Professional Testing Laboratory, Inc.

TEST REPORT

DATE: 09-12-2016 **TEST NUMBER**: 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ANSI B101.3 Dynamic Coefficient of Friction of Hard Surface Floors

	DESCRIPTION OF TEST SAMPLE
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

GENERAL PRINCIPLE

The BOT 3000E was used to determine the dynamic coefficient of friction of the test surface in a wetted condition. Distilled water/Sodium Laurel Sulfate solution was used to wet out the test area. The test device was fitted with the SBR slider and was used on all replications. The individual values were averaged.

TEST RESULTS

SAMPLE CONDITION	Wet with Distilled Water and 0.1% Sodium Laurel Sulfate

SAMPLE 1	**SAMPLE 2**	**SAMPLE 3**
0.43	0.43	0.43
AVERAGE DCOF		**0.43**

COMMENTS:

The ANSI B101.3 standard recommends a minimum average DCOF of **0.43** for level floors (**0.46** for ramps up to 4.76 degrees) for high slip resistance. Equivallent R9 (3.0 degrees to 10 degrees)

APPROVED BY: Gary Cathey

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TEST REPORT

DATE: 10-13-2016 **TEST NUMBER:** 0231071

CLIENT	Yousung C&F Co., Ltd.
TEST METHOD CONDUCTED	ASTM D543 Resistance of Plastics to Chemicals Option 1
	DESCRIPTION OF TEST SAMPLE
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

GENERAL PRINCIPLE

This method covers the testing of plastic materials for resistance to chemical reagents. The reagents used in testing are listed in the test procedure as guidelines for a comparable basis. Die cut specimens were measured, as received, for dimensions and weight. The samples of the measured material were allowed to dwell submersed in the individual chemicals for 7 days at 70°F. The specimens were removed and rinsed with distilled water, allowed to dry, and re-gauged for dimensional and weight changes. The differences are reported as percentage change from the original measurements.

TEST RESULTS

Reagent	Dimension Change		Gravimetric Change Weight	Color Change
	LENGTH	WIDTH		
Acetic Acid	-0.24%	-0.15%	6.3%	Slight
Acetic Acid (5%)	-0.30%	-0.45%	1.6%	No Change
Acetone	Dissolved	Dissolved	Dissolved	Dissolved
Ammonium Hydroxide	+0.21%	+0.05%	+0.78%	Slight
Ammonium Hydroxide (10%)	-0.10%	0.00%	+1.0%	Slight
Benzene	-1.3%	-2.4%	+7.9%	Slight
Citric Acid	+3.0%	-5.6%	+8.5%	Severe
Detergent Heavy Duty	-0.44%	-0.05%	+0.70%	No Change
Dimethyl Formamide*	Dissolved	Dissolved	Dissolved	Dissolved
Ethyl Alcohol (50%)	0.00%	-0.15%	+0.42%	Moderate
Ethyl Alcohol (95%)	+0.09%	-0.21%	+1.8%	Moderate
Heptane	-0.25%	-0.09%	+1.5%	Severe
Hydrochloric Acid (10%)	-0.05%	+0.15%	-1.7%	No Change
Hydrochloric Acid (Conc.)	-0.25%	+0.09%	-12.11%	No Change
Hydrogen Peroxide (28%)	-0.05%	+0.25%	+0.42%	No Change
Hydrogen Peroxide (3%)	-0.05%	+0.05%	+0.06%	No Change
Isooctane	-0.15%	-0.35%	+0.87%	Slight
Kerosene	-0.15%	-0.19%	+1.9%	No Change
Methyl Alcohol	-0.05%	+0.15%	+1.2%	No Change

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DATE: 10-13-2016 **TEST NUMBER:** 0231071

CLIENT	Yousung C&F Co., Ltd.
TEST METHOD CONDUCTED	ASTM D543 Resistance of Plastics to Chemicals Option 1
	DESCRIPTION OF TEST SAMPLE
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

