



# SMITH-EMERY LABORATORIES

An Independent Commercial Testing Laboratory

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Project/Job No.: 37139-1  
Laboratory No.: T-09-116

July 15, 2009

Client : GREG FILLO  
**BEDROSIANS**  
1515 E. WINSTON ROAD  
ANAHEIM, CA 92805-6445

Subject: **TCR ROM50C 20" x 20" Field Tile Roma-Camel Porcelain Tiles, Order No.97001335301**  
Specification: ASTM C 1028-07  
Source: Submitted to Smith-Emery Laboratories by Client July 10, 2009.

### STATIC COEFFICIENT OF FRICTION (ASTM C 1028-07)

A block of wood with a 3" x 3" x 1/8" section of standard neolite sole liner attached, was placed on the surface to be tested; on top of this assembly, a 50 pound (22kg) weight was placed. Using dynamometer, the force in pounds required to cause the test assembly to slip parallel to the test surface was measured. Four measurements were taken on each of three test surfaces, each measurement perpendicular to the previous one. The twelve measurements were averaged to obtain the coefficient of friction for each test condition.

#### A. As Received:

Test Condition	Tile No.	N	E	S	W	Average	Individual	S.C.O.F
							Coefficient of Friction (fc)	After Noelite Correction Factor
Dry Neolite	1	50	50	50	50	50.00	(0.98)	0.93
	2	50	50	50	50			
	3	50	50	50	50			
Wet Neolite	1	42	41	41	42	41.58	(0.81)	0.74
	2	41	42	43	41			
	3	42	41	42	41			

#### B After Cleaning with Hillyards Renovator. (ASTM C 1028 Standard Cleaner)

Dry Neolite	1	50	50	50	50	50.00	(0.98)	0.93
	2	50	50	50	50			
	3	50	50	50	50			
Wet Neolite	1	41	40	40	42	41.42	(0.81)	0.74
	2	42	41	43	42			
	3	42	41	41	42			

Respectfully Submitted,  
SMITH - EMERY LABORATORIES

V. Andrew Tan  
Registered Civil Engineer No. C64265  
Registration Expires: 06-30-11

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Specification: Department of Justice ADA Title III Regulation 28 CFR Part 36, Section A4.5.1; Recommends minimum of 0.60 SCOF for horizontal surfaces and 0.80 SCOF on ramps.

- Materials Tested Comply With Specifications.
  - Horizontal;  Ramps or Incline
- Materials Tested Did Not Comply With Specifications.
- No Established Criteria for Acceptable Limits.
- For Information Only.

CC:BEDROSIANS;SMITH-EMERY LABORATORIES

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Page 1 of 2



# TEI-Testing Services<sup>SM</sup>

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|||||  
BEDROSIANS TILE AND MARBLE  
1515 EAST WINSTON ROAD  
ANAHEIM CA 92805-6445  
USA

Analysis No. TS-S&T 00891  
Report Date 17 July 2009  
Date Sampled 23 June 2009  
Where Quarried/Fabricator Unknown  
Where Sampled Anaheim, CA USA  
Sample Received 25 June 2009  
Sampled By Client

This is to attest that we have examined: Manufactured Material identified: Porcelain Tile TCR ROM50C – 20X20 ROMA CAMEL

When examined to the applicable requirements of:

- ASTM C373-06 "Standard Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products"
- ASTM C648-09 "Standard Test Method for Breaking Strength of Ceramic Tile"
- ASTM C1027-04 "Standard Test Method for Determining Visible Abrasion Resistance of Glazed Ceramic Tile"
- CTIOA Field Report 81-7 (R-98) "Suggested Standard Test Method for Counter Top Glazed and Unglazed Ceramic Tile Appendix "A" Standard Test Method Mohs Hardness Scale for Determining Glaze and Bisque Hardness of Ceramic Tile"

The above identified material had the following values:

Exterior Volume – (V)	90.1 cm <sup>3</sup>
Volume of Open Pores – (VOP)	2.0 cm <sup>3</sup>
Volume of impervious Pores – (VIP)	88.1 cm <sup>3</sup>
Apparent Porosity – (P)	2.23 %
Water Absorption – (A)	0.47 %
Apparent Specific Gravity – (T)	2.363
Bulk Density – (B)	2.310 g/cm <sup>3</sup>
Breaking Strength	568 lbf
Visible Abrasion Resistance	<b>Class IV</b>
Mohs Hardness	8

The attached Report of Test is an integral portion of this summation certificate.  
END OF ANALYSIS

Merrill Gee P.E. – Engineer in Charge

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## TEST REPORT

### ASTM C1027-04

#### “Standard Test Method for Determining Visible Abrasion Resistance of Glazed Ceramic Tile”

## 1.0 SCOPE

1.1 This test method is designed to measure the resistance of tile surfaces to visible surface abrasion. Certain irregular surfaces may not be evaluated properly by this test method because of wear patterns.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 This procedure does not make provisions for the apparent difference in abrasion values between light and dark colored tile.

1.4 This procedure does not optimally evaluate loss of gloss with abrasion.

## 3.0 SIGNIFICANCE AND USE

3.1 The abrasion resistance of tile surfaces is determined by rotation of an abrasive load on the surface and the assessment of the resultant wear by means of visual comparison of the abraded test specimens and non-abraded tiles. A staining agent in light oil may be used to help determine whether abrasion surface is likely to result in mechanical entrapment of dirt particles.

## 4.0 ABRASIVE LOAD

4.1 The total load on each test specimen consists of the following:

4.1.1 Grade 25 chrome steel balls of various diameters:

4.1.1.1 70.0 g of 5-mm diameter steel balls.

