



**PRODUCT MANUAL FOR
POSITIVE DISPLACEMENT TYPE AIR COMPRESSORS AND
EXHAUSTERS- TESTING AND ACCEPTANCE
ACORDING TO IS 5456:2024**

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 5456:2024
	Title	:	Positive Displacement type Air Compressors and Exhausters- Testing and Acceptance
	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 <u>Annex A</u>
4.	Scheme of Inspection and Testing	:	Please refer <u>Annex B</u>
5.	Possible tests in day	:	Routine tests as per Cl. 8.1
6	Scope of the Licence	:	Please refer <u>Annex C</u>

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ANNEX – A**List Of Test Equipment**

Indicative list of major test equipment required to test as per the Indian Standard (For guidance only)

Sl No	Test Equipment	Tests used in with Clause Reference
1.	Mercury in glass barometer Calibrated bourdon gauges, dead weight gauges, mercury manometers or their equivalent or suitable equipment as per IS/ISO 1217	Measurement of Pressure, Cl. 10
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2.	Hygrometer or suitable equipment as per IS/ISO 1217	Measurement of Relative humidity, Cl 12
3.	Thermometers, thermo-electrical instruments, resistance thermometers or thermistors as per IS/ISO 1217	Measurement of Temperature, Cl 11
4.	a) Tachometer, or b) Speed counter, or c) Tachoscope, or d) Stroboscope. or any suitable equipment as per IS/ISO 1217	Measurement of Speed, Cl 13
5.	Measuring jar as per IS/ISO 1217	Measurement of Oil consumption, Cl 15
6.	Standard nozzle as per IS/ISO 1217	Measurement of Air flow, Cl 14
7.	Manometer as per IS/ISO 1217	Upstream pressure and differential pressure at nozzle, Suction pressure
8.	Torsion meter, Calibrated electric motor or Prime mover other than electrical drive, Wattmeter, Voltmeter, Frequency meter, Ammeter, Current transformer, Dimmer starter or any suitable equipment as per IS/ISO 1217	Measurement of Power, Cl 16

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

ANNEX B

Scheme of Inspection and Testing

1. QUALITY ASSURANCE PLAN

1.1 It is expected that during operation of BIS licence, manufacturers will implement a Quality Assurance Plan (QAP) i.e. a plan of regular testing and in-process controls, designed to ensure that the product bearing the Standard Mark conforms to all requirements of the Indian Standard.

1.2 The manufacturers shall define a Quality Assurance Plan (QAP) defining the control unit (i.e. lot/batch etc.), the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and declare the arrangement for testing i.e. whether in-house or subcontracting/sharing for each applicable test and submit the same to BIS Branch Office for information. The manufacturer shall comply with the QAP and maintain test records in accordance with para 2.1.

1.3 RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT:

1.3.1 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in Table 1. Manufacturer has the discretion of declaring their own levels of control or accept the levels of control given in this document.

1.3.3 The manufacturer shall ensure inspection and testing as per the Quality Assurance Plan submitted by them on the whole production of the factory which is covered by this plan.

2. ENSURING COMPLIANCE THROUGH TESTING – Manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard for which they may have in-house test facilities. However, there is no obligation to maintain in-house laboratory. Licensee may use alternative arrangements for tests of the production as per the declared QAP. Various alternatives are available for operation of BIS certification as given below and the relevant guidelines for availing such relaxations by the manufacturers, as amended from time to time, are to be referred:

- i) Shared testing resources like common facility,
- ii) Cluster based testing facility,
- iii) Sub-contracting to outside laboratories which may either be:
 - a) BIS recognized/empaneled laboratories, or
 - b) Any accredited laboratory as per ISO/IEC 17025

2.1 TEST RECORDS - The manufacturers shall maintain test records for the tests carried out (either in- house or at a sub-contracted or at shared test facility) to establish conformity of the product to the Standard for operation of licence. For the tests being subcontracted or conducted at a shared test facility, test results issued by the laboratories or test facilities, shall be made available for inspection by BIS.

3. DESIGN, DRAWING, CONFORMITY OF COMPONENTS AND DECLARATION OF PERFORMANCE VALUES BY MANUFACTURER-

3.1 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 exhaustor to BIS for approval at the time of Grant of licence and whenever there is a change in the type and design.

3.2 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.

3.3 The manufacturer shall declare all the performance values of the compressors and exhaustors. Evaluation would be done against these declared values.

4. LABELLING AND MARKING – As per the requirements given in IS 5456: 2024. The Standard Mark as given in the Schedule of the licence shall be incorporated legibly and indelibly on the product, provided always that the product so marked conforms to each requirement of the specification.

4.1 Additional Marking requirements: Additionally, the following shall also be marked on product or package :

“For BIS certification details please visit www.bis.gov.in”

5. REJECTION - All the production which conforms to the Indian Standard and covered under the scope of this licence shall be marked with the Standard Mark. 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.

Table 1 (Recommended Levels of Control- For guidance only)

(1)				(2)		
	TEST DETAILS			LEVELS OF CONTROL		
Cl.	Requirement	Test Methods		No. of samples	Frequency	Remarks
		Clause	Reference			
--	Critical components	--	--	(i) As per 3.1 of Scheme of Inspection and Testing (ii) List of critical components is given in Annexure I.		
7.2	TYPE TESTS		IS 5456	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.		
(a)	Mechanical tests	7.3, 7.4 Table1, Table2				
(b)	Capacity (free air delivery)	14				
(c)	Specific power consumption at various pressures from minimum to maximum working pressure under full flow condition	16				
(d)	Operating speed during the performance test period	13				
(e)	Maximum operating speed	13				
(f)	Lubricating oil consumption	15				
(g)	Testing of loading and unloading mechanism	7.3,7.4 Table1, Table2				
(h)	Flow of cooling water, if applicable, with rise in temperature	7.2				

8.1	ROUTINE TESTS		IS 5456	Each Compressor	The various stages of routine test shall be conducted for the duration shown in Table 3 of IS 5456.
(a)	Capacity (free air delivery)	14			
(b)	Speed	13			
(c)	Specific power consumption in the case of electrically driven compressors and specific fuel consumption with other drives at full load	16			

ANNEXURE I
(Clause 3.1 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 5456:2024 with the following scope:	
Name of the product	Positive displacement type Air Compressors and Exhausters- Testing and Acceptance
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	