CONSTRUCTION MATERIALS

T E C H N O L O G I E S

WIND RESISTANCE EVALUATION OF THE KONING EXTERIOR FINISH ASSEMBLY IN ACCORDANCE WITH ASTM E 330

(PROJECT NO. KCCI-002-02-03)

For

KONING CONSTRUCTION CONSULTANTS
8301 JOLIET STREET
HUDSON, FL 34667

APRIL 4, 2016

Purpose: Evaluate the Koning Exterior Finish Assembly for wind resistance in accordance with **ASTM E 330: *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference***.

Test Methods: Testing was conducted in accordance with ASTM E 330-02(2010): *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*. Specimens were tested in accordance with Procedure A. The selected test load was ±150 psf, which equates to a ±225 psf proof load when the typical 1.5 factor of safety is applied to the test result. The following sequence was used to evaluate the specimen:

1. -75 psf was applied for 10 seconds
2. Specimen was recovered for 1-5 minutes
3. -150 psf was applied for 10 seconds
4. Specimen was recovered for 1-5 minutes
5. +75 psf was applied for 10 seconds
6. Specimen was recovered for 1-5 minutes
7. +50 psf was applied for 10 seconds
8. Specimen was recovered for 1-5 minutes
9. -112.5 psf was applied for 10 seconds
10. Specimen was recovered for 1-5 minutes
11. -225 psf was applied for 10 seconds
12. Specimen was recovered for 1-5 minutes
13. +112.5 psf was applied for 10 seconds
14. Specimen was recovered for 1-5 minutes
15. +225 psf was applied for 10 seconds
16. Specimen was recovered for 1-5 minutes

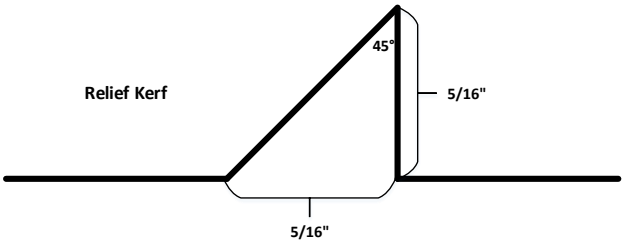
Sampling: All products applied to the exterior sheathing were provided by Koning Construction Consultants. Below is an itemized list of products that are used in the Koning Exterior Finish Assembly.

Product Identification	Manufacturer
Tyvek® HomeWrap	DuPont
Vinyl Casing Bead	Not provided
Structalath Twin Trac	Structa Wire Corporation
Florida Super Stucco	Argos Cement LLC
MasterSeal NP 150	BASF Corp.

Specimen: A 4-ft x 8-ft mock-up was constructed from No.2 2x6 dimensional lumber and sheathed with 7/16” OSB. The OSB sheathing was installed with two (2) offset vertical joints and one horizontal joint and was fastened to the framing with #8 x 2 wood screws spaced 6” o.c. along the edges and intermediate supports. DuPont Tyvek® HomeWrap was placed over the OSB using 1-1/2” plastic cap nails spaced 24” o.c. 5/8” ground x 1-3/4” flange, vinyl casing beads were located around perimeter of the specimen and attached 24” o.c with #8 x 1” PH wood screws. Structalath Twin Trac was secured through to the sheathing with #8 x 1” PH screws spaced 12” o.c. horizontally and 5” o.c vertically in a staggered pattern. The stucco finish was prepared by mixing Florida Super Stucco and

PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pricmt.com

sand at a 1:3 to 1:4 ratio and applied flush with the casing bead. A relief kerf, as shows below, was cut into the wet stucco at the casing bead. MasterSeal NP 150 was applied in the kerf to seal to the trim.



Results: The specimen was tested January 29, 2016. Results of testing are shown below.