Reagent	Dimension Change		Gravimetric Change Weight	Color Change
	LENGTH	WIDTH		
Mineral Oil	-0.05%	0.00%	+1.6%	Slight
Nitric Acid (10%)	-0.05%	-0.09%	-9.7%	Moderate
Nitric Acid (40%)	-0.25%	-0.54%	-26.3%	Severe
Olive Oil	+0.09%	-0.09%	+1.3%	No Change
Phenol Solution (5%)	+0.09%	-0.19%	+2.2%	Severe
Soap	-0.25%	+0.05%	+0.8%	No Change
Sodium Chloride	-0.05%	-0.15%	+0.2%	No Change
Sodium Hydroxide (1%)	-0.05%	0.00%	+0.2%	No Change
Sodium Hydroxide (10%)	0.00%	+0.05%	+0.12%	No Change
Sodium Hydroxide (60%)	-0.05%	+0.09%	+0.4%	Slight
Sodium Hypochlorite	-0.19%	-0.15%	+0.36%	Slight
Sulfuric Acid	+0.62%	+1.5%	+18.5%	Severe
Sulfuric Acid (3%)	+0.09%	-0.05%	+0.30%	Slight
Sulfuric Acid (30%)	+1.1%	+1.3%	+11.8%	Severe
Toluene	-0.44%	-0.15%	+1.2%	Slight
Turpentine	0.00%	-2.1%	+2.0%	Slight
Water	-0.05%	-0.19%	+0.48%	No Change

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Professional Testing Laboratory, Inc.

TEST REPORT

DATE: 10-07-2016 **TEST NUMBER**: 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM D570 Standard Test Method for Water Absorption of Plastics

	DESCRIPTION OF TEST SAMPLE
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

GENERAL PRINCIPLE

This test method covers the determination of the absorption of water by a test specimen when immersed in water. The specimen is immersed in 23° C distilled water for 24 hours. The difference in weight is determined and calculated as a percentage gained or lost from the water immersion.

TEST RESULTS

THICKNESS GAIN	0.17%

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TEST REPORT

DATE: 09-12-2016 **TEST NUMBER:** 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM D2240 Test Method for Rubber Property - Durometer Hardness

DESCRIPTION OF TEST SAMPLE	
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

GENERAL PRINCIPLE

The hardness of a test sample is measured by means of a Type A Shore Durometer. The Durometer measures the penetration of its specified indentor forced into the test material under specified conditions.

A relationship between tested materials exists only when the same type of Durometer is used.

TEST RESULTS

INDENTATION HARDNESS	100

APPROVED BY: Gary Cathey

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COMMERCIAL TESTING COMPANY
1215 South Hamilton Street • Dalton, Georgia 30720
Telephone (706) 278–3935 • Facsimile (706) 278–3936

Standard Method of Test for
Surface Burning Characteristics of Building Materials

ASTM E84–16

Test #231071 ID: Vinyl Composition Tile (VCT)

Report Number 16–09192

Test Number 4855–9500
September 19, 2016

Yousung C&F Co., Ltd.

Commercial Testing Company

(Authorized Signature)

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INTRODUCTION

This report is a presentation of results of a surface flammability test on a material submitted by Yousung C&F Co., Ltd.

The test was conducted in accordance with the ASTM International fire-test-response standard E84–16, *Surface Burning Characteristics of Building Materials*, sometimes referred to as the Steiner tunnel test. ASTM E84 is an American National Standard (ANSI) and has been approved for use by agencies of the Department of Defense. The ASTM E84 test method is the technical equivalent of UL No. 723. The test is applicable to exposed interior surfaces such as walls and ceilings. The test is conducted with the specimen in the ceiling position with the surface to be evaluated face down toward the ignition source. Thus, specimens shall either be self-supporting by its own structural quality, held in place by added supports along the test surface, or secured from the back side.

This standard is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire-hazard or fire-risk assessment of the materials, products, or assemblies under actual fire conditions.

PURPOSE

The purpose of the test is to provide only the comparative measurements of surface flame spread and smoke development of materials with that of select grade red oak and fiber–reinforced cement board, Grade II, under specific fire exposure conditions. The test exposes a nominal 24-foot long by 20-inch wide test specimen to a controlled air flow and flaming fire adjusted to spread the flame along the entire length of a red oak specimen in 5½ minutes. During the 10-minute test duration, flamespread over the specimen surface and density of the resulting smoke are measured and recorded. Test results are calculated relative to red oak, which has an arbitrary rating of 100, and fiber–reinforced cement board, Grade II, which has a rating of 0.

