

**JOB NUMBER:** TCT008146P-R  
**PAGE:** 1 of 3  
**DATE:** October 19, 2011  
**REVISED:** October 25, 2011

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Investigative Chemistry  
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Geotechnical Construction Materials  
Failure Analysis Product Evaluation  
Materials Testing Welder Qualification

**COEFFICIENT OF FRICTION TESTING  
OF  
TILE**


**Prepared for:  
MNY Group  
Attn: Jason Bahrke  
7809 Southtown Center #173  
Minneapolis, MN 55431**

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**Client Purchase Order Number: Prepaid**

**Prepared By:**



**Briana Hinrichs  
Testing Technician  
Product Evaluation Department**

**Reviewed By:**



**William Stegeman  
Advanced Materials Mgr.  
Phone: 651-659-7230**

The test results contained in this report pertain only to the samples submitted for testing and not necessarily to all similar products.

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**EAR-CONTROLLED DATA**

## **COEFFICIENT OF FRICTION TESTING OF TILE**

### **INTRODUCTION:**

This report presents the results of coefficient of friction tests conducted on samples of tile. The testing was authorized by Jason Bahrke of MNY Group on October 14, 2011. The testing and data analysis were completed on October 18, 2011.

The scope of our work was limited to conducting coefficient of friction tests on the samples submitted and reporting the results.

### **SUMMARY OF RESULTS:**

Sample ID	Static Coefficient of Friction	
	As-Received (Dry)	As-Received (Wet)
Rough Side	0.83	1.00
Smooth Side	0.92	1.02

### **SAMPLE IDENTIFICATION:**

The sample was identified as a 12" x 12" tile. One side was smooth and one side appeared to have a "brick like" pattern. Per customer request, both sides were tested.

### **TEST METHOD:**

The samples were allowed to condition at standard laboratory conditions of 72 ± 4°F and 50 ± 5% relative humidity for at least 40 hours prior to testing.

Coefficient of Friction testing was done based on ASTM C1028-07, "Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method." Instead of a dynamometer pull meter, a MTS Universal Test machine was used (pull rate of 12in/min) to determine the force required to set the test assembly in motion. Only one specimen was sent in for all testing, so only four (4) readings in each condition were taken. Both sides of the specimen were tested and reported as "Rough Side" and "Smooth Side". First, both sides were tested in the dry "as-received" condition. They were then tested in the wet "as-received" condition. The specimens were not cleaned and retested. The four readings were taken by rotating the specimen 90° after each pull.

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**CALIBRATED TEST EQUIPMENT:**

Honeywell Temp/RH Chart Recorder, S/N 7852 243000007, ID MM190-024, calibrated 8/11/11, due 8/11/12

MTS Universal Test Machine, Mdl QTest / 50LP, System #1532, ID MM210-009.3 & 6, calibrated 4/20/11, due 4/20/12

MTS Load Cell, 2250lbf Capacity, S/N 205974, ID MM210-009.1, calibrated 4/20/11, due 4/20/12

**TEST DATA:**

Sample Identification	Pull Number	Force to set in Motion, lbf	Static Coefficient of Friction
Rough Side (Dry)	1	43.5	<b>0.83</b>
	2	40.3	
	3	42.1	
	4	42.6	
	Sum (R <sub>D</sub> )	<b>168.5</b>	
Rough Side (Wet)	1	53.5	<b>1.00</b>
	2	56.2	
	3	57.9	
	4	58.4	
	Sum (R <sub>D</sub> )	<b>226.0</b>	
Smooth Side (Dry)	1	45.5	<b>0.92</b>
	2	47.8	
	3	48.3	
	4	46.9	
	Sum (R <sub>D</sub> )	<b>188.5</b>	
Smooth Side (Wet)	1	65.9	<b>1.02</b>
	2	45.2	
	3	52.4	
	4	66.4	
	Sum (R <sub>D</sub> )	<b>229.9</b>	

**REMARKS:**

The test materials not consumed in testing will be retained for 14 days from the date of this report and then discarded unless we receive written notification requesting otherwise.