Table 1. Results from ASTM E 330, Procedure A

Pressure (psf)	Duration (s)	Result (Pass/Fail)
-75	10	Pass
0	60	Pass
-150	10	Pass
0	60	Pass
+75	10	Pass
0	60	Pass
+150	10	Pass
0	60	Pass
-112.5	10	Pass
0	60	Pass
-225	10	Pass
0	60	Pass
+112.5	10	Pass
0	60	Pass
+225	10	Pass
0	60	Pass

Note(s): Deflection measurements were not evaluated.

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Statement of Attestation:

The performance evaluation of Koning Exterior Finish Assembly was conducted in accordance with ASTM E 330-02(2010): *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference* as described herein. The laboratory test results presented in this report are representative of the material supplied.

Signed: _____
Zachary Priest, P.E.
Director

Report Issue History:

Issue #	Date	Pages	Revision Description (if applicable)
Original	04/04/2016	13	NA

APPENDIX FOLLOWS

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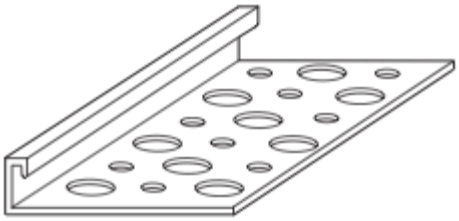


Vinyl Casing Bead

PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pricmt.com

INTRODUCING

STRUCTALATH®

1 1/2" SF CR *TWIN TRAC*

Another natural innovation from Structa Wire Corp.
We've made our product even better!

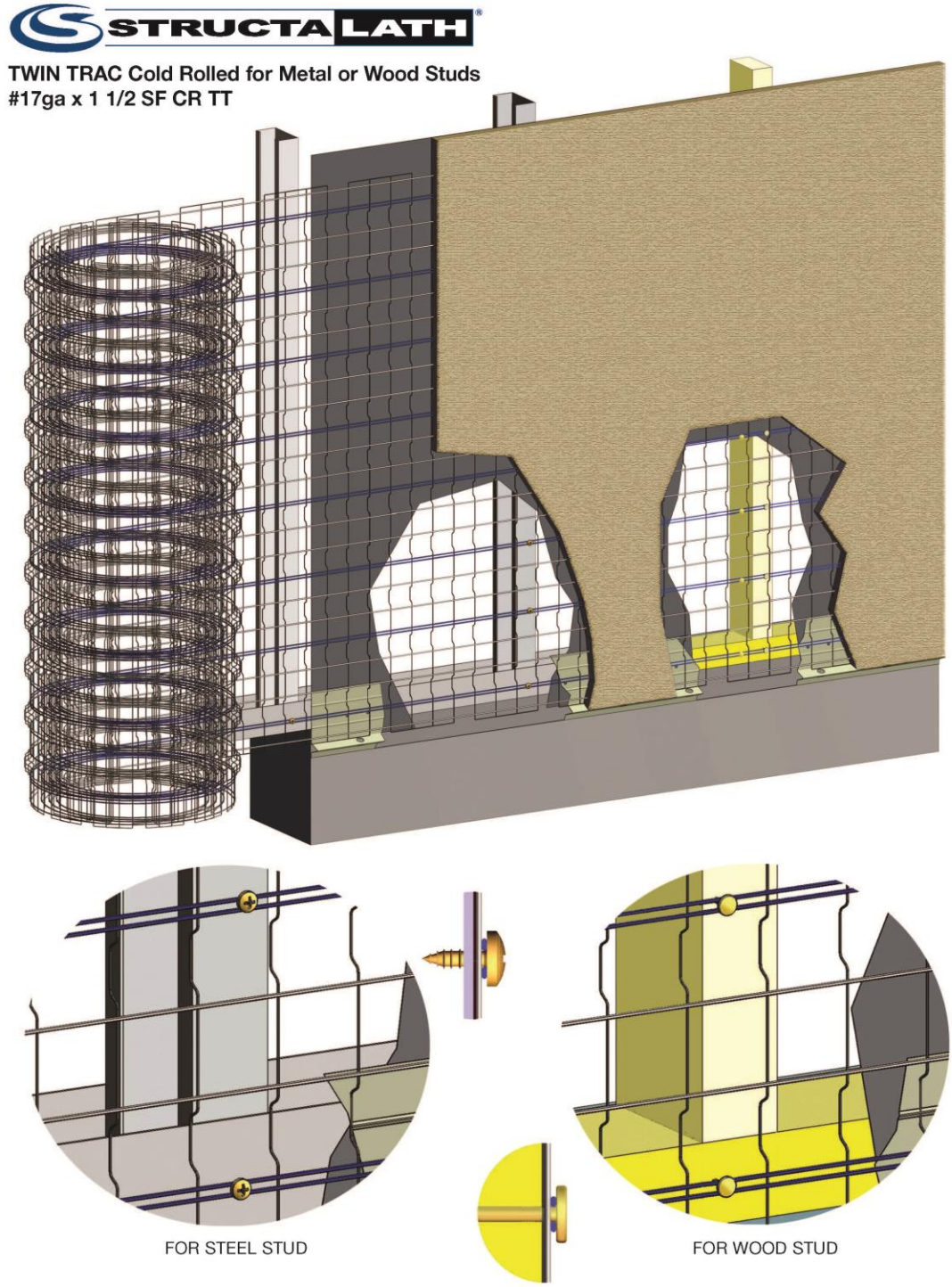
- **Twin Trac** simplifies the attachment of wire lath to wood and steel studs for residential and commercial construction.
- **Twin Trac** provides convenient options for attachment of the lath that exceed all building code requirements.