The test results are expressed as Flame Spread Index and Smoke Developed Index. The Flame Spread Index is defined in ASTM E176 as "a number or classification indicating a comparative measure derived from observations made during the progress of the boundary of a zone of flame under defined test conditions." The Smoke Developed Index, a term specific to ASTM E84, is defined as "a number or classification indicating a comparative measure derived from smoke obscuration data collected during the test for surface burning characteristics." There is not necessarily a relationship between the two measurements.

The method does not provide for measurement of heat transmission through the surface tested, the effect of aggravated flame spread behavior of an assembly resulting from the proximity of combustible walls and ceilings, or classifying a material as noncombustible solely by means of a Flame Spread Index.

The zero reference and other parameters critical to furnace operation are verified on the day of the test by conducting a 10–minute test using 1/4–inch fiber–reinforced cement board, Grade II. Periodic tests using NOFMA certified 23/32–inch select grade red oak flooring provide data for the 100 reference.

TEST SAMPLE

The test sample, selected by the client, was identified as **Test #231071 ID: Vinyl Composition Tile (VCT)**, a 12" x 12" tile with a thickness of 3 mm. Three test panels, each measuring two feet wide by eight feet in length, were prepared by adhering the material to 1/4-inch thick fiber-reinforced cement board, Grade II, using Henry 430 VCT Adhesive. The adhesive was applied to the smooth side of the cement board, the material placed into the adhesive, and smoothed with a brush and roller. After dead-stacking overnight, the prepared panels were transferred to storage racks and conditioned to equilibrium in an atmosphere with the temperature maintained at 71 ± 2°F and the relative humidity at 50 ± 5 percent. For testing, the panels were placed end-to-end on the ledges of the tunnel furnace and tested with no auxiliary support mechanism. This method of sample preparation is described in Appendix X1 of the E84 standard, Guide to Mounting Methods, Section X1.9.2.3 for Heavy Textile Materials.

TEST RESULTS

The test results, calculated on the basis of observed flame propagation and the integrated area under the recorded smoke density curve, are presented below. The Flame Spread Index obtained in E84 is rounded to the nearest number divisible by five. Smoke Developed Indices are rounded to the nearest number divisible by five unless the Index is greater than 200. In that case, the Smoke Developed Index is rounded to the nearest 50 points. The flame spread and smoke development data are presented graphically at the end of this report.

Test Specimen	Flame Spread Index	Smoke Developed Index
Fiber-Reinforced Cement Board, Grade II	0	0
Red Oak Flooring	100	100
Test #231071 ID: Vinyl Composition Tile (VCT)	**25**	**80**

OBSERVATIONS

Specimen ignition over the burners occurred at 0.65 minute. Surface flame spread was observed to a maximum distance of 6.22 feet beyond the zero point at 9.87 minutes. The maximum temperature recorded during the test was 626°F. For information purposes, the actual (unrounded) Flame Spread and Smoke Developed Indices were 22.7 and 77.9 respectively.

CLASSIFICATION

The Flame Spread Index and Smoke Developed Index values obtained by ASTM E84 tests are frequently used by code officials and regulatory agencies in the acceptance of interior finish materials for various applications. The most widely accepted classification system is described in the National Fire Protection Association publication NFPA 101 *Life Safety Code*, where:

Class A	0 – 25 Flame Spread Index	0 – 450 Smoke Developed Index
Class B	26 – 75 Flame Spread Index	0 – 450 Smoke Developed Index
Class C	76 – 200 Flame Spread Index	0 – 450 Smoke Developed Index

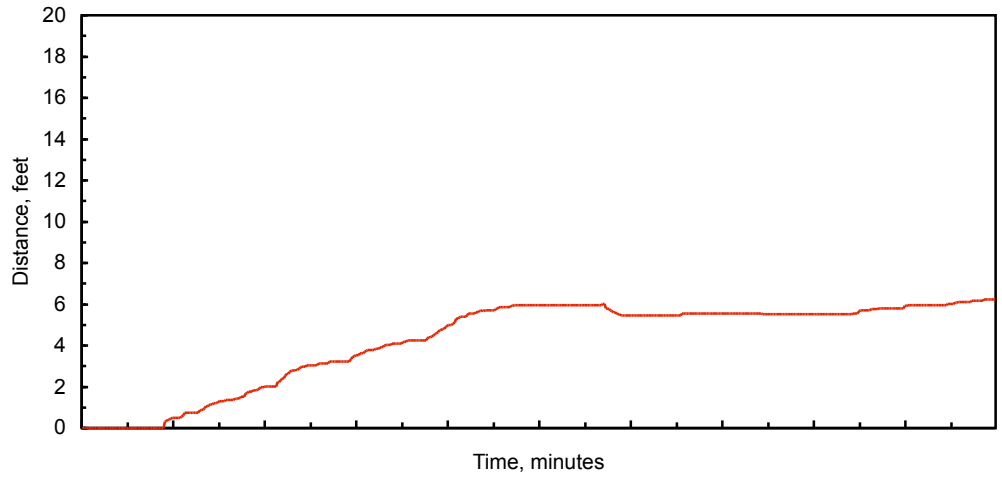
Class A, B, and C correspond to Type I, II, and III respectively in other codes. They do not preclude a material being otherwise classified by the authority of jurisdiction.

