

OBJECT: Laminam 12+ – Robinson test (ASTM C627)

The Robinson test is an American standard (ASTM C627) for predicting a floor's performance under several different loads, in real-world applications. The test allows to identify the final destination of the product according to the performances of the laid floor.

This simple yet effective test is considered as the most common, strict and widely accepted way to quick forecast the performance of installed tile floors.

Test Apparatus and interpretation of the results

The Robinson test consists of a three-wheel cart that rotates about its center on the top a sample section of a tile floor (consisting of screed, adhesive, tiles and grouting). The cart, a ½" thick hot-rolled steel plate, is in the shape of an equilateral triangle and has a swivel caster wheel on each corner. The three wheels are equally spaced in a circle 15 inches from the cart's center. Above each wheel is a rod along which weights can be stacked. A ¾-horse power motor drives the assembly and the cart rotates at a rate of 15 revolution per minute.

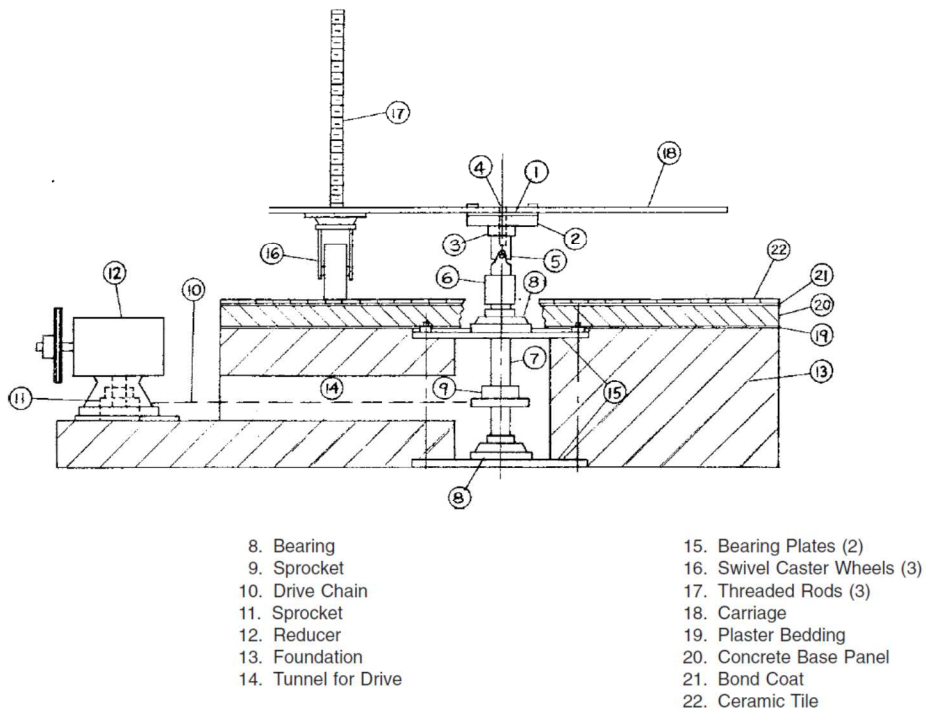


FIG. 1 Floor Tile Installations Systems Tester (Not to Scale)

The test is run according to a loading schedule with 14 different cycles. For each cycle, the schedule specifies a type of wheel to be used (soft rubber, hard rubber, or steel), the amount of weight to be stacked above each wheel, and the total number of cart revolutions to be executed. After the completion of each cycle, the sample floor section is visually examined for chipped tiles, broken tiles, loose tiles, popped-up grout joints, cracked grout joints and powdered grout joints.

The test method defines each of these characteristics, and quantifies the degree of which each one can be observed prior to designating failure of the tile floor sample.

TABLE 1 Loading Schedule for Testing

Cycle	Type of Wheels	Total Weight per Wheel lbs (kg)	Duration of Test, h	Total Number of Revolutions
1	soft rubber	100 (45)	1	900
2	soft rubber	200 (91)	1	900
3	soft rubber	300 (136)	1	900
4	soft rubber	300 (136)	1	900
5	hard rubber	100 (45)	1	900
6	hard rubber	200 (91)	1	900
7	hard rubber	300 (136)	1	900
8	hard rubber	300 (136)	1	900
9	steel	50 (23)	½	450
10	steel	100 (45)	½	450
11	steel	150 (68)	½	450
12	steel	200 (91)	½	450
13	steel	250 (114)	½	450
14	steel	300 (136)	½	450

To interpret Robinson floor test, technicians refer to the TCA Handbook for Ceramic Tile Installation. According to the Floor tiling Guide of TCA handbook, the incremental completion of ASTM cycles without failure can be categorized into one of five different service levels:

- Sample floor sections completing cycles 1 through 3 without failure: “Residential” rating
- Samples completing cycles 1 through 6: “Light” commercial rating
- Samples completing cycles 1 through 10: “Moderate” commercial rating
- Samples completing cycles 1 through 12: “Heavy” commercial rating
- Samples completing all 14 cycles without failure are assigned en “Extra heavy” commercial rating.