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 817 SHOWALTER AVE. • P.O. BOX 2041  
 DALTON, GEORGIA 30722-2041  
 PHONE: (706) 226-1400 • FAX: (706) 226-6118

## TEST REPORT

CLIENT:	MNY Group, LLC	REPORT NUMBER:	60267A
	2010 East Hennepin Avenue #8	LAB TEST NUMBER:	2591-8704
	Building 8 Suite 206	DATE:	March 25, 2014
	Minneapolis, MN 55413	PAGE:	1 of 2

Tile Identification	020614A
Tile Thickness	6mm
Sub Base	Concrete

Tested Dimension: 24" X 24"

Impact Locations: Various

Date of Receipt: February 20, 2014

Testing Period: March 5, 2014

Authorization: Jason Bahrke

Test Procedure: The submitted sample was evaluated for Shock Absorbing Properties in Accordance with the procedures outlined in ASTM F 1292-10; Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment

Missile: Hemispherical (Triaxial Accelerometer): Total Drop Assembly Weight (46g) 10 lbs

Test Equipment: Triax 2000 Surface Impactor  
 Date of Last Calibration: 3/13/2012 by Alpha Automation

Sample Pre-Condition: 50±10 RH, 70F±5F for a minimum of 24 hrs prior to testing

Temperature: **Maximum Drop Height That Gives a Gmax of 200 or Less and A HIC of 1000 or less**

Ambient, 61.7°F 38% RH < 1'

Hot, 120°F (49°C) Not Tested Per Client

Cold, 25°F (-6°C) Not Tested Per Client

<u>Critical Fall Height (CFH):</u>	< 1'
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Prepared and signed by:

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 Erle Miles, Jr. VP  
 Testing Services Inc.



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## TEST REPORT

CLIENT:	MNY Group, LLC	REPORT NUMBER:	60267A
	2010 East Hennepin Avenue #8	LAB TEST NUMBER:	2591-8704
	Building 8 Suite 206	DATE:	3/25/2014
	Minneapolis, MN 55413	PAGE:	Page 2 of 2

AMBIENT Sample Condition: Dry Temperature: 61.7 of 38% RH	<b>Drop #</b>	<b>Velocity ft/sec</b>	<b>Angle</b>	<b>Drop Ht/Actual</b>	<b>Drop Ht/Theoretical</b>	<b>Gmax</b>	<b>HIC</b>
	1	8.2	7	1'	1.04	408	1262
	2	8.3	9	1'	1.07	416	1456
	3	8.3	9	1'	1.07	420	1419
	<b>Average</b>				<b>Drops 2, 3</b>	<b>418</b>	<b>1438</b>
	<b>Drop #</b>	<b>Velocity ft/sec</b>	<b>Angle</b>	<b>Drop Ht/Actual</b>	<b>Drop Ht/Theoretical</b>	<b>Gmax</b>	<b>HIC</b>
	1	N/A	N/A	N/A	#VALUE!	N/A	N/A
	2	N/A	N/A	N/A	#VALUE!	N/A	N/A
	3	N/A	N/A	N/A	#VALUE!	N/A	N/A
	<b>Average</b>				<b>Drops 2, 3</b>	<b>#####</b>	<b>#####</b>
	<b>Drop #</b>	<b>Velocity ft/sec</b>	<b>Angle</b>	<b>Drop Ht/Actual</b>	<b>Drop Ht/Theoretical</b>	<b>Gmax</b>	<b>HIC</b>
	1	N/A	N/A	N/A	#VALUE!	N/A	N/A
	2	N/A	N/A	N/A	#VALUE!	N/A	N/A
	3	N/A	N/A	N/A	#VALUE!	N/A	N/A
	<b>Average</b>				<b>Drops 2, 3</b>	<b>#####</b>	<b>#####</b>

END OF REPORT 60267A



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## TEST REPORT

CLIENT:	MNY Group, LLC	REPORT NUMBER:	60267B
	2010 East Hennepin Avenue #8	LAB TEST NUMBER:	2591-8705
	Building 8 Suite 206	DATE:	March 25, 2014
	Minneapolis, MN 55413	PAGE:	1 of 2

Tile Identification	020614B
Tile Thickness	10mm
Sub Base	Concrete

Tested Dimension: 24" X 24"

Impact Locations: Various

Date of Receipt: February 20, 2014

Testing Period: March 5 & 6, 2014

Authorization: Jason Bahrke

Test Procedure: The submitted sample was evaluated for Shock Absorbing Properties in Accordance with the procedures outlined in ASTM F 1292-10; Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment

Missile: Hemispherical (Triaxial Accelerometer): Total Drop Assembly Weight (46g) 10 lbs

Test Equipment: Triax 2000 Surface Impactor  
 Date of Last Calibration: 3/13/2012 by Alpha Automation

Sample Pre-Condition: 50±10 RH, 70F±5F for a minimum of 24 hrs prior to testing

Temperature: **Maximum Drop Height That Gives a Gmax of 200 or Less and A HIC of 1000 or less**

Ambient, 61.7°F 38% RH	1'
Hot, 120°F (49°C)	1'
Cold, 25°F (-6°C)	Not Tested Per Client

<u>Critical Fall Height (CFH):</u>	1'
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Prepared and signed by:

\_\_\_\_\_  
 Erle Miles, Jr. VP  
 Testing Services Inc.



