PRODUCT MANUAL FOR PRESSED CERAMIC TILES ACCORDING TO IS 15622 : 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 licence/certificate.

1.	**Product**	:	IS 15622 : 2017
	Title	:	PRESSED CERAMIC TILES
	No. of Amendments	:	1
2.	**Sampling Guidelines:**		
a)	**Raw material**	:	-
b)	**Grouping guidelines**	:	Please refer ANNEX – A
c)	**Sample Size**	:	50 Tiles for all tests
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) Shapes and sizes (Clause 5.1 & 5.2) (ii) Spacer lugs (Clause 5.3) (iii) Dimensions and surface quality (Clause 6) (iv) Scratch hardness of surface (Mohs') (Clause 6) (v) Coefficient of friction (Clause 6)		
6.	**Scope of the Licence**	:	Please refer ANNEX – D

ANNEX A

Grouping Guidelines

1. IS 15622 : 2017 covers Pressed Ceramic Tiles with following classification based on various aspects :
   i) Water absorption : Group B Ia/ Group B Ib/ Group B IIa/ Group B IIb/ Group BIII
   ii) Nature of tile surface
      a) Smooth, Profiled, Wavy, Decorated or Finished in any other way,
      b) Glazed (GL) - Glossy, Matt or Semi-Matt, and
      c) Unglazed (UGL).
   iii) Nature of surface Finish
      a) Polished (P), Semi-Polished (SP), Unpolished (UP), and
      b) Special finish such as metallic or lustre (As agreed between the manufacturer and the purchaser).
   iv) Nature of edge finish – Rectified (R), Unrectified (UR).
   v) With or without spacer lugs.
   vi) Sizes – Modular (M)/coordinating size (work size) or Non-modular (NM)/Nominal Size (work size).

2. Considering the above following grouping guidelines for GOL/Inclusion have been developed based on water absorption groups only which is categorized as follows:

Water Absorption Group	Thickness	Samples to be drawn to cover all sizes
B III	< 7.5 mm	One sample shall be drawn with or without spacer lugs of any size to cover all sizes in the group. Separate samples of tiles shall be drawn for Glazed (GL) and Unglazed (UGL) variety.
	≥ 7.5 mm	
B II a	All	
B IIb	All	
B Ia	All	
B Ib	All	

   i) If sample of floor tiles is tested from a water absorption group then non-floor tiles may be included without further testing.

   ii) If sample of Polished (P) tiles is tested, then Semi-polished (SP) and Unpolished (UP) tiles may be included without further testing.

   iii) If sample of Rectified (R) tiles is tested, then Unrectified (UR) tiles may be included without further testing.

3. The Scope of Licence may be restricted based on the Manufacturing and Testing capabilities of the manufacturer.

4. During operation of license, BOs shall ensure that all the varieties covered in the licence 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	Test used in with clause reference	Test Equipment
1	Shapes and sizes (Clause 5.1 & 5.2)	- Vernier caliper - Micrometer /Screw gauge - Measuring tape and Steel scale
2	Spacer lugs (Clause 5.3)	- Vernier caliper - Measuring tape and Steel scale
3	**Dimensions and surface quality (Clause 6, Table 5, 6, 7, 8 & 9)**	
a)	Length and Width	- Vernier caliper - Measuring tape and Steel scale
b)	Thickness	- Micrometer /Screw gauge or any other suitable apparatus
c)	Straightness of sides	- Steel square - Apparatus for measurement of straightness of sides and rectangularity fitted with dial gauge as per Fig 1 of IS 13630 (Part 1) : 2019 - Calibrating plate of steel/aluminium
d)	Rectangularity	
e)	Surface flatness	- Apparatus for measurement of surface flatness as per Fig 2 of IS 13630 (Part 1) with three dial gauges etc. - Calibrating plate of metal and glass (Minimum 10 mm thick) - Metal straight edge - Thickness feeler gauge
f)	Surface quality	- Fluorescent lighting of colour temperature to 6000 K to 6500 K - Meter scale or other suitable means of measurement - Light meter
4	**Physical properties (Clause 6, Table 5, 6, 7, 8 & 9)**	
a)	Water absorption, percent by weight	- Drying oven - Heating apparatus of inert material

