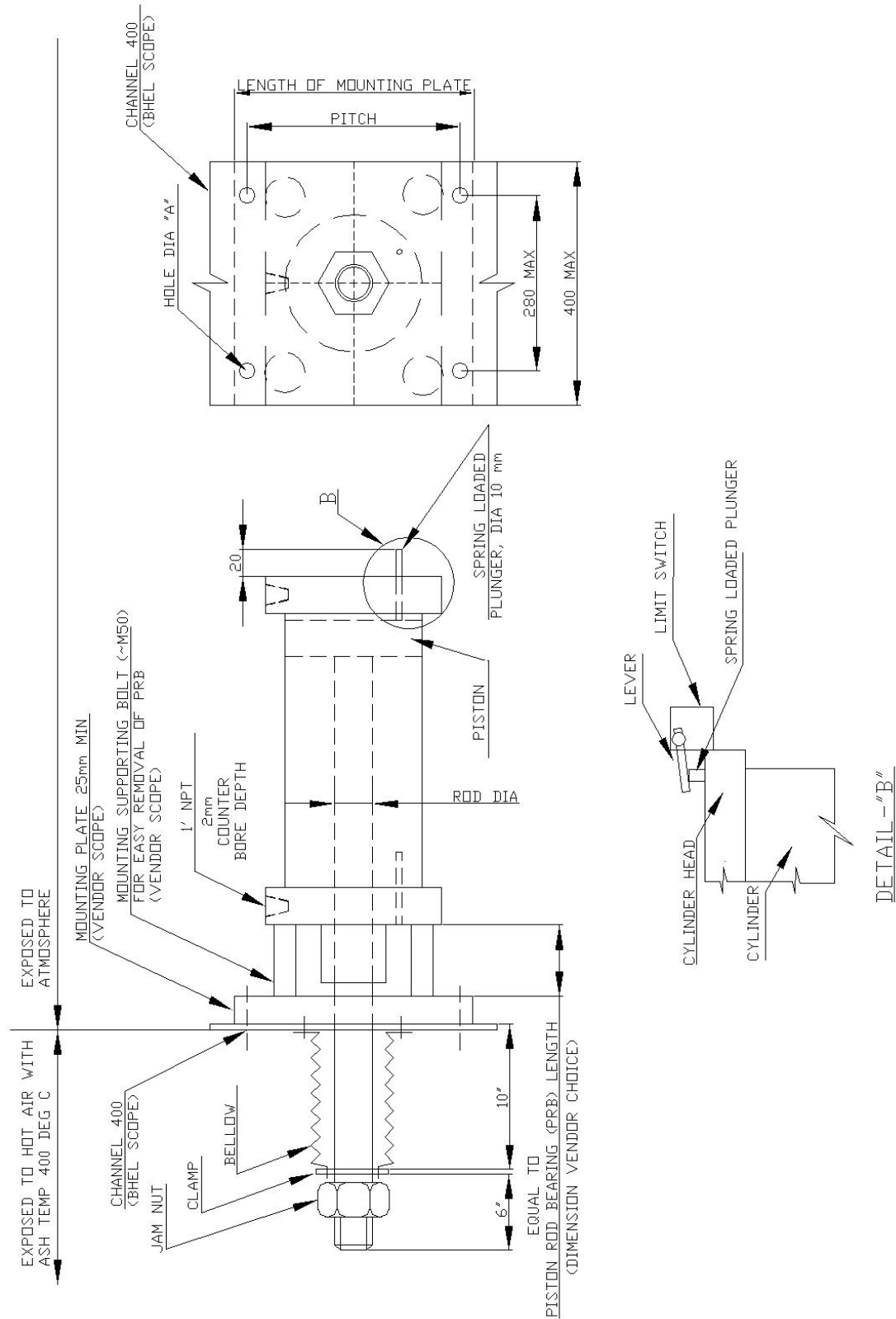
SL. NO	Particulars	Description	Vendor / Acceptance / Comments
14	Piston	1)Made up of one piece, fine grain alloy cast iron . Vendor to specify material specification for BHEL approval. 2)Piston wear strip made of PTFE is to be provided for Bore dia 300mm and above.	
15	Piston Rod design	High tensile material with case hardened & chrome plated with thread at the end. 4 or 6 wrench flat on piston rod to be provided for assembling and dismantling. The piston and rod shall be fixed by a reliable method.	
16	Piston Rod material	Material- BS 970 EN8 or better material.	
17	Rod cartridge	Suitably designed to provide support to endure the lateral load of 1/20 of the maximum cylinder force generated by the nominal pressure and guide the piston rod. (Material – IS2062 or IS210 FG220 with Bronze Bush or better material)	
18	Piston rod protection	Protection from Fly Ash, Bellow of suitable material to withstand up to 350° C . (Also refer Enquiry) Protection of Threaded portion from Transit Damage.	
19	Jam Nut	To be provided.	
20	Seals	VITON (Piston packing, Rod Packing, wipers & cushioning etc.)	
21	Variable end Cushioning	Both Rod and head side with Adjusting mechanism. Cushion stroke length shall be 25mm for bore dia ≤ 275mm and 30mm for cylinder dia ≥ 300mm	
22	Tie rod	Suitable number of tie rods to be provided.	
23	Cylinder interior parts	In the case where it is liable to rust, the rust preventive surface treatment shall be processed.	
24	Inspection	100 percent inspection by BHEL or BHEL approved agency.	
24(a)	Minimum working pressure test	During testing, the piston shall operate smoothly at the given minimum working pressure. The test shall be carried out Several(Minimum 10) times of operation as per condition given below. a) cylinder orientation : Vertical (Piston rod extension in the downward direction & retraction in the upward direction) b) Load: No load c) Test pressure: 0.61 kgf/cm ² for bore diameter 125-250 mm and 0.51 kgf/cm ² for bore diameter 300 - 350 mm. d) Cushion opening: Full-open e) Operating method of cylinder to be tested: Change over the pneumatic valve of test equipment, and allow the piston to operate in the direction of the rod side and cylinder head side alternately. f) Jerk Test: During testing, piston/piston rod has to move smoothly without any jerky motion both in the upward & downward direction	