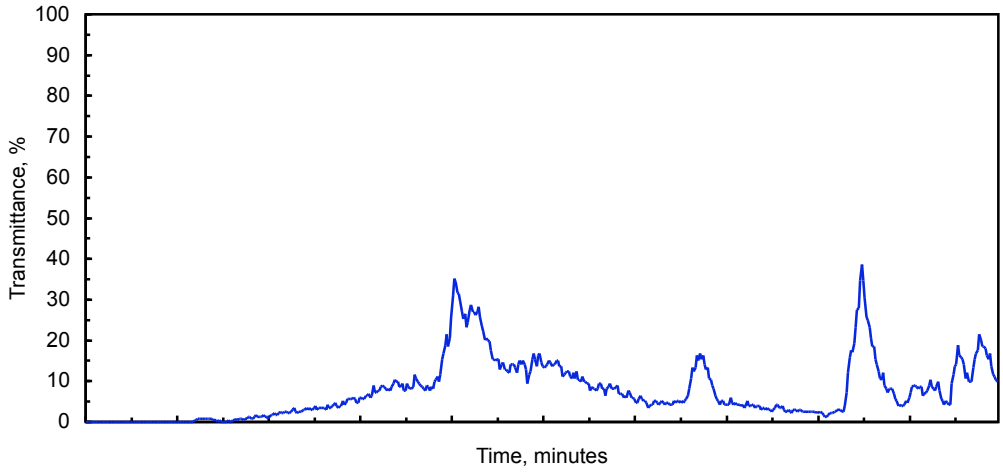
ASTM E 84 TEST DATA

Client: Yousung C&F Co., Ltd.
Test Number: 4855-9500
Material Tested: Test # 231071 ID: Vinyl Composition Tile (VCT)
Date: September 19, 2016

Test Results:

Time to Ignition	=	00.65 minutes
Maximum Flamespread Distance	=	06.22 feet
Time to Maximum Spread	=	09.87 minutes
Flame Spread Index	=	25
Smoke Developed Index	=	80





Professional Testing Laboratory, Inc.

TEST REPORT

DATE: 09-12-2016 **TEST NUMBER**: 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM E648 Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using A Radiant Heat Energy Source, also referenced as NFPA 253 and FTM Standard 372

DESCRIPTION OF TEST SAMPLE	
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

GENERAL PRINCIPLE

This procedure is designed to measure the critical radiant flux at flame out of horizontally mounted floor covering systems exposed to a flaming ignition in a test chamber which provides a graded radiant heat energy environment. The imposed radiant flux simulates the thermal radiation levels likely to impinge on the floors of a building whose upper surfaces are heated by flames from a fully developed fire in an adjacent room or compartment. The test result is an average critical radiant flux (watts/square cm) which indicates the level of radiant heat energy required to sustain flame propagation in the flooring system once it has been ignited. A minimum of three test specimens are tested and the results are averaged. Theoretically, if a room fire does not impose a radiant flux that exceeds this critical level on a corridor floor covering system, flame spread will not occur.

The NFPA Life Safety Code 101 specifies as Class 1 Critical Radiant Flux of .45 watts/sq cm or higher and Class 2 Critical Radiant Flux as .22 - .44 watts/sq cm.

