



GORILLA DECK® PVC DECK BOARDS

Date: July 27, 2012

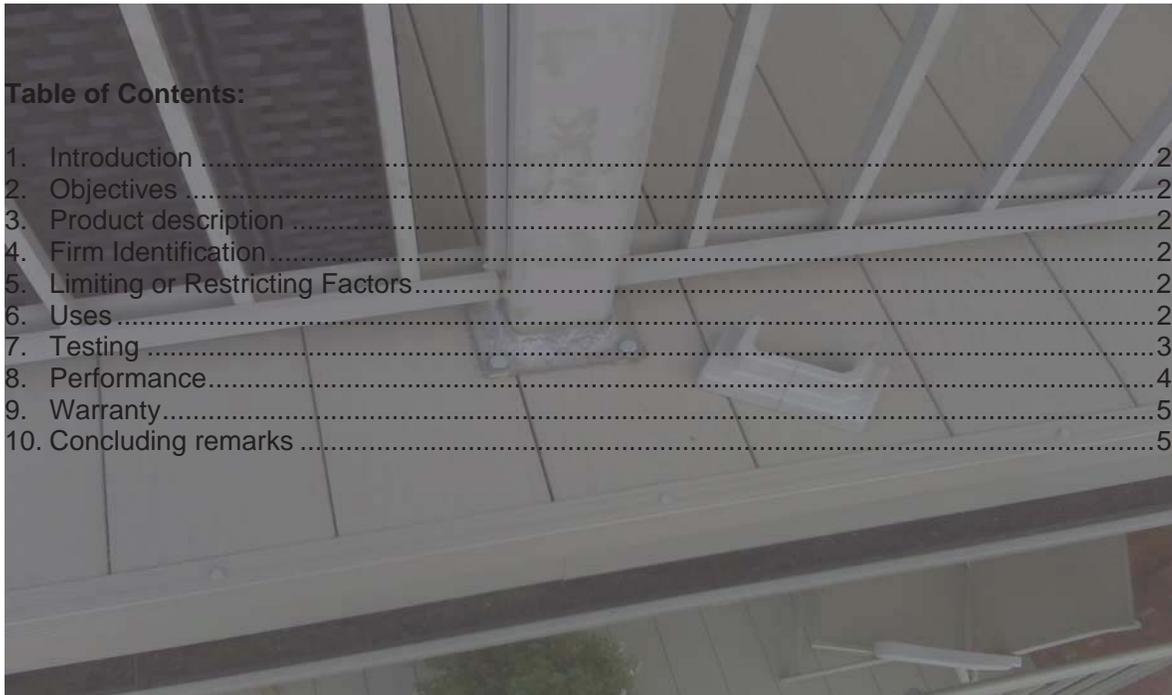


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NOTE:

Cut Rite Construction has the City of Ottawa Building Code Services approval to install Gorilla Decking, approved 31 August 2012.

This report must accompany Building Permit Applications



1. Introduction

The City of Ottawa Building Code Services has requested a submission of a document that fully describes the functionality and performance of Gorilla Deck® PVC Deck Boards.

2. Objectives

The aim of this document is to obtain approval from the City of Ottawa Building Department to use the Gorilla Deck® PolyVinyl Chloride (PVC) Deck Boards as a construction material for balconies, porches and decks in Residential applications as per Part 4 and 9 of the Ontario Building Code.

3. Product description

Gorilla Deck® PVC Deck Boards are extruded PVC material. It has been manufactured by Homeland Vinyl Products (an Alabama, USA home-based company) since 2003.

The manufactured product is intended for use as an exterior walking deck board as an alternative for wood or composite decking. The deck boards have four (4) chamber hollow co-extruded PVC profile, are manufactured in white, tan, gray, adobe and mocha walnut colours and are rectangular in shape. They also have a continuous screw flange for attachment and utilize a tongue and groove system for interlocking planks during installation.

The mixture used in the processing of the product is extruded through a continuous feed system and is produced as a deck board measuring a nominal 1-1/4 in thick and 7 in wide (32x178 mm) with the actual measurements being 1.25 by 7.02 inches (32x180 mm), and it is available in lengths of 16, 20 and 24 feet (4878, 6096 and 7315 mm). The top surface is flat on top with a wood-grain embossed texture. The top exposed surface of the deck board is capped (i.e. UV inhibitor layer).