## TEST REPORT

CLIENT:	MNY Group, LLC	REPORT NUMBER:	60267B
	2010 East Hennepin Avenue #8	LAB TEST NUMBER:	2591-8705
	Building 8 Suite 206	DATE:	3/25/2014
	Minneapolis, MN 55413	PAGE:	Page 2 of 2

AMBIENT Sample Condition: Dry Temperature: 61.7 of 38% RH	Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC	
	1	8.3	8	1'	1.07	117	197	
	2	8.4	8	1'	1.10	118	197	
	3	8.4	9	1'	1.10	126	213	
	<b>Average</b>				<b>Drops 2, 3</b>		<b>122</b>	<b>205</b>
	Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC	
	1	11.5	6.0	2'	2.06	435	1846	
	2	11.7	4.0	2'	2.13	426	1786	
	3	11.7	7.0	2'	2.13	430	1829	
	<b>Average</b>				<b>Drops 2, 3</b>		<b>428</b>	<b>1808</b>
	Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC	
	1	N/A	N/A	N/A	#VALUE!	N/A	N/A	
2	N/A	N/A	N/A	#VALUE!	N/A	N/A		
3	N/A	N/A	N/A	#VALUE!	N/A	N/A		
<b>Average</b>				<b>Drops 2, 3</b>		<b>#####</b>	<b>#####</b>	

HEATED Sample Condition: Dry Temperature: 120 9F 20% RH	Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC	
	1	8.3	6	1'	1.07	145	265	
	2	8.3	3	1'	1.07	207	396	
	3	8.4	6	1'	1.10	160	277	
	<b>Average</b>				<b>Drops 2, 3</b>		<b>184</b>	<b>337</b>
	Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC	
	1	11.5	3	2'	2.06	498	2604	
	2	11.5	5	2'	2.06	165	2268	
	3	11.6	6	2'	2.09	479	2359	
	<b>Average</b>				<b>Drops 2, 3</b>		<b>322</b>	<b>2314</b>
	Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC	
	1	N/A	N/A	N/A	#VALUE!	N/A	N/A	
2	N/A	N/A	N/A	#VALUE!	N/A	N/A		
3	N/A	N/A	N/A	#VALUE!	N/A	N/A		
<b>Average</b>				<b>Drops 2, 3</b>		<b>#####</b>	<b>#####</b>	

END OF REPORT 60267B



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## TEST REPORT

CLIENT:	MNY Group, LLC	REPORT NUMBER:	60267D
	2010 East Hennepin Avenue #8	LAB TEST NUMBER:	2591-8707
	Building 8 Suite 206	DATE:	March 25, 2014
	Minneapolis, MN 55413	PAGE:	1 of 2

Tile Identification	020614D
Tile Thickness	22mm
Sub Base	Concrete

Tested Dimension: 24" X 24"

Impact Locations: Various

Date of Receipt: February 20, 2014

Testing Period: March 5 & 6, 2014

Authorization: Jason Bahrke

Test Procedure: The submitted sample was evaluated for Shock Absorbing Properties in Accordance with the procedures outlined in ASTM F 1292-10; Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment

Missile: Hemispherical (Triaxial Accelerometer): Total Drop Assembly Weight (46g) 10 lbs

Test Equipment: Triax 2000 Surface Impactor  
 Date of Last Calibration: 3/13/2012 by Alpha Automation

Sample Pre-Condition: 50±10 RH, 70F±5F for a minimum of 24 hrs prior to testing

Temperature: **Maximum Drop Height That Gives a Gmax of 200 or Less and A HIC of 1000 or less**

Ambient, 61.7°F 38% RH	4'
Hot, 120°F (49°C)	3'
Cold, 25°F (-6°C)	Not Tested Per Client

<b>Critical Fall Height (CFH):</b>	<b>3'</b>
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Prepared and signed by:

\_\_\_\_\_  
 Erle Miles, Jr. VP  
 Testing Services Inc.







## TEST REPORT

<b>CLIENT:</b>	Life+Floor	<b>REPORT NUMBER:</b>	61944
	2010 E Hennepin Ave #8	<b>LAB TEST NUMBER:</b>	2650-1183
	Building 8, Suite 206	<b>DATE:</b>	September 26, 2014
	Minneapolis, MN 55413	<b>PAGE</b>	1 of 1

**SAMPLE ID:**

<i>Life+Floor Tile</i>	Part #212-41-50
<i>Color / Mold / Thickness</i>	Boulevard / Ripple / 9.5 mm
<i>CTN #</i>	216

**INTRODUCTION:** Testing Services Inc was instructed by the client, to perform ADA wheelchair accessibility for the above described material being used under and around playground equipment.