FLOORING SYSTEM ASSEMBLY			
SUBSTRATE	Mineral-Fiber/Cement Board	**UNDERLAYMENT**	Direct glue down
ADHESIVE	Advanced adhesive 272	**CONDITIONING**	Minimum of 96 hours at 70 ± 5° F and 50 ± 5% relative humidity

	Distance Burned	**Time To Flame Out**	**Critical Radiant Flux**
Specimen 1	12 cm	5 minutes	0.20 watts/square cm
Specimen 2	11 cm	5 minutes	1.07 watts/square cm
Specimen 3	11 cm	5 minutes	1.07 watts/square cm

Average Critical Radiant Flux	0.78 Watts/Square Cm
Standard Deviation	0.01 Watts/Square Cm
Coefficient of Variation	0.89 %

**** NOTE: Meets or exceeds Class 1 rating as specified in NFPA Life Safety Code 101 and IBC 804.2 Classification.***

APPROVED BY: Gary Asbury

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TEST REPORT

DATE: 09-12-2016 **TEST NUMBER**: 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM E662 Smoke Density (Flaming) Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials also referenced as NFPA 258

DESCRIPTION OF TEST SAMPLE	
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

GENERAL PRINCIPLE

This procedure is designed to measure the specific optical density of smoke generated by the test specimen within a closed chamber. Each specimen is exposed to an electrically heated radiant-energy source positioned to provide a constant irradiance level of 2.5 watts/square cm on the specimen surface. Measurements are recorded through a photometric system employing a vertical beam of light and a photo detector positioned to detect the attenuation of light transmittance caused by smoke accumulation within the chamber. The light transmittance measurements are used to calculate specific optical density, a quantitative value which can be factored to estimate the smoke potential of materials. Two burning conditions can be simulated by the test apparatus. The radiant heating in the absence of ignition is referred to as the Non-Flaming Mode. A flaming combustion in the presence of supporting radiation constitutes the Flaming Mode.

CONDITIONS			
PREDRYING OF TEST SAMPLE **CONDITIONING OF TEST SAMPLE** **TESTING CONDITION**	24 Hours at 140° F 24 Hours at 70° F and 50% Relative Humidity As Received		
FURNACE VOLTAGE **CHAMBER TEMPERATURE** **TEST MODE**	118 V 95° F Flaming	**IRRADIANCE** **CHAMBER PRESSURE**	2.5 watts/sq cm 3" H_2O

AVERAGE MAXIMUM DENSITY CORRECTED (Dmc)		**FLAMING**	112
AVERAGE SPECIFIC OPTICAL DENSITY AT 4.0 MINUTES			76
	Specimen 1	**Specimen 2**	**Specimen 3**
Maximum Density (Dm)	117.0	124.0	120.0
Time to Dm (minutes)	7.5	7.5	7.0
Clear Beam (Dc)	6.0	11.0	7.0
Corr. Max Density (Dmc)	111.0	113.0	113.0
Density at 1.5 minutes	11.0	12.0	11.0
Density at 4.0 minutes	73.0	80.0	75.0
Time to 90% Dm (minutes)	5.0	5.0	5.0
Specimen Weight (grams)	36.5	36.8	37.2

**** This sample PASSES the requirements of 450 or less.***

APPROVED BY: Gary Asbury

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Professional Testing Laboratory, Inc.

TEST REPORT

DATE: 09-12-2016 **TEST NUMBER**: 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM E662 Smoke Density (Non-Flaming) Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials also referenced as NFPA 258

DESCRIPTION OF TEST SAMPLE	
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

GENERAL PRINCIPLE

This procedure is designed to measure the specific optical density of smoke generated by the test specimen within a closed chamber. Each specimen is exposed to an electrically heated radiant-energy source positioned to provide a constant irradiance level of 2.5 watts/square cm on the specimen surface. Measurements are recorded through a photometric system employing a vertical beam of light and a photo detector positioned to detect the attenuation of light transmittance caused by smoke accumulation within the chamber. The light transmittance measurements are used to calculate specific optical density, a quantitative value which can be factored to estimate the smoke potential of materials. Two burning conditions can be simulated by the test apparatus. The radiant heating in the absence of ignition is referred to as the Non-Flaming Mode. A flaming combustion in the presence of supporting radiation constitutes the Flaming Mode.