Features

- **Twin Trac** in rolls (compared to sheet) provides the most economical and cost effective metal base (wire lath) for 3 coat stucco on commerical buildings.
- **Twin Trac** creates a series of (8)-3/16" spacing bands which act as a continuous washer. This allows the easy penetration of self-tapping screws or hand nails, providing a wide flat base for automatic staples.
- **Twin Trac** flat wires provide a pressure seal at the fastener penetration point that serves to inhibit water leakage.
- **Twin Trac** secures and protects asphalt building paper from punctures.
- **Twin Trac** at a 38 3/8" width and 150' length requires 50% less side and end laps on average (compared to 27" x 101" metal lath sheets). This reduces overlaps which create weak points and are a significant source of shrinkage cracking.
- **Twin Trac** utilizes our cold rolled flat wire exclusively for longitudinal wires which provides greater tensile strength and additional surface area for keying purposes.
- Worker friendly **Twin Trac** unwinds from roll into the flat without curvature memory.

StructaLath provides a minimum of 28 (rugged) furring points per square foot that ensure superior embedment and crack resistance.

STRUCTA WIRE CORP.
Structa Wire Corp., Vancouver, BC Canada **1.800.887.4708**
www.structawire.com



BASF
We create chemistry

Technical Data Guide

07 92 00
Joint
Sealants

MasterSeal® NP 150

Low-modulus, non-sag, elastomeric, hybrid sealant

FORMERLY SONOLASTIC® 150 VLM

PACKAGING
– 300 ml (10.1 fl oz) cartridges, 30 cartridges per carton
– 20 oz (590 ml) ProPaks, 20 per carton

COLORS
White, Stone, Limestone, Black, Medium Bronze, Aluminum Gray, Tan, Off-White, Special Bronze, Precast White, Champagne

YIELD
See page 3 for charts

STORAGE
Store in original, unopened containers in a cool, dry area. Protect unopened containers from heat and direct sunlight. Storing at elevated temperatures will reduce shelf life.

SHELF LIFE
15 months when properly stored

VOC CONTENT
13.6 g/L
less water and exempt solvents

DESCRIPTION
MasterSeal NP 150 is a high performance, very low-modulus, high-movement, non-sag, fast-curing, hybrid sealant.