	Bulk density	- Source of heat - Weighing balance - Distilled water - Desiccator with Silica gel - Chamois leather - Wire loop - Halter and Basket - Vacuum chamber and Vacuum system to maintain a pressure of 10 ± 5 kPa
b)	Modulus of rupture Breaking strength	- Drying oven - Recording gauge - MOR Testing apparatus as per Fig 1 of IS 13630 (Part 6) : 2019
c)	Moisture expansion	- Direct reading gauge (minimum travel of 10 mm and LC 0.01mm) - Reference bar of Nickel steel (invars) - Kiln - Vernier caliper - Constant temperature hot water bath
d)	Scratch hardness of surface (Mohs')	- Reference minerals as per Mohs' Scale
e)	Coefficient of linear thermal expansion from ambient to 100 ° C	- Suitable calibrated thermal expansion apparatus with heating rate of 5 ± 1 °C as per clause 3.1 of IS 13630 (Part 4) : 2019 - Desiccator - Drying oven - Vernier caliper
f)	Thermal shock resistance	- Low temperature water bath with water flow of 4 liter/ min - Drying oven - Stop watch
g)	Impact Resistance - Coefficient of Restitution	- Ball release apparatus as per Fig 1 of IS 13630 (Part 14) : 2019 - Electronic timing device - Chrome Steel Ball (19 ± 0.05 mm Dia) - Humidity chamber - Epoxide resin adhesive - Apparatus for measurement of surface water absorption of concrete blocks or slabs as per Fig 3 of IS 13630 (Part 14) : 2019

h)	Coefficient of friction (applicable for tiles intended for use on floor)	- Procedure to be declared by the manufacturer
i)	Crazing Resistance	- Steam autoclave or directly heated autoclave of volume suitable to keep Tiles and specimens - Suitable Stains (1% solution of aqueous methylene blue) - Damp cloth
j)	Resistance to surface abrasion of glazed tiles Class I to Class V (Applicable for floor application only)	- Abrasion testing machine as per clause 5.1 of IS 13630 (Part 11) : 2019 with suitable abrasive loads - White fused aluminum oxide conforming to the grain size requirement of Grit No. 80 of Table 1 of IS 11643 - 20 ml of de-ionized or distilled water - Fluorescent viewing box with fluorescent light of colour temperature 6000 K to 6500 K and of size 61 cm x 61 cm x 61 cm - Drying oven - Weighing balance - Protractor
k)	Frost Resistance	- Drying oven - Weighing balance - Container (for impregnation by Capillarity) - Vacuum pump (Capable of lowering than air pressure by 40 ± 2.6 KPa in a tank) - Freezer (operating temperature range +5 °C to -5 °C) - Chamois leather - Demineralized water
l)	Resistance to deep abrasion of unglazed tiles, volume of material removed per cubic millimeter (Applicable for floor application only	- Aluminium Oxide (Grain size requirement of Grit no 80 of Table 1 of IS 11643) - Abrasion apparatus as per clause 5.1 and as depicted in Fig 1 of IS 13630 (Part 12) : 2019 - Measuring gauge

<table>
<tr><td>5</td><td colspan="2">Chemical properties (Clause 6, Table 5, 6, 7, 8 & 9)</td></tr>
<tr><td rowspan="3">A</td><td>Resistance to staining of glazed tiles</td><td rowspan="3">Chemicals required:
1. Stains
• Methylene Blue (10 g/l)
• Potassium Permanganate Solution (10 g/l)
2. Household chemicals - Ammonium Chloride Solution (100 g/l)
3. Swimming Pool Salts
• Sodium Hypochlorite Solution (20 g/l)
• Copper Sulphate Solution (20 g/l)
4. Acid and Alkalis
• Hydrochloric Acid Solution, 3% (v/v), prepared from concentrated acid (ρ = 1.19 g/ml).
• Citric Acid Solution (100 g/l)
• Potassium Hydroxide Solution (200 g/l)
5. Cleaning Agents
• Anhydrous Sodium Carbonate: 33%(m/m)
• Sodium Perborate: 7%(m/m)
• Sodium silicate solution of density 1.33 g/cm^3: 7% (m/m)
• Commercial Sodium Oleate soap flakes: 30%(m/m)
• Distilled water of de-ionized water: 23%(m/m)
Apparatus:
- Vessel with lid made of borosilicate glass
- Cylinder of borosilicate glass
- Drying oven
- Sealing material
- White cloth made of cotton or flax
- Chamois leather
- Weighing balance
- Pencil of HB Hardness
- Electric lamp of 40W (White Inside).</td></tr>
<tr><td>Resistance to household chemicals and swimming pool water cleansers except to cleansing agents containing hydrofluoric acid and its compounds – Glazed tiles</td></tr>
<tr><td>Resistance to acid and alkalis (with the exception of hydrofluoric acid and its compounds – Glazed tiles</td></tr>
<tr><td rowspan="2">B</td><td>Resistance to Staining of Unglazed Tiles</td><td rowspan="2">Chemicals required:
1. Stains
• Green Paste Staining Agent
• Red Paste Staining Agent (Only applicable for Green coloured tiles)
• Iodine, 13 g/l solution in alcohol</td></tr>
<tr><td>Resistance to household chemicals and swimming pool water cleansers except to cleansing agents containing hydrofluoric acid</td></tr>
</table>

