

	Bharat Heavy Electricals Ltd Boiler Auxiliaries Plant Ranipet-632 406	EDC / GATES & DAMPERS TECHNICAL SPECIFICATION
SPECIFICATION NO: GDRS 017	REV NO:00	PAGE NO 01 OF 05

1	Item	Air cylinder (flange mounted with Clevis and Turn Buckle)	Vendor / Acceptance /Comments
2	Scope of supply	Flange mounted Air cylinder, with front clevis, Turn buckle with lock nut, two connecting pin with circlip, metallic dummy caps and leather bellow	
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 4 of 5 and as per drawing page 5 of 5	
8	Working Environment	Dusty, corrosive & highly polluted. Temperature may go up to 110° C.	
9	Mounting	Front head mounting, 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 cap	
12	Cylinder Head	Made up of IS 2062 or better material.	
13	Cylinder barrel	Seamless steel tube, hard chrome plated (20-25 microns) & mirror finished. Material - ASME SA 106 GR B or better material	
14	Piston	Made up of one piece, fine grain alloy cast iron . Vendor to specify material specification for BHEL approval.	
15	Piston rod design	High tensile material with case hardened & chrome plated (20-25 microns) 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.a	Piston rod material	Material- BS 970 EN8 or better material.	
16.b	Fork material	IS 2062 / IS1030 GR.230 – 450W	

00	17-08-16	Fresh release	Saravanan.K	V. Kesavan
REV	DATE	DESCRIPTION	PREPARED	APPROVED

SL. NO	Particulars	Description	Vendor / Acceptance /Comments
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	Leather bellow and dust wiper to be provided.	
19	Lock Nut	To be provided on both side of turn buckle.	
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/cm² for bore diameter 125-250 mm and 0.51 kgf/cm² 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	
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.	

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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 (i.e. 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/cm ²) 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	Packing	a) Port -metallic plug type cap to be provided. b) Threaded portion of piston rod - Protected from damage. c) Cylinder assembly - Wrapped in polythene paper and packed in wooden crate.	
28	Documents during Enquiry	The following details shall be furnished by the supplier during offer itself; with out this the offer will not be considered. a) Point wise acceptance /comment for specification to be submitted along with offer. b) General Arrangement drawing with sectional view & material specification. c) Spares recommended for commissioning d) Spares recommended for two years trouble free operation. e) Seal Kit model no & make. f) Catalogue, if any g)	
29	Drawing for approval	Approval to be obtained for detailed drawing with BOM & Spare kit BOM before manufacturing.	

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30	Documents during Supply	The following documents shall be submitted by the supplier along with supply of Air cylinder a) Material test certificate. b) Operational test certificate. c) Operation and Maintenance manual-indicating assembly, dismantling, operation, maintenance, instruction and spare kit make & model details.	
31	Clevis dimension and material	Dimensional details & clevis thread size to be furnished by the vendor. Clevis material IS 2062, or steel casting of IS 1030: Gr.230-450W (Cast iron not recommended). Dimensional tolerance should be H9f8. Chain connecting the Clevis pin & Cylinder body to be provided.	
32	Turnbuckle with lock nut	Adjustable Turnbuckle with minimum 50 mm lead movement. Lock nut to be provided for freezing the turnbuckle adjustment. While adjusting the turnbuckle, clevis should move forward/backward without rotating. (one side RH and other side LH threads should be provided)	

Dimensional details

	# BHEL REQUIREMENT							** VENDOR CHOICE				
SL. NO	BORE SIZE (mm) #	TH (mm) #	PS (NPT) (INCH) #	RD (mm) #	HOLE Dia-A (mm) #	PH1 (mm) #	PH2 (mm) #	AA (mm) **	BB (mm) **	FS1 (mm) **	FS2 (mm) **	PL (mm) **
01	125	M20X1.0	1.00	25	14	115	115	75	160	150	150	60
02	150	M27X1.5	1.00	35	14	125	125	80	180	165	165	80
03	175	M27X1.5	1.00	35	14	170	170	85	185	190	190	100
04	200	M27X1.5	1.00	35	22	190	190	85	185	215	215	100
05	250	M39X2.0	1.00	45	22	250	250	105	225	280	280	120
06	300	M45X2.0	1.00	50	26	280	280	120	240	325	325	120
07	350	M56X3.0	1.00	65	26	400	280	125	285	470	375	140

NOTES:-	01) Dimensions marked as '#' is to be maintained by vendor.	
	02) Dimensions marked as '***' are for guidance only.	
	03) All sharp corners & edges are to be rounded of (Approximately R2)	
	04) 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).	
	05) At 'PS' counter bore depth = 2mm & metallic 1" Dummy caps chained to the cylinder heads to be provided by vendor before dispatch.	

