



**PRODUCT MANUAL FOR
SOLAR COOKER – BOX TYPE
ACCORDING TO IS 13429 (Part 1): 2020**

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 13429 (Part1):2020
	Title		Solar Cooker – Box type
	No. of Amendments	:	Nil
2.	Sampling Guidelines:		
a)	Raw material	:	As per Cl. 7.2 read in conjunction with Cl. 4 of IS 13429 (Part 1): 2020
b)	Grouping guidelines	:	Please refer Annex- A
c)	Sample Size	:	As per Cl. 7.2 of IS 13429 (Part 1): 2020
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	:	(i) Leakage Test (Cl 7.3.1) (ii) Slam Test (Cl 7.3.2) (iii) Components dimension (Cl 4) (iv) Load Test (Cl 7.4.2) (v) Rain penetration test (Cl. 7.4.4)
6.	Scope of the Licence:		
	“Licence is granted to use Standard Mark as per IS 13429 (Part1):2000 with the following scope:		
	Name of the product	Solar Cooker- Box type	
	Grade		

ANNEX - A

Grouping Guidelines

1. Box Type Solar Cookers as per IS 13429 (Part 1): 2020 are classified as given below depending upon their thermal performance:
 - **Grade** – Grade A/ Grade B
2. Considering the above, the following grouping guidelines shall be followed for GoL/CSoL:
 - Separate sample of each grade of cooker shall be tested for all the requirements.
3. The Firm shall declare the varieties they intend to cover in the Licence. The Scope of Licence may be restricted based on the Manufacturing and Testing capabilities of the Manufacturer.
4. During the operation of license, it shall be ensured that all varieties covered in the license are tested in rotation, to the extent possible

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

Sl. No.	Tests used in with Clause Reference	Test Equipment
1.	Components as per IS 13429 (Part 2): 2018, Cl. 4	<ul style="list-style-type: none"> i. Micrometer ii. Measuring Tape iii. 10 Kg load iv. Spherical Ball(1.5 Kg) v. Temperature Indicator contact type vi. Creep test set up for Handle vii. Fatigue test set up viii. Pyranometer ix. Digital Stopwatch x. Vernier Calliper xi. Heating Oven xii. Adhesive Cellulose Tape xiii. Thermal Conductivity Test apparatus xiv. Pyranometer- 2 nos. with Stand xv. Measuring Tape xvi. Bevel protractor xvii. Platform Digital Weighing Balance
2.	Shape (Cl. 5)	<ul style="list-style-type: none"> i. Micrometer ii. Vernier Calliper iii. Measuring Tape
3.	Leakage Test, Cl. 7.3.1	<ul style="list-style-type: none"> i. Paper (Thickness - 0.050mm) ii. Digital Stop Watch iii. Spray Nozzle(5mm) iv. Pressure Gauge(LC-0.02MPa) v. Pump
4.	Reflecting Surface Test, Cl.7.3.3	<ul style="list-style-type: none"> i. Pyranometer- 2 nos. with Stand ii. Measuring Tape iii. Bevel protractor
5.	Shape Retention Test (Clause 7.3.3.1) Applicable for Metallic Reflecting Surface only	<ul style="list-style-type: none"> i. Surface plate ii. Feeler Gauges

6.	Exposure Test, Cl.7.4.1	i. Solar Pyranometer with recorder
7.	Load Test, Cl. 7.4.2	i) 50 Kg Load ii) Digital Stop watch
8.	Thermal Performance Test, Cl. 7.4.3	Pyranometer and temperature sensor along with measuring/recording device
9.	Rain penetration test, Cl. 7.4.4	Spray nozzle and pressure gauge

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 equipment.

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 Clause 9 of IS 13429 (Part1):2020.

4. CONTROL UNIT – Solar Cooker of same shape, size and grade assembled 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.

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

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	Level of Controls		
Cl.	Requirement	Test Methods			No. of sample	Frequency	Remarks
		Clause	Reference				
4	Components	As per Table 2 of this SIT					
5	Shape	5.1	IS 13429 (Part1)	R	Two	Each control unit	The manufacturer shall furnish the details of relevant shapes and dimensions to BIS. Dimensions of the box cooker shall be checked by the manufacturer as per the drawings submitted to BIS.
6.	Assembly and Workmanship	6.1 to 6.4	IS 13429 (Part1)	R	Every cooker		
7.3	Routine Tests						
7.3.1	Leakage Test	5.1	IS 13429 (Part 3)	R	Two	Each control unit	In case of failure, two more samples from the same control unit shall be tested for the requirements in which failure has occurred. The control unit shall not be marked, in case of any failure.
7.3.2	Slam Test	5.2	IS 13429 (Part 3)	R	Two	Each control unit	
7.3.3	Reflecting Surface Test	5.3	IS 13429 (Part 3)	R	Two	Each control unit	
7.3.3.1	Shape retention test	7.1.3.1	IS 13429 (Part 1)	R	Two	Each control unit	
7.4	Type tests						
7.4.1	Exposure Test	5.4	IS 13429 (Part 3)	S	One	Once in a year or whenever there is change in design/ material whichever is earlier (Please see Note 1 also).	
7.4.2	Load test	7.4.2	IS 13429 (Part 1)	R	One	Each batch of cooker box received in one consignment	This Test is applicable for cooker box made of fiber reinforced plastics
7.4.3	Thermal Performance Test	5.5	IS 13429 (Part 3)	S	One	Once in a year or whenever there is change in design/ material whichever is earlier (Please see Note 1 also).	
7.4.4	Rain Penetration Test	5.1.4	IS 13429 (Part 3)	R	One	Once in a year or whenever there is change in design/material whichever is earlier	