	and its compounds – Unglazed tiles	• Olive Oil 2. Household Chemicals - Ammonium Chloride Solution (100 g/l) 3. Swimming Pool Salts, Sodium hypochlorite solution, 20 mg/l prepared from technical grade sodium hypochlorite with about 13 percent (m/m) of active chloride. 4. Acid and Alkalis- Low Concentration • Hydrochloric acid solution, 3% (v/v) prepared from concentrated acid (ρ = 1.19 g/ml) • Citric acid solution, 100 g/l • Potassium Hydroxide solution, 30 g/l 5. Acid and Alkalis- High Concentration • Hydrochloric acid solution, 18% (v/v) prepared from concentrated acid (ρ = 1.19 g/ml) • Lactic acid solution, 5% (v/v) • Potassium Hydroxide solution, 100 g/l 6. Cleaning Agents • Hot water at a temperature of 55 ± 5 °C • Weak Cleaning agent- A commercial agent not containing abrasive, with a pH of 6.5 to 7.5 • Strong Cleaning agent- A commercial agent containing abrasive, with a pH of 9 to 10 • Hydrochloric acid solution, 3% (v/v) prepared from concentrated acid (ρ = 1.19 g/ml) • Potassium Hydroxide • Acetone Apparatus: - Vessel with lid made of borosilicate glass - Drying oven - Sealing material - White cloth made of cotton or flax - Chamois leather - Weighing balance - Electric lamp of 40 W (White Inside).
	Resistance to acid and alkalis (with the exception of hydrofluoric acid and its compounds – Unglazed tiles	

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 IS 15622 : 2017.

4. CONTROL UNIT – All the tiles manufactured continuously in a week or part thereof from the same batch of raw materials and under similar conditions of manufacturing (Vitrification process/Glazing process) 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**	**Levels of Control**		
Cl.	**Requirement**	**Test Methods**			**No. of Sample**	**Frequency**	**Remarks**
		Clause	**Reference**				
4	Classification	4.1 to 4.4	IS 15622	-	-	Each tile	-
5.1	Shapes and Sizes	5.1 and 5.2	IS 15622	R	-	Each tile	-
5.3	Spacer Lug	5.3.1 and 5.3.2	IS 15622	R	Ten	Daily for each size	If Spacer lug is provided.
6	**REQUIREMENTS**						
	1) DIMENSIONS AND SURFACE QUALITY	Table 5 to 9	IS 15622	-	-	-	-.
	a) Length and Width	2	IS 13630 (Part 1)	R	As per respective clause of IS 13630 (Part 1)	Daily for each size and type of tile	#
	b) Thickness	3	IS 13630 (Part 1)	R			
	c) Straightness of sides	4	IS 13630 (Part 1)	R			
	d) Rectangularity	5	IS 13630 (Part 1)	R			
	e) Surface flatness	6	IS 13630 (Part 1)	R			
	f) Surface Quality	7	IS 13630 (Part 1)	R			
	2) PHYSICAL PROPERTIES	Table 5 to 9	IS 15622	-	-	-	-
	a) Water Absorption	-	IS 13630 (Part 2)	R	As per clause 4 of IS 13630 (Part 2)	Each control unit	#