PRODUCT HIGHLIGHTS
- Superior adhesion results in a long-lasting bond, helping to reduce call backs
- Low modulus to accommodate for joint movement (100% extension in EIFS joints with little stress on bond line)
- Can be painted with elastomeric coatings soon after installation
- Easy to gun and tool, speeding up application
- Wide temperature application range
- Weather resistant for long-lasting weathertight seals
- Fast curing helps to speed up jobsite production
- Non-staining formula for use on stone and other sensitive substrates
- Available in ProPaks to reduce jobsite waste and lower disposal costs
- Meets all state and federal VOC regulations

SUBSTRATES
- EIFS
- Stucco
- Aluminum
- Concrete
- Masonry
- Wood
- Stone
- Metal
- Vinyl
- Fiber cement siding

APPLICATIONS
- Vertical or horizontal
- Exterior or interior
- Above grade
- Joints with high movement
- In place of silicone sealants
- Store front systems
- Expansion joints
- Panel walls
- Precast units
- Aluminum, vinyl and wood window frames
- Fascia
- Parapets
- Sanitary applications

HOW TO APPLY

JOINT PREPARATION
1. The product may be used in sealant joints designed in accordance with SWR Institute's Sealants - The Professional's Guide.
2. In optimal conditions, the depth of the sealant should be ½ the width of the joint. The sealant joint depth (measured at the center) should always fall between the maximum depth of ½" and the minimum depth of ¼". Refer to Table 1.

Master Builders Solutions by BASF
www.buildingsystems.basf.com

MASTER® BUILDERS SOLUTIONS

Technical Data Guide
MasterSeal® NP 150

Technical Data

Composition

MasterSeal NP 150 is a formulation based on hybrid polymer.

Compliances

- ASTM C 920, Type S, Grade NS, Class 50, Use NT, M, A, and O*
  -capable of +100/-50% movement under typical field conditions.
- ASTM C 1382 for use with EIFS wall systems at 100% Extension
- Federal Specification TT-S-001543A, Type II, Class A, Type Nonsag
- Federal Specification TT-S-00230C, Type II,Class A
- Corps of Engineers CRD-C-541, Type II, Class A
- CFI accepted
- USDA compliant for use in areas that handle meat and poultry

*Refer to substrates in Where to Use.

Typical Properties

PROPERTY	VALUE
Service temperature range, ° F (° C)	-40 to 180 (-40 to 82)
Shrinkage	None

SEALANT • WATERPROOFING & RESTORATION INSTITUTE

Issued to: **BASF Corporation**
Product: **Sonolastic 150 W/VLM**

C719: Pass ✔ Ext:+50% Comp:-50%

Substrate: Primed Mortar, Unprimed Aluminum and Glass
[mortar substrates were primed with Sonneborn Primer 2000]

C661: Rating 17

Validation Date: 10/12/13 – 10/11/17

No. 1013-VLM1017 *Copyright © 2013*

SEALANT VALIDATION
www.swrionline.org

Test Data

PROPERTY	RESULTS	TEST METHOD
Movement capability, %	±50	ASTM C 719
Extention	100%	ASTM C 1382
100% modulus, psi (MPa)	35 (0.24)	ASTM C 412
Tensile strength, psi (MPa)	140–180	ASTM D 412
Tear strength, lb/in (kg/cm)	40 (7.1)	ASTM D 1004
Ultimate elongation at break, %	800–1,000	ASTM D 412
Rheological, (sag in vertical displacement), at 120° F (49° C)	No sag	ASTM C 639
Extrudability, sec	2 – 3	ASTM C 1183
Hardness, Shore A, at standard conditions	17	ASTM C 661
Weight loss, after heat aging, %	< 10	ASTM C 1246
Tack-free time, min (maximum 72 hours)	90	ASTM C 1246
Stain and color change	Passes (no visible stain)	ASTM C 510
Bond durability,* pli on aluminum and concrete, +/– 50% movement	Passes	ASTM C 719
Adhesion* in peel, pli (kg/cm), (minimum 5 pli [0.89 kg/cm])		ASTM C 794
Aluminum	35 (6.2)	
Concrete	36 (6.4)	
Artificial weathering, Xenon arc, 2,000 hrs	No Cracking	ASTM G 155

*Concrete primed with MasterSeal P 179 for water immersion as indicated in ASTM C 920.
Test results are averages obtained under laboratory conditions. Reasonable variations can be expected.