CONDITIONS			
PREDRYING OF TEST SAMPLE **CONDITIONING OF TEST SAMPLE** **TESTING CONDITION**	24 Hours at 140° F 24 Hours at 70° F and 50% Relative Humidity As Received		
FURNACE VOLTAGE **CHAMBER TEMPERATURE** **TEST MODE**	118 V 95° F Non-Flaming	**IRRADIANCE** **CHAMBER PRESSURE**	2.5 watts/sq cm 3" H_2O

AVERAGE MAXIMUM DENSITY CORRECTED (Dmc)		**NON-FLAMING**	142
AVERAGE SPECIFIC OPTICAL DENSITY AT 4.0 MINUTES			28
	Specimen 1	**Specimen 2**	**Specimen 3**
Maximum Density (Dm)	135.0	156.0	142.0
Time to Dm (minutes)	14.5	15.0	15.0
Clear Beam (Dc)	0.0	0.0	0.0
Corr. Max Density (Dmc)	135.0	150.0	142.0
Density at 1.5 minutes	0.0	0.0	1.0
Density at 4.0 minutes	26.0	31.0	28.0
Time to 90% Dm (minutes)	11.0	12.0	11.5
Specimen Weight (grams)	36.3	36.7	36.5

**** This sample PASSES the requirements of 450 or less.***

APPROVED BY: Gary Asbury

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Professional Testing Laboratory, Inc.

TEST REPORT

DATE: 10-07-2016 **TEST NUMBER**: 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM F137 Test Method for Flexibility of Resilient Flooring Materials with Cylindrical Mandrel Apparatus

DESCRIPTION OF TEST SAMPLE	
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

GENERAL PRINCIPLE

The flexibility of a specimen is determined by flexing the material around mandrels of varying sizes. The mandrel sizes range from 6 mm to 120 mm in diameter. The specimen is flexed 180° around the mandrel and then examined for cracking or breaking. If none exists, the procedure is repeated on the next smaller mandrel. The procedure is continued until the material breaks or cracks or until the smallest mandrel is passed.

TEST RESULTS

RESULT	PASSES 30 mm Mandrel

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Professional Testing Laboratory, Inc.

TEST REPORT

DATE: 09-12-2016 **TEST NUMBER**: 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM F386 Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces

	DESCRIPTION OF TEST SAMPLE
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

GENERAL PRINCIPLE

The total thickness of a resilient flooring material is determined through measurements made using a .250 inch presser foot and a dial micrometer. The average of 5 total measurements is reported as the average total thickness.

TEST RESULTS

	THICKNESS
SPECIMEN 1	0.130 Inch
SPECIMEN 2	0.127 Inch
SPECIMEN 3	0.126 Inch
SPECIMEN 4	0.129 Inch
SPECIMEN 5	0.129 Inch

AVERAGE TOTAL THICKNESS	0.128 Inch

APPROVED BY: Gary Cathey

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Professional Testing Laboratory, Inc.

TEST REPORT

DATE: 09-12-2016 **TEST NUMBER**: 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM F925 5 Minute Standard Test Method for Resistance to Chemicals of Resilient Flooring

DESCRIPTION OF TEST SAMPLE	
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

TEST RESULTS

5 MINUTE RATINGS

STAINING AGENT	SURFACE DULLING	SURFACE ATTACK	COLOR CHANGE
5% Acetic Acid	0	0	0
70% Isopropyl Alcohol	0	0	0
Mineral Oil	0	0	0
5% Sodium Hydroxide	1	0	0
5% Hydrochloric Acid	0	0	0
5% Ammonia	2	0	0
Bleach	0	0	0
5% Phenol	1	1	0
Gasoline	0	0	2
Sulfuric Acid	0	0	0
Kerosene	0	0	1
Olive Oil	0	0	0

RATING KEY
0 - No change (----)
1 - Slight change
2 - Moderate change
3 - Severe change

APPROVED BY: Gary Asbury

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Professional Testing Laboratory, Inc.

TEST REPORT

DATE: 09-12-2016 **TEST NUMBER**: 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM F925 24 Hour Standard Test Method for Resistance to Chemicals of Resilient Flooring

DESCRIPTION OF TEST SAMPLE	
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

TEST RESULTS

24 HOUR RATINGS

STAINING AGENT	SURFACE DULLING	SURFACE ATTACK	COLOR CHANGE
5% Acetic Acid	0	0	0
70% Isopropyl Alcohol	0	0	0
Mineral Oil	0	0	0
5% Sodium Hydroxide	1	0	0
5% Hydrochloric Acid	0	0	0
5% Ammonia	2	0	0
Bleach	0	0	0
5% Phenol	1	1	1
Gasoline	0	0	0
Sulfuric Acid	0	0	0
Kerosene	0	0	0
Olive Oil	0	0	0

RATING KEY
0 - No change (----)
1 - Slight change
2 - Moderate change
3 - Severe change

APPROVED BY: Gary Cathey

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Professional Testing Laboratory, Inc.