4. Firm Identification

Based on the testing reports (53597.01-119-19 dated Jun. 13, 2005, 92221.01-119-19 dated August 13, 2009 and 85730.03-119-19 revision 1 dated Sep. 22, 2009) by Architectural Testing, the firm taking responsibility for the Gorilla Deck® PVC Deck Boards is Estructura Inc.

The Firm has vast experience in residential design in both Canada and USA.

Certificate of Authorization# 100161057 60533

5. Limiting or Restricting Factors

Homeland Vinyl Products Inc is not aware of particular environmental limitations for using the product. This specific product has been installed throughout the United States and Ontario since it was first produced in 2003.

6. Uses

The Gorilla Deck® PVC Deck Boards are limited to exterior use as deck boards for balconies, patios, porches and decks for residential applications as described in Part 4 and Part 9 of the Ontario Building Code. The maximum span for the deck boards is to safely withstand 100 psf is 24".



7. Testing

The Gorilla Deck® PVC Deck Boards have been extensively tested in United States by Architectural Testing, an approved Testing Laboratory (T-1444) by International Accreditation Service and they are in compliance with ANS/ISO/IEC Standard 17025. The testing was performed using the methods as set forth in:

- ICC-ES AC174 Acceptance criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails)
- AAMA 306-01, PVC Exterior Plank Profiles Used for Decking and Dock Walking Surfaces.

The Gorilla Deck® PVC Deck Boards have been evaluated and approved by the International Code Council Evaluation Service (ICC-ES) ERS-1657 2005 and 2012, which is the approved USA nation-wide building product evaluation service.

The Gorilla Deck® PVC Deck Boards were designed by Randy Heath, who holds a degree in Mechanical Engineering. All tests were performed on full size pieces of manufactured product, which is pulled at random from standard production runs. There is no selective sampling allowed within the AC174 process to ensure that the formulation and manufacturing is typical and not just for testing purposes. Sampling is done by a third party group to ensure that this policy is followed.

The deck boards have been tested for the following parameters (see Table 1 for a summary of results):

- Bending
- Freeze-thaw resistance
- Creep relaxation
- Wind uplift resistance
- Impact resistance
- Static coefficient of friction
- Heat resistance and heat build-up in PVC building products
- Dimensional stability
- Weight tolerance
- UV testing
- Load duration
- Fire resistance
- Deflection
- Slip resistance

The following referenced standards we referenced during testing:

- Standard test methods for flexural properties of unreinforced and reinforced plastic lumber. ASTM D 6109-05
- Standard test methods for impact resistance of Poly PVC rigid profiles by means of a falling weight. AAMA D 4495-00
- Poly PVC exterior profile extrusions ASTM 303-98
- Standard test method for predicting heat build-up in PVC building products. ASTM D 4803-97.
- Standard specification for polyolefin-based plastic lumber decking boards. ASTM D 6662-01.
- Standard Methods for simulated service testing of wood and wood base finish flooring. ASTM D 2394-99.

- Test methods for flexural properties of unreinforced and reinforced plastics and electrical insulating materials. American Society for testing and Materials. ASTM D 790-99.
- Standard guide for evaluating mechanical and physical properties of wood-plastic composite products. ASTM D 7031-04.
- ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials

Test	Results												
ASTM D 6109 Flexural Tests Baseline properties at standard conditions	Avg. Mu = 4638 in·lbs Avg. EI = 161625 lbs·in ²												
Freeze-Thaw Resistance ASTM D 6109 Flexural Tests Post Freeze-Thaw Cycling	MOE & MOR loss <10%: Within allowable range												
AC174 Creep Relaxation / Three Samples 100 psf Live Load at 24" Span	97% or Better Recovery >75% required Max. Permanent Set = 0.010" <1/16" allowed												
Stair Tread Load on 24" Span (Midspan) (Two Span Condition)	Average Design Load Deflection = 0.45" Exceeds L/180 = 24/180 = 0.13" Does not meet requirement for stair tread.												
300 pound Stair Tread Load at Support (End of plank)	Max. Deformation at D.L = 0.022" 88% or Better Recovery from 2.38 x Design Load												
ASTM E 330 Wind Uplift Resistance / Three Samples	Min. = 115 psf, Max. = 146 psf, Avg. = 132 psf												
ASTM S 4495 Impact Resistance	M.F.E. < 36 ft·lbs min. required												
ASTM D 2394 Coefficient of Friction: Dry Conditions Avg. at Test Directions: 0, 180, 90, and 270°	Dry Conditions: 0° - 0.45, 180° - 0.47 Dry Conditions: 90° - 0.58, 270° - 0.50												
ASTM D 2394 Coefficient of Friction: Wet Conditions Avg. at Test Directions: 0, 180, 90, and 270°	Wet Conditions: 0° - 0.67, 180° - 0.65 Wet Conditions: 90° - 0.77, 270° - 0.79												
AAMA 303 Heat Resistance	No visible evidence of blistering, cracking, flaking or delamination on the exposed surfaces.												
ASTM D 4803 Heat Build-Up	Average Horizontal Heat Buildup: 49.9°F												
ASTM D 4726 Dimensional Stability	Avg. Change = 0.6% v. 2.2% allowed Max. Change = 0.6% v. 2.4% allowed												
AAMA 306 Weight Tolerance	Measured Range: 1.190 -1.220 lbs/ft. v. Allowable Range: 1.170 - 1.430 lbs/ft.												
ASTM D 790 Flexural Properties for End Use Adjustment Factors	<table border="1"> <thead> <tr> <th></th> <th>@ +125°F</th> <th>@ -20°F</th> <th>Weathered</th> </tr> </thead> <tbody> <tr> <td>M.O.R.</td> <td>-22%</td> <td>+33%</td> <td>+8%</td> </tr> <tr> <td>M.O.E.</td> <td>-19%</td> <td>+16%</td> <td>-3%</td> </tr> </tbody> </table>		@ +125°F	@ -20°F	Weathered	M.O.R.	-22%	+33%	+8%	M.O.E.	-19%	+16%	-3%
	@ +125°F	@ -20°F	Weathered										
M.O.R.	-22%	+33%	+8%										
M.O.E.	-19%	+16%	-3%										

Table 1
 Summary of results, Report # 53597.01-119-19
 dated Jun. 13, 2005 Architectural Testing

The above referenced Standards are appropriate for the testing program done on the Gorilla Deck® PVC Deck Boards.

8. Performance

- Design Basis: the unique characteristics of PVC deck boards make them a feasible option instead of wood: Deck boards do not rot, they are impervious to insect attack, do not absorb moisture, the special design allows for water shedding, they do not need painting or staining.
- The Gorilla Deck® PVC Deck Boards are designed to withstand a load of 100 lbs/sqft when supported at 24" o.c. The design loads easily surpass Building Code requirements for decks.
- Fatigue: 90 days duration of load testing showed no tertiary creep or sign of failure due to static loads for sustained time.
- Deflection: Temperature effect is considered in the ICC testing and is a non-issue, coefficient of thermal expansion falls within ASTM spec for vinyl fence and railing and the decking meets the same requirement for the VFDRMA decking standard (there is not an ASTM spec for vinyl decking).
- Decay: moisture does not affect PVC, as it does not absorb water, there is no potential for decay or insect consumption as there is no cellulose material in the product.



- f. Due to the characteristics of the PVC and based on the testing reports available, the Gorilla Deck® PVC Deck Boards would be at least as durable and as strong as treated lumber and they are maintenance-free.
- g. After a fire test (as per ASTM E-84) conducted on March 21, 2005 by SwRI, the Gorilla Deck® PVC Deck Boards obtained a Flame Spread Index of 15..

9. Warranty

The Gorilla Deck® PVC Deck Boards come with a limited warranty of 30 years by the manufacturer Homeland Vinyl Products Inc

10. Concluding remarks

Based on reports from Architectural Testing, as mentioned above, The Gorilla Deck® PVC Deck Boards can safely withstand a superimposed load of 100 psf when supported @ 24" o.c. It is our conclusion that the Gorilla Deck® PVC Deck Boards meet the requirements of the Ontario Building Code 2006 Part 4 and Part 9. Also, the product meets the safety objectives of the Ontario Building Code as defined in Division A Section 2.2 Table 2.2.1.1 Category OS2 and OS2.1.

If you have any further questions, please contact the undersigned

Regards
Daniel
Segura

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Daniel Segura, P.Eng
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