**TEST METHOD:** *ASTM F1951: Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment*

**REQUIREMENT:** A surface in place shall have average work per foot (work per meter) values for straight propulsion and for turning *less* than the average work per foot (work per meter) values for straight propulsion and for turning, respectively, on a hard, smooth, surface with a grade of 1:14 (7.1 %).

**PROCEDURE:** **Test Surface Preparation:** Tests were conducted on 09/25/14 indoors at TSi Laboratories in an environment of 77°F and 44% R.H. The Life+Floor tile was installed in a wooden box (44"W x 117"L).

**Wheelchair/Operator:** The wheelchair used in these tests was manufactured by *Invcare*, Model Action Xtra, serial Number 98J84142. This wheelchair is totally adjustable, a necessity for these tests. The pneumatic tires were inflated to 60 psi on the rear and 32 psi on the front. The weight of the wheelchair was 24.25 pounds and the operator's weight was 165 pounds for a total of 189 pounds. The operator's distribution was adjusted to 60% on the rear wheels and 40 % on the front.

**Torque Measuring System:** A certified *Dillion Electronic Force Gauge*, Model BFG 500N, S/N 98-2277-07 was used as an interface between a *Dell Laptop* and a certified *Dillion Smart Torque Wrench*, S/N 97-0085-01. Software, also from Dillon, logged the load vs. time and integrated the area under the resulting curves. The adapters and accessories needed to attach the instrumentation were fabricated locally. This total package added 10 pounds to the total weight bringing the total to 199 pounds.

**TEST RESULTS:**

<b>Baseline Straight (Average Work/ft-Force)</b>	<b>Life+Floor Tile (Average Work/ft-Force)</b>
14.33 lbs	3.92 lbs
<b>Baseline Turning (Average Work/ft-Force)</b>	<b>Life+Floor Tile (Average Work/ft-Force)</b>
10.14 lbs	4.29 lbs

**CONCLUSION:** The above listed material *meets/exceeds* both the straight line and turning propulsion requirements set forth in this test method and therefore, passes the standard.

Erle Miles, Jr V.P., Testing Services Inc

TSi Accreditation: Our laboratory is accredited with US Dept of Commerce, National Institute of Standards and Technology: ISO/IEC 17025:2005. Our code # is NVLAP 100108-0. However, it should be noted that some or all of the tests performed are not under our scope of accreditation due to the work not fully conforming to the standard, or it being outside the scope of our accreditation, or subcontracted.

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## TEST REPORT

<b>CLIENT:</b>	MNY Group, LLC	<b>REPORT NUMBER:</b>	55544C
	7809 Southtown Center #173	<b>LAB TEST NUMBER:</b>	2456-2910
	Bloomington, MN 55431	<b>DATE:</b>	August 3, 2012

**TEST MATERIAL:**

Identification
LifeFloor

**SUBJECT:** Testing Services Inc was instructed by the client to perform a procedure for measuring the critical radiant flux of horizontally mounted floor-covering systems exposed to a flaming ignition source in a graded radiant heat energy environment in a test chamber.

**SCOPE OF TEST:** This fire test standard is designed to provide a basis for estimating one aspect of the fire exposure behavior of a floor-covering system installed in a building corridor.

**TEST METHOD:** *ASTM E648: Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source*

**TEST INFORMATION:** Specimens of the sample were tested for critical radiant flux in accordance with ASTM Test Method E-648, NFPA 253 and FTM Standard 372. The value reported is the average of three specimens, reported as Critical Radiant Flux in units of watts per centimeter squared (W/cm<sup>2</sup>).

**Mounting Board:** Astone Fabricators Inc. (AFI) Tunnel Board Z Calcium Silicate Board  
**Adhesive:** LifeFix  
**Trowel:** 1/16" X 1/16" x 1/16"  
**Conditioning:** Minimum 96 hrs @ 70°F 50% RH

**CLASSIFICATIONS:** NFPA: **Class I=** 0.45 W/cm<sup>2</sup> or higher  
**Class II =** 0.22 – 0.44 W/cm<sup>2</sup>  
**No Classification=** <0.21 W/cm<sup>2</sup>

**TEST DATA:**

Specimen	Time	Distance	Critical Radiant Flux
#1	39 min	29.3 cm	0.72 W/cm <sup>2</sup>
#2	40 min	31.8 cm	0.67 W/cm <sup>2</sup>
#3	38 min	31.0 cm	0.68 W/cm <sup>2</sup>
Standard Deviation: 0.03 Coefficient of Variation: 3.77%			

**TEST RESULTS:**

Average Critical Radiant Flux	NFPA Classification
0.69 W/cm <sup>2</sup>	I

Approved By:

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 Erle Miles, Jr. VP  
 Testing Services Inc