



**PRODUCT MANUAL FOR
ROOM AIR CONDITIONERS-
UNITARY AIR CONDITIONERS**

ACCORDING TO IS 1391 (PART 1): 2017

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 license/certificate.

1.	Product	:	IS 1391 (Part 1): 2017
	Title	:	Room Air Conditioners- Unitary Air Conditioners
	No. of Amendments	:	Three
2.	Sampling Guidelines:		
a)	Raw material	:	Material- as per Cl. 5.2 Electrical Cables- as per Cl. 5.3.5, Cl. 5.3.6 Refrigerating circuit- as per Cl. 5.4 Temperature Sensing Controls- as per Cl. 5.8 Hermetic Compressors- as per Cl. 5.9 Motors- as per Cl. 5.10 Heat Exchangers- as per Cl. 5.11
b)	Grouping guidelines	:	Please refer ANNEX – A
c)	Sample Size	:	One assembled air conditioner plus other suitable number of components as required.
3.	List of Test Equipment	:	Please refer ANNEX – B
4.	Scheme of Inspection and Testing	:	Please refer ANNEX – C
5.	Possible tests in a day :	:	Please refer ANNEX – D
6.	Scope of the Licence :	:	Please refer ANNEX – E

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ANNEX--A

GROUPING GUIDELINES

1. The following parameters are taken into consideration for evolving the grouping guidelines for certification of Unitary Air Conditioner as per IS 1391 (Part 1): 2017.

Classifications based upon function: (i) Cooling only (ii) Cooling and Heating

2. Considering the above, following Group has been formed for GoL/CSoL:

Group	Cooling capacity in Watt (W)
I	Upto and including 4 400
II	Above 4 400

3. From each group, sample of highest cooling capacity among the capacities intended to be covered in the licence for each function, shall be tested for all requirements.
4. When samples are tested to cover both the groups and functions, at least one sample from each function shall be tested to cover the entire range.
5. The manufacturer shall declare the function and cooling capacities of Air- conditioners they intend to cover in the Licence. The Scope of Licence may be restricted based on the Manufacturing and testing capabilities of the manufacturer.
6. During the operation of Licence, it shall be ensured that all the varieties covered in the Licence are tested in rotation, to the extent possible.
7. A typical example for drawal of sample to cover the entire varieties under the scope of the License is given for the purpose of general guidance:

Sample 1	Unitary Air conditioner, Rated Cooling Capacity 4 400 W, 'Cooling only'
Sample 2	Unitary Air conditioner, Rated Cooling Capacity 10 500 W, 'Cooling and Heating'

Or

Sample 1	Unitary Air conditioner, Rated Cooling Capacity 10 500 W, 'Cooling only'
Sample 2	Unitary Air conditioner, Rated Cooling Capacity 4 400 W, 'Cooling and Heating'

ANNEX -B**List of Test Equipment***Major test equipment required to test as per the Indian Standard*

Sr No	Tests used in with clause reference	Test equipment
1.	Vacuum test , Cl.5.2.5	Vacuum test apparatus
2.	Pressure test, Cl. 16.2.2	Pressure gauge
3.	High Voltage Test, Cl. 16.2.3	High Voltage tester
4.	Leakage Current Test, Cl. 16.2.4	Power Multimeter
5.	Earth Resistance test, Cl. 16.2.5	Voltage Source, Miliohmmeter
6.	Cooling Capacity test, Cl. 10.9, Annex G, H	Calorimeter as per Cl. 13 Temperature instruments as per Cl. 12.1 Pressure measuring instruments as per Cl. 12.2 Electrical instruments as per Cl. 12.3 Water flow measuring instruments as per Cl. 12.4 Nozzles as per Cl. 14.2 Air flow apparatus as per Cl. 14.3, 14.4, 14.5
7.	Power factor test, Cl. 10.3	PF Meter
8.	Maximum Operating Condition test, Cl. 10.4	Test bench as per Cl. 10.4
9.	Freeze up test Cl. 10.5	Test bench as per Cl. 10.5
10.	Enclosure sweat test, Cl. 10.6	Test bench as per Cl. 10.6
11.	Condensate disposal test, Cl. 10.7	Test bench as per Cl. 10.7
12.	Power consumption test, Cl. 10.8, 10.9	Power meter
13.	Sound test, Cl. 10.11	Noise measuring room as per Fig.7, Noise measuring instrument
14.	Heat Pump heating capacity test, Cl. 10.12	Test set up as per Cl. 10.12
15.	Maximum Heating Performance Test, Cl. 10.14	Test set up as per Cl. 10.14

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

ANNEX- C

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 requirement of IS 1391 (Part 1): 2017.

4. CONTROL UNIT –All Room Air Conditioners of one type (based on function) and rating manufactured in a day shall constitute a control unit.

5. LEVELS OF CONTROL - The tests as indicated in column 1 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.

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.