TABLE 1
Joint Width and Sealant Depth

JOINT WIDTH, IN (MM)	SEALANT DEPTH AT MIDPOINT, IN (MM)
½–¾ (13–19)	¼–⅜ (6–10)
¾–1 (19–25)	⅜–½ (10–13)
1–1½ (25–38)	½ (13)

Yield
LINEAR FEET PER GALLON*

JOINT DEPTH, (INCHES)	⅜	½	JOINT WIDTH (INCHES) ⅝
¼	205	154	122
⅜	–	–	82
½	–	–	–

3. In deep joints, the sealant depth must be controlled by closed cell backer rod or soft backer rod. Where the joint depth does not permit the use of backer rod, a bond breaker (polyethylene strip) must be used to prevent three-point bonding.
4. To maintain the recommended sealant depth, install backer rod by compressing and rolling it into the joint channel without stretching it lengthwise. Closed cell backer rod should be about ⅛" (3 mm) larger in diameter than the width of the joint to allow for compression. Soft backer rod should be approximately 25% larger in diameter than the joint width. The sealant does not adhere to it, and no separate bond breaker is required. Do not prime or puncture the backer rod.

SURFACE PREPARATION

Substrates must be structurally sound, fully cured, dry and clean. Substrates should always be free of the following: dirt, loose particles, oil, grease, asphalt, tar, paint, wax, rust, waterproofing or curing and parting compounds, membrane materials and sealant residue.

EIFS

1. MasterSeal NP 150 should be applied to the system base coat for best adhesion and to avoid delamination of EIFS finish applied in the joint.
2. Base coat must be sound, well bonded, properly cured and of sufficient depth to comply with manufacturer's specifications.
3. Certain EIFS systems require the use of a primer. Refer to the EIFS manufacturer for recommendations.

CONCRETE, STONE, AND OTHER MASONRY

Clean by grinding, sandblasting or wire brushing to expose a sound surface free of contamination and laitance.

WOOD

New and weathered wood must be clean, dry and sound. Scrape away loose paint to bare wood. Any coatings on wood must be tested to verify adhesion of sealant or to determine an appropriate primer.

METAL

Remove scale, rust and loose coatings from metal to expose a bright white surface. Any coatings on metal must be tested to verify adhesion of sealant or to determine an appropriate primer.

PRIMING

1. MasterSeal NP 150 is generally a non-priming sealant, but special circumstances or substrates may require a primer.
   - Porous materials subject to intermittent water immersion require priming. Use MasterSeal P 179.
   - Certain architectural metal finishes may require priming with MasterSeal P 173.
   - It is the user's responsibility to check the adhesion of the cured sealant on typical test joints at the project site before and during application. Refer to the technical data guides for MasterSeal P 179 and MasterSeal P 173.
2. Apply primer full strength with a brush or clean cloth. A light, uniform coating is sufficient for most surfaces. Very porous surfaces may require a second coat of MasterSeal P 179; however, do not over apply.
3. Allow primer to dry before applying MasterSeal NP 150. Depending on temperature and humidity, primer will be tack-free in 15–30 minutes. Priming and sealing must be done on the same day.

APPLICATION

1. MasterSeal NP 150 comes ready to use. Apply using professional grade caulking gun. Do not open cartridges, ProPaks or pails until preparatory work has been completed.
2. Fill joints from the deepest point to the surface by holding an appropriately sized nozzle against the back of the joint.
3. Dry tooling is recommended. Proper tooling results in the correct bead shape, neat joints, and optimal adhesion.

CLEAN UP

1. Immediately after use, clean equipment with MasterSeal 990 or xylene. Use proper precautions when handling solvents.
2. Remove cured sealant by cutting with a sharp-edged tool.
3. Remove thin films by abrading.