TEST REPORT

DATE: 09-12-2016 **TEST NUMBER:** 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM F970 Standard Test Method for Static Load Limit

DESCRIPTION OF TEST SAMPLE	
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

GENERAL PRINCIPLE

This test determines the recovery properties of resilient floor covering after long term indentation test (24 hours) under a specified load.

PROCEDURE

The test sample is conditioned to equilibrium at 73° F and 50% relative humidity. The initial thickness of the sample is determined using a dial micrometer with a flat presser foot .250 inches in diameter. A specified load is applied to the sample over a 1.125 inch diameter indentor foot for 24 hours. After removal of the load, the sample is allowed to recover for 24 hours. The sample is regauged using the .250 inch diameter presser foot. The difference between the two measurements is reported as the residual compression.

TEST RESULTS

SPECIFIED LOAD	RESIDUAL COMPRESSION
250 Lbs.	0.002 Inch

APPROVED BY: Gary Ashley

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Professional Testing Laboratory, Inc.

TEST REPORT

DATE: 09-12-2016 **TEST NUMBER**: 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM F1265 Resistance to Impact

	DESCRIPTION OF TEST SAMPLE
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

GENERAL PRINCIPLE

This test method measures the resistance of impact of resilient floor tile using a 65 gram ball.

TEST RESULTS

SPECIMEN 1	Passes Impact failure point exceeds 20 inches
SPECIMEN 2	Passes Impact failure point exceeds 20 inches
SPECIMEN 3	Passes Impact failure point exceeds 20 inches

APPROVED BY: Gary Ashley

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TEST REPORT

DATE: 09-12-2016 **TEST NUMBER**: 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM F1304 Deflection of Tile

	DESCRIPTION OF TEST SAMPLE
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

GENERAL PRINCIPLE

This test method is used to determine the deflection of relativity rigid resilient floors such as vinyl composition tile.

TEST RESULTS

	WIDTH	**LENGTH**
SPECIMEN 1	2.0 Inch	2.0 Inch
SPECIMEN 2	2.0 Inch	2.0 Inch
SPECIMEN 3	2.0 Inch	2.0 Inch
AVERAGE	2.0 Inch	2.0 Inch

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TEST REPORT

DATE: 10-07-2016 **TEST NUMBER**: 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM F1514 Measuring Heat Stability of Resilient Flooring by Color Change

	DESCRIPTION OF TEST SAMPLE
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

GENERAL PRINCIPLE

The test specimens are exposed to heat for 7 continuous days in an air circulating chamber. The materials are read using a spectrophotometer for the baseline color value and then read after the exposure. The Delta E is listed to show the color value change resulting from each exposure.

TEST RESULTS

	DELTA E (∆E) Rating	**Gray Scale Rating**
Heat Aged Sample 1	0.21	5.0
Heat Aged Sample 2	0.17	5.0
Heat Aged Sample 3	0.12	5.0

Test requirements of < 8.0 Delta E were met by the tested samples.

AATCC RATING KEY	
5	No change
4	Slight change
3	Noticeable change
2	Considerable change
1	Severe change

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TEST REPORT

DATE: 10-07-2016 **TEST NUMBER**: 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM F1515 Measuring Light Stability of Resilient Flooring by Color Change

	DESCRIPTION OF TEST SAMPLE
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

GENERAL PRINCIPLE

The test specimens are exposed to accelerated light via xenon light using the standard irradiance as listed in the method. The materials are read using a spectrophotometer for the baseline color value and then read after 100, 200, and 300 hours of exposure. The Delta E is listed to show the color value change resulting from each exposure.

TEST RESULTS

	DELTA E (∆E) Rating	**Gray Scale Rating**
100 AFU Exposed Sample	1.52	4.0
200 AFU Exposed Sample	3.19	3.0
300 AFU Exposed Sample	10.04	1.5

Test requirements of < 8.0 Delta E were not met by the tested samples.