According to the Floor Tiling Guide of the TCA Handbook, the incremental completion of ASTM C627 cycles without failure can be categorized into one of five different service levels, each one corresponding to a specific final destination of the flooring:

- Residential: kitchens, bathrooms and foyers
- Light: light commercial use in office space, reception areas, kitchens and bathrooms
- Moderate: normal commercial and light institutional use in public space of restaurants and hospitals
- Heavy: shopping malls, stores, commercial kitchens, work areas, laboratories, auto showrooms and service areas, shipping/receiving and exterior decks
- Extra heavy: extra heavy and high-impact use in food plants, dairies, breweries, and kitchens.

Laminam 12+ rating

Please find in attachment Laminam 12+ test report issued by Centro Ceramico, with final rating “**EXTRA HEAVY**”. The adhesive used has a classification of C2ES2 (highly deformable cementitious improved adhesive), according to ISO 13007. For the recommended installation techniques (features of the substrate, back buttering method of application of the adhesive, trowels, size and number of joints and grouting), please make reference to “Laminam Technical Guide”.

We remain available in case of further information

Best regards

Laminam SpA
Project Management

ATTACHMENT – Laminam 12+ – Robinson test (performed by Centro Ceramico)**CENTRO CERAMICO**

Test Report No. 4488/17

Date 18/05/2017

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Evaluating Ceramic Floor Tile Installation Systems Using the Robinson-Type Floor TesterThe test was performed according to ASTM C627-10**TEST AND MATERIAL DESCRIPTION:**

As per client's request, the following materials have been used for the preparation of the testing pads.

Item #	Product name and size	Provided By:
1	Concrete base Nominal Size: 1219mm x 1219mm x 51mm	Centro Ceramico
2	Ultralite S2, Mapei	Centro Ceramico
3	Ultracolor plus, Mapei	Centro Ceramico
4	Slant ridge notched trowel with notch size 8 mm, Raimondi	Centro Ceramico
5	Square notched trowel with notch size 3 mm, Raimondi	Centro Ceramico
6	Heavy Rubber tamper, Ramondi	Centro Ceramico

TYPE OF INSTALLATION:

All the materials used and the tested assembly were approved by the client. The installation was made by multilayer elements for flooring, over concrete substrate.

Base:

A concrete base was prepared and cured for a minimum of 28 days prior to testing.

Tile and Grout:

All tile installation and grouting were performed by a Centro Ceramico representative according to the instructions approved by the client.

Ultralite S2 mortar mixed with water per manufacturer's instructions (mix ratio 5.7-6.2 liters :15 kg), was troweled over the concrete subfloor with a trowel with notch size 8 mm. The Multilayer elements were back-buttered with a trowel with notch size 3 mm.

After the Multilayer elements were installed, they were tapped with a heavy rubber tamper to attempt to eliminate any air pockets or voids underneath the tiles.

Once set, the installation was allowed to cure for 24 hours before grouting.

Ultracolor plus grout, prepared per manufacturer's instructions, was forced into the 2 mm grout joints with a rubber float. Once set, the tiles were allowed to cure for 14 days before testing the assembly.



TEST RESULTS:

Cycle Type of Wheels	Type of Wheels	Total Weight per Wheel lbs (kg)	Duration of Test, h	Total Number of Revolutions	Damage	N° of damage	Type of damage
1	Soft rubber	100 (45)	1	900	No damage	---	
2	Soft rubber	200 (91)	1	900	No damage	---	
3	Soft rubber	300 (136)	1	900	No damage	---	
4	Soft rubber	300 (136)	1	900	No damage	---	
5	Hard rubber	100 (45)	1	900	No damage	---	
6	Hard rubber	200 (91)	1	900	No damage	---	
7	Hard rubber	300 (136)	1	900	No damage	---	
8	Hard rubber	300 (136)	1	900	No damage	---	
9	steel	50 (23)	1/2	450	Damage	1	popped-up grout joint < 5%
10	steel	100 (45)	1/2	450	No damage	---	
11	steel	150 (68)	1/2	450	No damage	---	
12	steel	200 (91)	1/2	450	No damage	---	
13	steel	250 (114)	1/2	450	No damage	---	
14	steel	300 (136)	1/2	150	No damage	---	

Number of test cycles performed	14
Highest number of the test cycle the installation passed	14

Classification as prescribed by "Handbook for Ceramic, Glass, and Stone Tile Installation 2016".

CLASSIFICATION:

EXTRA HEAVY