PRODUCT MANUAL FOR POSITIVE DISPLACEMENT TYPE AIR COMPRESSORS AND EXHAUSTERS ACORDING TO IS 5456:2006

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

1.	**Product**	**:**	IS 5456:2006
	Title	**:**	Positive Displacement type Air Compressors and Exhausters
	No of amendments	**:**	One
2.	**Sampling guidelines:**		
a)	**Raw material**	**:**	--
b)	**Grouping guidelines**	**:**	Each new design (clause 3.4 of IS 5456) is to be tested for GOL/CSoL. Further, reciprocating and rotary type air compressors and exhausters shall be tested separately to cover the respective varieties.
c)	**Sample size**	**:**	One unit
3.	**List of Test Equipment**	**:**	Please refer **Annex A**
4.	**Scheme of Inspection and Testing**	**:**	Please refer **Annex B**
5.	**Possible tests in day**	**:**	All tests
6	**Scope of the Licence**	**:**	Please refer **Annex C**

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ANNEX – A

List Of Test Equipment

Major test equipments required to test as per the Indian Standard

Sl No	Test Equipment	Tests used in with Clause Reference
1	Mercury in glass barometer	Atmospheric pressure, Cl 10.6
2	Calibrated bourdon gauges, dead weight gauges, mercury manometers or their equivalent	Measurement of pressure, Cl 10
3	Bourdon gauge	Measurement of delivery pressure, Cl 10.3
4	Psychromotor	Measurement of Relative humidity, Cl 12
5	a) Tachometer, or b) Speed counter, or c) Tachoscope, or d) Stroboscope.	Measurement of Speed, Cl 13
6	Measuring jar	Measurement of Oil consumption, Cl 15
7	Standard nozzle	Measurement of Air flow, Cl 14
8	Manometer	Upstream pressure and differential pressure at nozzle, Suction pressure
9	a) Torsion meter or b) Calibrated electric motor or c) Prime mover other than electrical drive	Measurement of Power, Cl 16
10	Wattmeter, Voltmeter, Frequency meter, Ammeter, Current transformer, Dimmer starter	Measurement of Power, Cl 16
11.	a) Calibrated mercury in-glass thermometer, b) Thermocouple, c) Resistance thermometer, or d) Thermistors.	Measurement of Temperature, Cl 11

The above list is indicative only and may not be treated as exhaustive.

ANNEX B

Scheme of Inspection and Testing

1. LABORATORY - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipments.

2. TEST RECORDS – The manufacturer shall maintain test records for the tests carried out to establish conformity.

3. **LABELLING AND MARKING:** As per the requirements of IS 5456:2006.

4. **LEVELS OF CONTROL -** The tests as indicated in column of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

4.1 All the production which conforms to the Indian Standard and covered by this licence should be marked with Standard Mark.

4.2 The manufacturer shall submit the design details and drawings of all the critical components (Annexure I of SIT) for each type of air compressor and exhauster to BIS for approval in the beginning and whenever there is a change in the type and design.

4.3 The licensee shall procure various critical components from the manufacturers whose quality has already been established. These components would be continued to be procured along with necessary test certificate from the same source as used for the sample submitted for type approval test. Any change in the quality of component and source of supply should be brought to the notice of BIS immediately and approval shall be obtained for using the same.

4.4 The manufacturer shall declare all the performance values of the compressors and exhausters. The checking would be done against these declared values.

4.5 If an air compressor and exhauster fail in any requirement, it shall be considered as unfit for the purpose of marking with BIS Standard Mark. The air compressor and exhauster rejected may be suitably repaired and defects rectified. Such repaired air compressor and exhauster, when tested again shall conform to all the requirements of the specification.

6. REJECTIONS: Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

(1)				(2)	(3)		
	TEST DETAILS			**Test equipment requirement R: required (or) S: Sub-contracting permitted**	**LEVELS OF CONTROL**		
Cl.	**Requirement**	**Test Methods**			**No. of samples**	**Frequency**	**Remarks**
		Clause	**Reference**				
--	Critical components	--	--	---	(i) As per 5.2 & 5.3 of SIT (ii) List of critical components is given in Annexure I.		
7.2	**TYPE TESTS**						
(a)	Mechanical tests	7.3, 7.4 Table1, Table2	IS 5456	R	These type tests shall be carried out at the time of initial approval of a particular Type and Design and thereafter whenever if any change in approved design.		
(b)	Capacity (free air delivery)	14		R			
(c)	Specific power consumption at various pressures from minimum to maximum working pressure under full flow condition	16		R			
(d)	Maximum operating speed	13		R			
(e)	Volumetric and overall efficiency of machine	Annex B of IS 5456		R			
(f)	Lubricating oil consumption	15		R			
(g)	Testing of loading and unloading mechanism	7.3,7.4 Table1, Table2		R			
(h)	Flow of cooling water, if applicable, with rise in temperature	11.7		R			

8.1	**ROUTINE TESTS**					
(a)	Capacity (free air delivery)	14	IS 5456	R	Each Compressor	The various stages of routine test shall be conducted for the duration shown in Table 3 of IS 5456.
(b)	Speed	13		R		
(c)	Specific power consumption in the case of electrically driven compressors and specific fuel consumption with other drives at full load	16		R		
13	Maximum operating speed	13	IS 5456	R	One compressor of each type/capacity every week or one in 20, whichever is earlier.	The performance value shall be compared against the declared values on the name plate and value declared according to 5.4 of SIT
15	Lubricating oil consumption	15		R		
11.7	Flow of cooling water, if applicable, with rise in temperature	11.7		R		

Note-1: The control unit and levels of control as decided by the Bureau are obligatory, to which the licensee shall comply with.
Note-2: The control unit and levels of control as decided by the Bureau are obligatory to which the licensee shall comply with.

ANNEXURE I

(Clause 4.2 of SIT)

Critical Components

1. Cylinder body
2. Cylinder head
3. Piston
4. Piston rings
5. Gudgeon Pin
6. Connecting rod
7. Crank shaft
8. Inlet and Outlet valves
9. Relief Valve/Pressure Switch
10. Bearings
11. Air receiver
12. Inter coolers/after coolers
13. Fasteners
14. Crank Pin

ANNEX C

SCOPE OF LICENCE

Licence is granted to use Standard Mark as per IS 5456:2006 with the following scope:	
Name of the product	Positive displacement type Air Compressors and Exhausters
Type	Rotary/Reciprocating
Rated delivery pressure ($kgf/cm^{2)}$	
Free air delivery (m^3/hr)	
Input power (kW)	
Specific power consumption/or Specific fuel consumption, as applicable	