FOR BEST PERFORMANCE

- In cold weather, store container at room temperature for at least 24 hours before using.
- Not for use in glazing applications. Do not apply on glass and plastic glazing panels.
- For proper sealing of joint edges, all window covers must be removed prior to application of sealant.
- Do not allow uncured MasterSeal NP 150 to come into contact with alcohol-based materials or solvents.
- MasterSeal NP 150 should not be applied adjacent to other uncured sealants and certain petroleum based products.
- MasterSeal NP 150 can adhere to other residual sealants in restoration applications. For best results, always clean the joint as advised in the Surface Preparation section of this data guide. A product field adhesion test for MasterSeal NP 150 within the specific application is always recommended to confirm adhesion and suitability of the application.
- MasterSeal NP 150 should not be used for continuous immersion in water. Contact Technical Service for recommendations.
- Do not apply over freshly treated wood. Allow six months for weathering.
- Do not use MasterSeal P 179 on nonporous surfaces such as aluminum, steel, vinyl or Kynar 500 based paints. Use MasterSeal P 173 on coated metals when testing dictates.
- Lower temperatures and humidity will extend curing times.
- MasterSeal NP 150 can be painted over after a thin film or skin forms on the surface.
- Pursuant to accepted industry standards and practices, using rigid paints and/or coatings over flexible sealants can result in a loss of adhesion of the applied paint and/or coating, due to the potential movement of the sealant. However, should painting and/or coating be desired it is required that the applicator of the paint and/or coating conduct on-site testing to determine compatibility and adhesion.
- Proper application is the responsibility of the user. Field visits by BASF personnel are for the purpose of making technical recommendations only and not for supervising or providing quality control on the jobsite.

Technical Data Guide
MasterSeal® NP 150

HEALTH, SAFETY AND ENVIRONMENTAL

Read, understand and follow all Safety Data Sheets and product label information for this product prior to use. The SDS can be obtained by visiting www.master-builders-solutions.basf.us, e-mailing your request to basfbscst@basf.com or calling 1(800)433-9517. Use only as directed.

For medical emergencies only, call ChemTrec® 1(800) 424-9300.

LIMITED WARRANTY NOTICE

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is the replacement of product or refund of the purchase price, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

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BASF Corporation
Construction Systems

889 Valley Park Drive, Shakopee, MN 55379
www.master-builders-solutions.basf.us

Customer Service 1(800)433.9517
Technical Service 1(800)243.6739

DuPont™ Tyvek® HomeWrap®

PHYSICAL PROPERTIES DATA SHEET

PROPERTIES	METHOD	DUPONT™ TYVEK® HOMEWRAP®
Air Penetration Resistance	ASTM E2178 (cfm/ft²@1.57 psf)	< .004
	Gurley Hill (TAPPI T-460) (sec/100cc)	1200
	ASTM E1677	Type 1
Water Vapor Transmission	ASTM E96-05 Method A (g/m²-24 hrs)	400
	(perms)	56
	Method B (glm²-24 hrs)	370
	(perms)	54
Water Penetration Resistance	ATTCC 127 (cm)	250
Basis Weight	TAPPI T-410 (oz/yd²)	1.8
Breaking Strength	ASTM D882 (lbs/in)	30/30
Tear Resistance (Trapezoid)	ASTM D1117 (lbs)	8/6
Surface Burning Characteristics	ASTM E84 Flame Spread Index	15 Class A
	Smoke Developed Index	15 Class A
Ultra Violet Light Exposure (UV)		120 days (4 months)

Test results shown represent roll averages. Individual results may vary either above or below averages due to normal manufacturing variations, while continuing to meet product specifications.

For more information about DuPont™ Tyvek® Weatherization Systems, please call 1-800-44-Tyvek or visit us at www.Construction.Tyvek.com

WARNING: DuPont™ Tyvek® is combustible and should be protected from an open flame and other high heat sources. If the temperature of DuPont™ Tyvek® reaches 750 °F (400 °C), it will burn and the fire may spread and fall away from the point of ignition.

DuPont The miracles of science™

DuPont™ Tyvek® HomeWrap®