	b) Modulus of rupture	-	IS 13630 (Part 6)	R	As per clause 5 of IS 13630 (Part 6)	Each control unit	#
	c) Breaking Strength	-	IS 13630 (Part 6)	R	As per clause 5 of IS 13630 (Part 6)	Each control unit	#
	d) Moisture expansion	-	IS 13630 (Part 3)	R	Five	Once in a month for each type of tile	#
	e) Scratch hardness of surface	-	IS 13630 (Part 13)	R	Three	Each Control Unit	#
	f) Coefficient of linear thermal expansion from ambient temperature to 100 ^{0}C	-	IS 13630 (Part 4)	S	Two	Once in a month for each type of tile	#
	g) Thermal shock resistance	-	IS 13630 (Part 5)	R	Five	Each Control Unit	#
	h) Impact resistance- Coefficient of restitution	-	IS 13630 (Part 14)	S	Five	Once in three months for each type of tile	#
	i) Coefficient of Friction	-	IS 15622	S	As per manufacturer's declared value for specified requirement and declared test method for tiles intended for use on floors.		
	j) Crazing resistance	-	IS 13630 (Part 9)	R	Five	Each Control Unit	#
	k) Resistance to surface abrasion of glazed tiles (For floor tiles)	-	IS 13630 (Part 11)	S	19 Test Specimens	Once in a month for each type of tile	#

	l) Frost resistance (Applicable for Groups B Ia, B Ib, B IIa and B IIb)	-	IS 13630 (Part 10)	S	As per clause 4 of IS 13630 (Part 10)	Once in a month for each type of tile	#
	m) Resistance to deep abrasion of unglazed tiles (For floor tiles and applicable for Groups B Ia, B Ib, B IIa and B IIb)	-	IS 13630 (Part 12)	S	Five	Once in a month for each type of tile	#
	n) Bulk Density (Applicable for Groups B Ia and B Ib)	-	IS 13630 (Part 2)	R	As per clause 4 of IS 13630 (Part 2)	Each control unit	#
6	a) Resistance to Staining	Table 5 to 9	IS 15622	-	-	-	-
	i) For Glazed Tiles	-	IS 13630 (Part 8)	S	Five test specimen	Once in three months for each type	#
	ii) For Unglazed Tiles (Only for Group B Ia)	-	IS 13630 (Part 7)				
	b) Resistance to household chemicals and swimming pool water cleansers except to cleansing agent containing hydrofluoric acid and its compounds	Table 5 to 9	IS 15622	-	-	-	-
	i)For Glazed Tiles	-	IS 13630 (Part 8)	S	Five test specimen for each solution	Once in three months for each type	#
	ii) For Unglazed Tiles (Only for Group B Ia)	-	IS 13630 (Part 7)				# Required, if agreed according to the chemical resistance class indicated by the manufacturer.

	c) Resistance to acid and alkalis (With the exception of hydrofluoric acid and its compounds)	Table 5 to 9	IS 15622	-	-	-	-
	i) For Glazed Tiles	-	IS 13630 (Part 8)	S	Five test specimen for each solution	Once in three months for each type	# Required, if agreed according to the chemical resistance class indicated by the manufacturer.
	ii) For Unglazed Tiles (Only for Group B Ia)	-	IS 13630 (Part 7)				

All the tiles taken for test shall satisfy the requirements of the specification for acceptance of the control unit. If any tile fails to satisfy the requirement of any test, another sample consisting of twice the number of tiles tested initially shall be taken from the same control unit and tested. If there is any failure, control unit from which the tiles have been selected shall not be marked with Standard Mark.

Note-1: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-2: 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.

ANNEX - D

Scope of the Licence

"Licence is granted to use Standard Mark as per IS 15622 : 2017 with the following scope:	
Name of the product	PRESSED CERAMIC TILES
Water absorption	Group B Ia/ Group B Ib/ Group B IIa/ Group B IIb/ Group BIII
Nature of tile surface	- Smooth/ Profiled/ Wavy/ Decorated/ Finished in any other way - Glazed (GL) - Glossy/ Matt/ Semi-Matt - Unglazed (UGL).
Nature of surface Finish	Polished (P)/ Semi-Polished (SP)/ Unpolished (UP)/ Special finish such as metallic or lustre
Nature of edge finish	Rectified (R)/ Unrectified (UR).
Spacer lugs	With or without
Sizes	Modular (M)/coordinating size (work size) or Non-modular (NM)/ Nominal Size (work size)
Application	Wall/Floor application