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24(b)	Pressure Resistance Test	During testing, the respective parts of the cylinder should not undergo any abnormalities such as loosening and permanent deformations. Installing direction of cylinder to be tested: It is not designated particularly, but every possible attention shall be paid to secure safety. a) Test pressure : 0.7 MPa (7.13 kgf / cm²) b) Holding time of pressurizing: 2 Minute or over c) Pressurizing method : After releasing the back pressure side to the open air, pressurize the rod side and the head side respectively.	
24(c)	Variable Cushion Functioning test	Test shall be carried out on both sides of the cylinder, by adjusting the needle valve mechanism. Change of retardation shall be recorded at the test pressure of 3kg/cm ² .	
24(D)	Piston rod _ Oscillation test	Mount the cylinder vertically downward direction, allow the piston rod to extend fully. Hold the end of piston rod, shake it with hand in the horizontal direction. Note down the oscillation value on either side. It will be 2mm for stroke less than 2000 mm and 3 mm for stroke greater than 2000 mm.	
25	Name plate	Two name plates are to be fastened at the front end cover (ie one near the cushion adjustment face & other near the port face). It has to contain the following details. 1) Manufactures name 2) Maximum working pressure (kg/cm²) 3) Bore diameter (mm) 4) Stroke length (mm) 5) BHEL material code (Indent No / P.O.Ref.) 6) Year and month of manufacture and serial number. 7) Cylinder weight in kgs	
26	Painting	Surface preparation– Blast cleaning of SA 2 1/2 to a surface profile of 35 to 50 micron. Epoxy primer-as per IS 13238 with film thickness of 30 micron. Epoxy finish paint as per is 14209 with film thickness of 30 micron. Shade 692 of IS 5. Total DFT=60 micron. Note: suitable care to be taken to protect the machined surface during blast cleaning.	
27	Documents during Enquiry	The following details shall be furnished by the supplier during offer itself; without this the offer will not be considered. a) Point wise acceptance /comment for specification GDRS:013/(Refer latest rev) to be submitted along with offer.	
		b) General Arrangement drawing with sectional view & material specification.	
		c) Detailed view of Plunger Assembly required during Enquiry itself.	

28	Drawing for approval	Approval to be obtained for detailed drawing with BOM & Spare kit BOM before manufacturing.	
29	Documents during Supply	The following documents shall be submitted by the supplier along with supply of Air cylinder a) Material test certificate.	
		b) Operation and Maintenance manual - indicating assembly, dismantling, operation, maintenance, instruction and spare kit make & model details.	



NOTES:-	01) All sharp corners & edges are to be rounded of (Approximately R2)	
	02) External mounted Limit switch not in the scope of vendor. Switch Activation by plunger movement is to be demonstrated during Inspection.	
	03) Two name plates are to be fastened at the front end cover(i.e. one near the cushion adjustment face & other near the port face).	



ASSEMBLY OF AIR CYLINDER ARRANGEMENT FOR GUILLOTINE GATE

Sl. no.	# BHEL REQUIREMENT				** VENDOR CHOICE	
	BORE SIZE (mm)	PISTON ROD THREAD (mm)	ROD DIA (mm)	HOLE Dia-A (mm)	PITCH (mm)	LENGTH OF MOUNTING PLATE (mm)
	#	#	#	#	**	**
01	300	M45 x 2.0	50	≥ 26	350	460
02	350	M56 x 3.0	65	≥ 32	400	540