AATCC RATING KEY	
5	No change
4	Slight change
3	Noticeable change
2	Considerable change
1	Severe change

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TEST REPORT

DATE: 09-12-2016 **TEST NUMBER**: 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM F1914 Test Method for Short-Term Indentation and Residual Indentation of Resilient Floor Covering

DESCRIPTION OF TEST SAMPLE	
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

PROCEDURE

A test sample is loaded with 30 lbs. on a presser foot for 30 seconds, 1 minute and 10 minutes. The indentation is immediately measured and compared to the original thickness of the sample.

TEST RESULTS

	30 Seconds @ 115⁰ F	**1 Minute @ 77⁰ F**	**10 Minutes @ 77⁰ F**
IMMEDIATE INDENTATION AT 30 Lbs.	-0.028 Inch (23.33%)	0.006 Inch (5.00%)	0.010 Inch (8.33%)

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TEST REPORT

DATE: 09-12-2016 **Page 1 of 2** **TEST NUMBER:** 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM F2055 Test Method for Size and Squareness of Resilient Floor Tile by Dial Gage Method

DESCRIPTION OF TEST SAMPLE	
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

GENERAL PRINCIPLE

This test method covers the determination of both dimensions (length and width) and squareness of resilient floor tile. The gage dials were set at the listed specified size and reported as deviation from the 24 inch zero point. Results are listed in inches.

TEST RESULTS

Specified Size in Inches	
Length	Width
11.811	11.811

#1	Gage A	Gage B	Gage C		Squareness Gage D
Side 1	0.003	0.006	0.004		0.004
Side 2	0.002	0.004	0.008		0.003
Side 3	0.004	0.006	0.003		0.008
Side 4	0.008	0.004	0.002		0.006
			Per Linear Ft		
Length Deviation L		0.003	0.003		
Length Deviation C		0.006	0.006		
Length Deviation R		0.004	0.004		
Width Deviation L		0.002	0.002		
Width Deviation C		0.004	0.004		
Width Deviation R		0.008	0.008		

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TEST REPORT

DATE: 09-12-2016 **Page 2 of 2** **TEST NUMBER:** 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM F2055 Test Method for Size and Squareness of Resilient Floor Tile by Dial Gage Method

DESCRIPTION OF TEST SAMPLE	
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

#2	Gage A	Gage B	Gage C		Squareness Gage D
Side 1	0.002	0.002	-0.003		0.005
Side 2	0.002	0.005	0.003		0.007
Side 3	-0.003	0.002	0.002		0.009
Side 4	0.003	0.005	0.002		0.006
			Per Linear Ft		
Length Deviation L		0.002	0.002		
Length Deviation C		0.002	0.002		
Length Deviation R		-0.003	-0.003		
Width Deviation L		0.002	0.002		
Width Deviation C		0.005	0.005		
Width Deviation R		0.003	0.003		

#3	Gage A	Gage B	Gage C		Squareness Gage D
Side 1	0.000	0.002	0.003		0.010
Side 2	0.009	0.003	0.010		0.002
Side 3	0.003	0.002	0.000		0.010
Side 4	0.010	0.003	0.009		0.009
			Per Linear Ft		
Length Deviation L		0.000	0.000		
Length Deviation C		0.002	0.002		
Length Deviation R		0.003	0.003		
Width Deviation L		0.009	0.009		
Width Deviation C		0.003	0.003		
Width Deviation R		0.010	0.010		

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Professional Testing Laboratory, Inc.

TEST REPORT

DATE: 09-12-2016 **TEST NUMBER**: 0231071

CLIENT	Yousung C&F Co., Ltd.

TEST METHOD CONDUCTED	ASTM F2199 Test Method for Determining Dimensional Stability of Resilient Floor Tile after Exposure to Heat

DESCRIPTION OF TEST SAMPLE	
IDENTIFICATION	Vinyl Composition Tile (VCT)
COLOR	Fineo Deluxe 000
CONSTRUCTION	Homogeneous
REFERENCE	Fineo VCT Deluxe Tile

GENERAL PRINCIPLE

This test method is intended for use in determining the linear change of resilient flooring after being exposed to heat. The dimensional change over 12 inches is reported as the dimensional stability.

TEST RESULTS

IDENTIFICATION	RESULT
Length	-0.008 Inch per 12 inches (-0.07%)
Width	-0.002 Inch per 12 inches (-0.02%)

APPROVED BY: Gary Cathey

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