4.1.1.2 52.5 g of 3-mm diameter steel balls.

4.1.1.3 43.75 g of 2-mm diameter steel balls.

4.1.1.4 8.75 g of 1-mm diameter steel balls.

4.1.2 3.0 g No. 80 grit aluminum oxide, and

4.1.3 20.6 0.5-mL demineralized water.

## 5.0 REAGENTS AND APPARATUS

5.1 Note the Abrasion Apparatus used is in accordance with this Section. Manufacturer – Gabbrielli Technology S.R.L., Calenzano (Fi), Italy, Model – Abrasimeter GT0989

5.2 Note the Apparatus for Visual Assessment used is in accordance with this Section. Manufacturer – TEI-Support Services, SLC, UT 84115

5.3 Note the Drying Oven used is in accordance with this Section. Manufacturer – Humboldt Manufacturing, Co., Chicago, IL 60656 USA, Model – 21-350.

## TEST REPORT

5.4 10 % (v/v) *Hydrochloric Acid Solution*, prepared by adding 263 mL of 38 % hydrochloric acid to 837 mL of distilled or demineralized water.

### 6.0 TEST SPECIMEN

6.1 Types of Test Specimens – NOTE: The test specimens were in accordance with this Section. Care was taken to ensure that color and decorative differences were minimized.

6.2 NOTE: The facial dimensions of the test specimens were 4 by 4 in.

6.3 Number of Test Specimens – Eleven test specimens were used for the test. Eight test specimens were available for visual assessment. One test specimen was used for each stage of abrasion, and three test specimens were used to verify the visual fail point.

6.4 Preparation – NOTE: The surfaces, of the test specimens to be tested, were clean and dry.

### 7.0 PROCEDURE

7.1 Abrasion Procedure – NOTE: The procedure was followed without exception.

7.1.1 After abrasion – NOTE: The procedure was followed without exception.

7.1.2 Evaluation of Surface Abrasion – NOTE: The procedure was followed without exception.

7.1.3 Result Verified by Retesting – NOTE: The procedure was followed without exception.

7.1.4 After Use – NOTE: The procedure was followed without exception.

7.2 Cleaning Procedure – NOTE: The procedure was followed without exception.

7.2.1 Test Specimens – Only one abraded tile was used for each of the abrasion test stages.

7.2.2 Staining Agents – NOTE: Green staining agent in light oil was used in the evaluation.

7.2.3 Cleaning Agents:

7.2.3.1 Hot Water was used.

7.2.3.2 Weak Cleaning Agent – NOTE: BIOCHEM Corporation, BRANDEX – All-Purpose Neutral Cleaner Catalog # with a pH of 7-0 – 8.0 was used for the testing.

7.2.3.3 Strong Cleaning Agent – NOTE: BIOCHEM Corporation, CONCENTRATED SUPER NEUTRAL CLEANER Catalog # V227 with a pH of 9.5 was used for the testing.

7.2.4 *Suggested Solvents:*

7.2.4.1 3 % (v/v) *HCl Solution*, prepared from 38 % hydrochloric acid by adding 79 mL of the reagent hydrochloric acid solution to 951 mL of distilled water.

7.2.4.2 20 % *KOH Solution (200 g/L)*, prepared by dissolving 200 g of 90 % potassium hydroxide crystals in 1 L of water.

7.2.4.3 *Acetone*, technical grade.

TEST REPORT

7.3 Application of the Staining Agent – NOTE: This procedure was followed without exception.

7.4 Cleaning Procedure:

7.4.1 Stain Removal Attempts – NOTE: This procedure was followed without exception.

7.4.2 Procedure A – NOTE: This procedure was followed without exception.

7.4.3 Procedure B – NOTE: This procedure was followed without exception.

7.4.4 Procedure C – NOTE: This procedure was followed without exception.

7.4.5 Procedure D – NOTE: This procedure was followed without exception.

8.0 CLASSIFICATION OF RESULTS

8.1 The test specimens are classified according to Table 1. To be classified as Class V, the tile also must pass the staining procedure in Section 6.4 (based on ISO 10545–14). If there is no visual failure at 12 000 revolutions, but the stain cannot be removed by any of the procedures listed in 6.4, the tile shall be classified as Class IV.

RESULTS

TILE CYCLES	VISUAL ASSESSMENT	CLEANER	CLEANING PROCEDURE	CLASSIFICATION
100	No Visual Difference	Hot Water	A	Class IV
150	No Visual Difference	Hot Water	A	
600	No Visual Difference	Hot Water	A	
750	No Visual Difference	Hot Water	A	
2 100	No Visual Difference	Weak Cleaner	B	
6 000	No Visual Difference	Strong Cleaner	C	
12 000	Visual Difference	Strong Cleaner	C	
REPEAT TEST				
2 100	No Visual Difference	Weak Cleaner	B	
6 000	No Visual Difference	Strong Cleaner	C	
12 000	Visual Difference	Strong Cleaner	C	

Note: Visual Assessment was by agreement of Three test technicians. Prior to Cleaning the Abrated samples were stained with Green staining agent as specified in Section 7.2.2. Cleaning was done in accordance with the Standard. N/A means Not Applicable.

TABLE 1 CLASSIFICATION OF TILE

<u>Abrasion Stage at Which the Failure is Visible</u>	<u>Class</u>
100	Class 0
150	Class I
600	Class II
750	Class III
1 500	Class III
2 100	Class IV
6 000	Class IV
12 000	Class IV
>12 000	Class V
and pass staining test	