

BHARAT HEAVY ELECTRICALS LTD.**Ranipet****PRODUCT ENGINEERING
GATES AND DAMPERS****SPECIFICATION
FOR
BLOWER WITH MOTOR****RECORD OF REVISIONS**

REV No.	DATE	DESCRIPTION	PREPARED	APPROVED
00	04.12.97	ORIGINAL RELEASE	sd./-b.m.k	sd/-v.s.r
01	31-07-99	Drawing No. deleted in point No.2.1	sd./-b.m.k	sd/-v.s.r
02	04-09-03	Point No 2.3.1 & 4.2.2 revised	sd./-b.m.k	sd/-v.s.r
03	18-08-05	Point No 4.1.1 , 5.1 & 5.2 revised	sd./-b.m.k	sd/-v.s.r
04	21-03-2009	Point 3.5 & 4.2.2 revised	Sd SA	Sd VK
05	01-03-2010	Annexure - I added	Sd./-K.S	Sd./- VK
06	10-01-2014	Clause 3.1 & 4.1 altered	Sd MS	Sd/ VK

1.0 SCOPE:

- 1.1 This Specification specifies the design, construction and testing requirements of seal air blowers for Guillotine Gates/Biplane Dampers in order to provide seal air for isolating the equipments from flow medium.

2.0 REFERENCE DOCUMENTS:

- 2.1 BHEL Specification drawing (Enclosed)
- 2.2 Engineering Specification for L.T.Motor and Data sheet (Enclosed)
- 2.3 Standards:
- 2.3.1 BS 848 Part-1 (or) IS 4894- Inspection and testing for Fans
- 2.3.2 IP 55 as per IS 4691-68 for enclosure protection
- 2.3.4 ISO 1940 for dynamic balancing

3.0 DESIGN FEATURES:

- 3.1 The blower shall operate satisfactorily under heavily polluted, dusty & corrosive environment
- 3.2 All blowers shall be of Monoblock type, with centrifugal flow. It shall be designed for free air delivery and arrangements shall conform to BHEL drawing.
- 3.3 Fan discharge shall be bottom horizontal viewing from motor side.
- 3.4 **Impeller :** The impeller shall withstand the stress developed by the centrifugal force during operation. The thickness of impeller blade shall be sized depending on the operating condition. In any case the impeller blade thickness shall not be less than 2mm.

The fan impeller shall be well aligned in the casing and dynamically balanced. The fan impeller can be directly mounted on the shaft with the impeller hub keyed with the shaft and axially bolted to the motor shaft to prevent axial movement of the impeller. Suitable labyrinth seal has to be provided in the gap between shaft and casing.

3.5 **Casing :** The casing shall be of split type or **provision for removing the the impeller** for easy handling and maintenance. The casing shall be suitably stiffened to have minimum vibration and it should be of bolted construction. Inspection door in the casing is to be provided. Sufficient clearance shall be given between impeller and casing and between impeller and suction mouth. Flow direction to be marked on the casing by a good quality arrow plate. The arrow plate shall be riveted or screwed to the casing. The thickness of the casing shall be sized depending on the operating condition. In any case the casing thickness shall not be less than 2mm.

3.6 Necessary damping pads can be provided wherever necessary to arrest vibration.

3.7 The suction mouth shall be suitably covered by wire mesh or otherwise to avoid entry of foreign objects.

3.8 Provision for greasing and lubricating the bearings shall be provided.

4.0 **INSPECTION AND TESTING:**

4.1 Performance Testing:

Test environment: In line with the test bed environment prevailing at the time of testing in their respective works spot of the vendor.

One in each type of blower shall be tested for performance characteristics.

4.1.1 Fan Characteristics:

1. Pressure Vs. Discharge
2. Power Vs. Discharge

Tolerance on Pressure, Capacity and power absorbed shall be as per BS 848 Part-I or IS4894.

4.2 **ROUTINE TEST:**

4.2.1 **Motor :**

The rotor shall be dynamically balanced on motor shaft and shall have unbalancement permissible as per ISO 1940 Grade 6.3.

Fan: the impeller shall be dynamically balanced and permissible unbalancement shall be within limits of Grade 6.3 of ISO 1940.

4.2.2 **Blower assembly :**

The assembly shall be run at supplier's works for trouble free, smooth running for continuous 8 hours.

Vendor shall indicate the expected sound pressure level (in dBA at 1metre distance) for all sizes as per **Annexure - I** during running of the blower in full speed at specified performance test condition (testing for the selection

parameter of flow and pressure rise). The same value to be demonstrated during the performance testing. Any increase in noise level beyond the specified value will not be accepted.

5.0 **DOCUMENTATION:**

5.1 The following details to be furnished by the supplier during offer itself, without this, the offer will not be considered.

- A) General Arrangement Drawing with dimension, unit weight and material specification.
- B) Filled in L.T.Motor Data sheet.
- C) Point wise confirmation/comment for this specification and motor specification.
- D) Deviation / Nil deviation report
- E) Catalogue

5.2 The following documents to be submitted by the supplier along with supply

- A) Certificates of type test and routine test for the characteristics mentioned in clause 4.0
- B) The supplier shall also submit material test certificates along with the supply for each type.
- C) Operation and Maintenance manual : Instructions in Compact Disk is preferable (or) 25 sets of Print to BHEL. (Price shall include this also).

6.0 **GUARANTEE:**

6.1 The equipment shall be guaranteed for trouble-free operation for a period of 18 months from the date of despatch or 12 months from the date of commissioning whichever is earlier.

7.0 **IDENTIFICATION:**

7.1.1 Name Plate Details for Blower:

Fan :
Frame Size :
Capacity : Volume (CFM) x Pressure (IN WC)
Blade Configuration :
Direction of rotation :
Mounting Orientation : CW/CCW
Weight (Kgs) :

7.1.2 MOTOR:

Frame Size :
Enclosure :
Insulation Class :
RPM :
Starting Current :
Full load Current :
Voltage :
Cycle :
Output :
Bearing type & Number :
Weight (Kgs) :

8.0 PAINTING:

- 8.1 The blower shall be painted with one coat of zinc chromate Red Oxide Primer to IS 2074 and two coatings of air craft grey enamel paint over primer.
- 8.2 All machined parts are to be applied with rust preventive coating.

9.0 PACKING AND DESPATCH:

- 9.1 The fan and motor to be sent as an assembly and covered with water proof sheet (Polythene) and should be packed in wooden boxes.
- 9.2 The suction and delivery openings are to be covered so as to avoid water entry during storage.
- 9.3 Bolted connections are to be made after applying anti-seize compound.
- 9.4 All components shall be identifiable with packing list.
- 9.5 Necessary erection and instruction manuals shall be sent along with supplies.

ANNEXURE – I**ENQUIRY NUMBER :****DATE :**

Vendor has to fill and submit this sheet along with Technical offer.

ENQUIRY SL.No (Vendor has to fill)	HEAD (INCH)	FLOW (CFM)	Expected Sound pressure level (noise in dBA) during performance test for achieving the required Head & Flow
	4	1100	
	4	1200	
	4	2400	
	8	1100	
	8	1700	
	8	2400	
	8	3200	
	10	4200	
	10	6500	
	10	7900	
	12	2400	
	12	5300	
	12	6500	
	36	3200	
	36	4200	
	36	5300	
	38	5300	
	40	5300	
	42	11000	
	44	4200	
	46	5300	
	50	3200	