TABLE 1

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Method			No. of Sample	Frequency	Remarks
		Clause	Reference				
5	CONSTRUCTION						
5.2	Material	5.2.1	IS 1391 (Part 1)	S	Raw material/Components which are covered under mandatory certification of BIS shall be ISI marked and received along with manufacturers test certificate. For other materials, Conformity shall be established as per Internal quality Assurance Plan of the licensee and no further testing is required if received with a test certificate or is ISI Marked.		
5.3.5	Electric Cables	5.3.5, 5.3.6	IS 1391 (Part 1)	S			
5.4	Refrigerant Circuit	5.4	IS 1391 (Part 1)	S			
5.7	Air Filter	5.7	IS 1391 (Part 1)	S			
5.8	Temperature sensing Controls	5.8	IS 1391 (Part 1) IS/IEC 60730- 2-9	S			
5.9	Hermetic Compressors	5.9	IS 1391 (Part 1) IS 10617	S			
5.10	Motors	5.10	IS 1391 (Part 1) IS 996	S			
5.11	Heat Exchanger	5.11	IS 1391 (Part 1) IS 11329	S			
5.6	Grounding Terminal and Grounding Lead Wire	5.6	IS 1391 (Part 1) IS 302(Part 1)	R	Adequate random Inspection as per Internal Quality Assurance plan of the licensee.		

10, 16.3 PERFORMANCE REQUIREMENTS, TYPE TESTS						
10.2 Safety						
16.3.3	Protection against access to the live part	8	IS 302 (Part 1)	S	One	Once in a year for each function and rating (Also see Note 1).
	Electric strength test	13.3	IS 302 (Part 1)	S	One	
10.2	Safety Conditions for units using A ₃ refrigerants	-	IS 16678(part 1)/ ISO 5149(Part 1)	R	One	Once in a month (Also see Note 1).
10.3, 16.3.1(c)	Power Factor Test	10.3	IS 1391 (Part 1)	S	One	Once in two years for each function and rating (Also see Note 1).
10.4 16.3.1(d)	Maximum Operating Conditions Test	10.4	IS 1391 (Part 1)	S	One	Once in two years for each function and rating (Also see Note 1).
10.5 16.3.1(e)	Freeze Up Test	10.5	IS 1391 (Part 1)	S	One	Once in a year for each function and rating (Also see Note 1).
10.6 16.3.1(f)	Enclosure Sweat Test	10.6	IS 1391 (Part 1)			
10.7	Condensate Disposal Test	10.7	IS 1391 (Part 1)	S	One	Once in two years for each rating (Also see Note 1).
10.8 16.3.1(g)	Power Consumption Test for Cooling	10.8	IS 1391 (Part 1)	S	One	Once in two years for each function and rating (Also see Note 1).
10.9 16.3.1(g)	Power Consumption Test for Heat Pump	10.9	IS 1391 (Part 1)	S	One	

10.10	Cooling Capacity Test	10.10	IS 1391 (Part 1)	S	One	Once in two years for each function and rating (Also see Note 1).
10.11	Sound Test	10.11, 15	IS 1391 (Part 1)	S	One	Once in two years for each function and rating (Also see Note 1).
10.12	Heating Capacity Test	10.12	IS 1391 (Part 1)	S	One	
10.14	Maximum Heating Performance Test	10.14	IS 1391 (Part 1)	S	One	
5.2.5, 16.2	<i>Production Routine Test</i>					
5.2.5	Vacuum Test	5.2.5	IS 1391 (Part 1)	R	Each Air- conditioner	—
16.2.1	General Running Test	16.2.1	IS 1391 (Part 1)			
16.2.2	Pressure Test or Leakage Test	16.2.2	IS 1391 (Part 1)			
16.2.3	High Voltage Test	16.2.3 Annex A	IS 1391 (Part 1) IS 302 (Part 1)			
16.2.4	Leakage Current Test	16.2.4 13.2	IS 1391 (Part 1) IS 302 (Part 1)			
16.2.5	Earth Resistance Test (Provision for Earthing)	16.2.5 27	IS 1391 (Part 1) IS 302 (Part 1)			
16.4	<i>Acceptance Tests</i>	16.4	IS 1391 (Part 1)			

Note-1: The test shall be done whenever there is a change in design.

Note- 2: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-3: The control unit and levels of control as decided by the Bureau are obligatory to which the licensee shall comply with.

ANNEX – D

Possible tests in a day

- i) Vacuum Test (Cl. 5.2.5)
- ii) General Running (Cl. 16.2.1)
- iii) Pressure Test (Cl. 16.2.2)
- iv) High Voltage Test (Cl. 16.2.3)
- v) Leakage Current Test (Cl. 16.2.4)
- vi) Earth resistance (Cl. 16.2.5)
- vii) Power factor Test (Cl. 10.3)
- viii) Maximum Operating Conditions test (Cl. 10.4)
- ix) Enclosure Sweat test (Cl. 10.6)

Note: During each visit, IO shall check that all the components used in manufacturing (either bought-out or manufactured in-house) which are covered under various QCOs [e.g.: Cables as per IS 694/IS 9968-1, Capacitors as per IS 2993, Finned Type Heat Exchangers as per IS 11329, Hermetic Compressors as per IS 10617, Temperature Sensing Controls as per IS 60730-2-9 etc.), as applicable, are ISI Marked under a valid BIS licence.

ANNEX E

Scope of Licence

“Licence is granted to use Standard Mark as per IS 1391 (Part 1): 2017 with the following scope:

Name of the product	Room Air Conditioners- Unitary Air Conditioners
Classification based on function	
Cooling Capacity (up to and including)	