TABLE 2
(Please see para 5 of SIT)
IS 13429 (Part 2):2018
SOLAR COOKER BOX TYPE - PART 2 – COMPONENTS

(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				
4.1	<i>Cooker Box</i>						
4.1.1	Material	4.1.1.1 to 4.1.1.5	IS 13429 (Part 2)	R	Two	Each consignment	
4.1.2.1	Performance Test	4.1.2.1	IS 13429 (Part 2)	R	One	Each consignment	
4.1.2.2	Test on lock and latch	4.1.2.2	IS 13429 (Part 2)	R	One	Each consignment	
4.1.2.3	Impact Test	4.1.2.3	IS 13429 (Part 2)	R	One	Each consignment	
4.2	<i>Handle and Knobs</i>						
4.2.1	Screws, Studs, Nuts	4.2.1	IS 13429 (Part 2)	R	Two	Each consignment	
4.2.2	Rivets	4.2.2	IS 13429 (Part 2)	R	Two	Each consignment	
4.2.3	Temperature test	4.2.3	IS 13429 (Part 2)	R	Two	Each consignment	
4.2.4.1	Creep Test	4.2.4.1	IS 13429 (Part 2)	R	Two	Each consignment	
4.2.4.2	Fatigue Test	4.2.4.2	IS 13429 (Part 2)	R	Two	Each consignment	

4.3	Cover Plate						
4.3.1	Material	4.3.1	IS 13429 (Part 2)	S	Glazing material shall be conforming to IS 2553 (Part 1) and as per Cl. 4.3.1 of IS 13429 (Part 2). In case of other material like transparent polymer, the same should satisfy overall functional requirements of solar cooker.		
4.3.2	Transmittance Test	4.3.2.2 to 4.3.2.5	IS 13429 (Part 2)	R	Two	Each consignment. Every day's production if manufactured in house	Photo voltaic based solar meter may be used for routine test
4.4	Cooking Tray						
4.4.1	Material and its thickness	4.4.1.1, 4.4.1.2	IS 13429 (Part 2)	R	Two	Each consignment. Every day's production if manufactured in house	
4.4.2	Test	4.4.2.1, 4.4.2.2	IS 13429 (Part 2)	R	Two	Each consignment. Every day's production if manufactured in house	
4.5	Gaskets & Sealants						
4.5.1	Material & thickness	4.5.1	IS 13429 (Part 2)	S	Two	Each consignment	To ensure that only recommended materials are used.
4.5.2	Thermal Shock Test	4.5.2	IS 13429 (Part 2)	R	Two	Every week	
4.6	Insulation						
4.6	Thermal Resistance		IS 3346	S	Two	Each consignment	No testing is necessary if consignment is accompanied with a test certificate giving details of test requirements of Indian Standards and observed values.
4.6.1	Thermal resistance for non- metallic body	4.6.1	IS 13429 (Part 2)	S	-do-	Each consignment	

4.7	Mirror or Reflector (Metallic)						
4.7	Freedom from defects	4.7	IS 13429 (Part2)	R	Two	Each consignment	To examine visually for defects like waviness and bubbles.
4.7	Solar Reflectance	5.3	IS 13429 (Part 3)	S	Two	Each consignment	
4.8	Cooking Pots with Lid						
4.8.1	Material	4.8.1	IS:13429 (Part 2)	S	One	Each consignment#	
4.8.2	Coating	4.8.2, 4.4.2	IS:13429 (Part 2)	R	Two	Each consignment	In case this test has been carried out at component stage, this need not be carried out on cookers.
4.9	Caster Wheels	4.9	IS:13429 (Part 2)	R	One	Each consignment	This test is applicable only if caster wheels are provided
4.10	Workmanship and Finish	4.10	IS:13429 (Part 2)	R	Each Component		
4.11	Assembly and Workmanship	4.11	IS:13429 (Part 2)	R	Each Cooker		

Total quantity of material required for one day's production with constitute one batch for material.

Note-1: In case of failure, the marking of the particular type of cookers shall be stopped and cause of failure investigated and necessary corrective action taken. A cooker with the improved design shall be tested and marking shall be resumed only if the cooker satisfies all the requirements of type tests.

Note-2: Materials which are covered under mandatory BIS certification shall be ISI Marked. For other materials, no further testing is required, if accompanied with test certificate or ISI marked.

Note-3: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-4: -Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval by BO Head.