PRODUCT MANUAL FOR ROOM AIR CONDITIONERS- SPECIFICATION PART 2 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- Specification - Part 1 Unitary Air Conditioners
	No. of Amendments	:	Three
2.	**Sampling Guidelines:**		
a)	**Raw material**	:	Material- as per Cl. 5.2 Electrical Cables- IS 694 or IS 9968(Part 1), as per Cl. 5.3.6 Temperature Sensing Controls- IS/IEC 60730-2-9 Hermetic Compressors- IS 10617 Motors- as per Cl. 5.10 Heat Exchangers- IS 11329
b)	**Grouping guidelines**	:	Please refer ANNEX – A
c)	**Sample Size**	:	One assembled air conditioner plus other suitable number of components if 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

BUREAU OF INDIAN STANDARDS
ManakBhawan, 9, Bahadur Shah ZafarMarg,
New Delhi – 110002

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 and Dehumidification (ii) Cooling and heating by Heat Pump and (iii) Cooling and heating by electric heater.

2. Considering the above, following Group has been formed for GOL/Inclusion:

Group	Cooling capacity in Watt (W)	Sample to be tested
I	Upto and including 4 400	From each group, sample of highest cooling capacity among the capacities intended to be covered in the license, shall be tested for all requirements.
II	Above 4 400	

3. 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 of Air-conditioners. However, if a sample of Air Conditioner with "Cooling and Dehumidification" is tested, Air conditioners with "Cooling and heating by Heat Pump" may also be included without further testing and vice-versa.

4. The manufacturer shall declare the function and cooling capacities of Air- conditioners they intend to cover in the Licence.

5. 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 and Dehumidification' or 'Cooling and heating by Heat Pump'
Sample 2	Unitary Air conditioner, Rated Cooling Capacity 10 500 W, 'Cooling and heating by Electric Heater'

Or

Sample 1	Unitary Air conditioner, Rated Cooling Capacity 10 500 W, 'Cooling and Dehumidification' or 'Cooling and heating by Heat Pump'
Sample 2	Unitary Air conditioner, Rated Cooling Capacity 4 400 W, 'Cooling and heating by Electric Heater'

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			
5.3.5	Electric Cables	5.3.5, 5.3.6	IS 1391 (Part 1)	S			Conformity shall be established as per Internal quality Assurance Plan of the licensee.
5.4	Refrigerant Circuit	5.4	IS 1391 (Part 1)	S			
5.5	Electric Heater	5.5	IS 1391 (Part 1)	R			
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.
5.7	Air Filter	5.7	IS 1391 (Part 1)	S			Conformity shall be established as per Internal quality Assurance Plan of the licensee. Temperature Sensing Control, Hermetic Compressor, Heat Exchanger shall be ISI Marked.
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	Same as above.		
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)	R	One	Each Control Unit	—
	Electric strength test	13.3	IS 302 (Part 1)	R	One	Once in a year for each type and rating.	--
	Provision for earthing	27	IS 302 (Part 1)	R	One	Each Control Unit	--
	Electrical leakage current at operating temperature	13.2	IS 302 (Part 1)	R	One	Each Control Unit	---
10.2	Safety Conditions for units using A_3 refrigerants	-	IS 16678(part 1)/ ISO 5149(Part 1)	R	One	Once in a month	—
10.3, 16.3.1(c)	Power Factor Test	10.3	IS 1391 (Part 1)	R	One	Once in two years for each type and rating.	Please see Note 1
10.4 16.3.1(d)	Maximum Operating Conditions Test	10.4	IS 1391 (Part 1)	R	One	Once in two years for each type and rating.	Please see Note 1
10.5 16.3.1(e)	Freeze Up Test	10.5	IS 1391 (Part 1)	R	One	Once in a year or whenever there is a change in design, whichever is earlier.	—
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)	R	One	Once in two years for each rating.	
10.8 16.3.1(g)	Power Consumption Test for Cooling	10.8	IS 1391 (Part 1)	R	One	Once in two years for each rating.	Please see Note 1
10.9 16.3.1(g)	Power Consumption Test for Heat Pump	10.9	IS 1391 (Part 1)	R	One	Once in two years for each rating.	
10.10	Cooling Capacity Test	10.10	IS 1391 (Part 1)	R	One	Once in two years for each rating.	
10.11	Sound Test	10.11, 15	IS 1391 (Part 1)	S	One	Once in two years for each type.	—
10.12	Heating Capacity Test	10.12	IS 1391 (Part 1)	R	One	Once in two years for each type and rating.	Please see Note 1
10.14	Maximum Heating Performance Test	10.14	IS 1391 (Part 1)	R	One	Once in two years for each type and rating.	
16.3.1	General Running test	16.2.1	IS 1391 (Part 1)	R	Each unit		
16.3.1	Pressure Test or Leakage Test	16.2.2	IS 1391 (Part 1)	R	Each unit		
16.3.1	High Voltage test	16.2.3	IS 1391 (Part 1)	R	Each unit		
16.3.1	Leakage Current Test	16.2.4	IS 1391 (Part 1)	R	Each unit		
16.3.1	Provisions for Earthing	16.2.5	IS 1391 (Part 1)	R	Each unit		

5.2.5, 16.2	***Production Routine Test***						
5.2.5	Vacuum Test	5.2.5	IS 1391 (Part 1)	R			
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)		Each Air- conditioner	—	
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	***Acceptance Tests***	16.4	IS 1391 (Part 1)	As agreed to between manufacturer and purchaser.			

Note-1: OSL reports may also be accepted for the purpose of operation of the Scheme.

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)

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- Specification - Part 1 Unitary Air Conditioners
Classification based on function	
Cooling Capacity (up to and including)	