

STAYCELL® HYBRID INTUMESCENT SPRAY FOAM INSULATION SYSTEM

QAI EVALUATION REPORT B1020-1, EDITION 6

DESCRIPTION:

The **HYBRID System** consists of two separate layers: **Staycell® 265** closed-cell, spray polyurethane foam insulation (base layer) covered with **Staycell ONE STEP® 255** closed-cell, intumescent, spray polyurethane foam insulation as the exposed surface layer. It is used to insulate building components such as roof decks, ceilings, walls, siding, structural steel and tanks to provide an integral air barrier / insulation / vapor retarder for building envelope assemblies.

Benefits of the **HYBRID SYSTEM** include:

- Superior insulation
- Controls moisture infiltration
- Controls air infiltration
- Non-fibrous
- Structural enhancement

TYPICAL PROPERTIES – STAYCELL 265 (BASE LAYER)⁽¹⁾

PROPERTY	METHOD	VALUE
Density, core (pcf @ 2" lifts)	ASTM D 1622	2.0 +/- .10%
Compressive Strength (psi)	ASTM D 1621	26
Tensile Strength (psi)	ASTM D 1623	62.4
Closed Cell Content (%)	ASTM D 6226	98
Thermal Resistance (aged) R-value (ft ² hr °F/Btu in) ⁽²⁾	ASTM C 518	6.7 < 4" thick 6.9 ≥ 4" thick
Water Vapor Transmission Permeance (perms)	ASTM E 96	1.39 @ 1" thick 0.70 @ 2" thick
Air Leakage (L/s*m ² @ 75 Pa)	ASTM E 283	<.005 @ 1" thick
Surface Burning Characteristics		
Flame Spread ⁽³⁾	ASTM E 84	≤ 25
Smoke Developed	ASTM E 84	≤ 450

TYPICAL PROPERTIES – STAYCELL ONE STEP 255 (TOP LAYER)⁽²⁾

PROPERTY	METHOD	VALUE
Density, core (pcf @ 2" lifts)	ASTM D 1622	2.0 +/- .10%
Compressive Strength (psi)	ASTM D 1621	22
Tensile Strength (psi)	ASTM D 1623	28
Closed Cell Content (%)	ASTM D 6226	90
Thermal Resistance (aged) R-value (ft ² hr °F/Btu in) ⁽²⁾	ASTM C 518	4.60 @ 1" thick
Water Vapor Transmission Permeance (perms)	ASTM E 96	0.99 @ 2.4" thick
Air Leakage (L/s*m ² @ 75 Pa)	ASTM E 283	.008 @ 1" thick
Surface Burning Characteristics		
Flame Spread ⁽³⁾	ASTM E 84	≤ 25
Smoke Developed	ASTM E 84	≤ 450

ADDITIONAL TESTING, APPROVALS & CERTIFICATIONS:

- ASTM E 84 (Class I) with Product Listing⁽³⁾⁽⁴⁾
- NFPA 285 complying assemblies available; see Table 1 & 2
- Fire Resistant assemblies available
- ASTM C 1029 - Type II Compliant
- Thickness is not limited when installed behind a code-prescribed thermal barrier (per ICC-ES AC377)
- GREENGUARD and GREENGUARD Gold Certification for VOC Emissions
- Meets the requirements of CDPH Section 01350 for VOC emissions and formaldehyde
- Mold resistant per ASTM C1338 – "Pass" rating (no growth)

Exposed spray polyurethane foam (including Staycell ONE STEP 255) is sensitive to ultraviolet light (UV) and will change color over time depending on exposure but can be easily painted with latex paints to color match adjacent surfaces. Contact PSI for paint recommendations.

Please contact your local Sales or Technical Representative for specific questions regarding properties, approvals, or certifications of the **HYBRID SYSTEM**.

(1) These physical property values are typical for this material as applied at our development facility under controlled conditions. SPF performance and actual physical properties will vary with differences in application (i.e. ambient conditions, process equipment and settings, material throughput, etc). As a result, these published properties should be used as guidelines solely for the purpose of evaluation. Physical property specifications should be determined from actual production material. The above data was collected from samples prepared using equipment configurations pertinent to lab conditions.

(2) The data chart shows the R-value of this insulation. "R" means resistance to heat flow. The higher the R-value, the greater the insulating power. Compare insulation R-values before you buy. There are other factors to consider. The amount of insulation will depend upon the climate, the type and size of the building. If you buy too much insulation it will cost you more than what you will save on fuel. To achieve proper R-values, it is essential that this insulation be installed properly.

(3) This numerical flame spread rating does not reflect hazards presented by this or any other material under actual fire conditions. Building codes provide guidelines representing minimum requirements. Consult all Authorities Having Jurisdiction (AHJ) for additional or specific requirements prior to beginning any project.

(4) ASTM E 84 is a test designed for sample thickness up to four (4) inches. UL 1715 and NFPA 286 are building code recognized alternative tests conducted on large-scale assemblies to evaluate foam thickness in excess of four (4) inches as permitted in 2015 and 2018 IBC Section 2603.9; 2012 IBC Section 2603.10; 2006 & 2009 IBC Section 2603.9; 2009, 2012, 2015 and 2018 IRC Section R316.6; 2006 IRC Section R314.6.

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GENERAL INFORMATION:

The HYBRID System is a spray polyurethane foam (SPF) system intended for installation by qualified contractors trained in the processing and application of SPF systems, as well as the plural-component polyurethane dispensing equipment required to do so. Contractors and applicators must comply with all applicable and appropriate storage, handling, processing and safety guidelines. PSI technical service personnel should be consulted in all cases where application conditions are questionable.

For detailed technical and application information/instructions, refer to the separate technical data sheets and installation guides for the Staycell 265 and Staycell ONE STEP 255 products. Both products are formulated for maximum yield. Actual yield is based on factors affecting density including, but not limited to: multiple lifts, substrate texture, substrate temperature, overspray loss, windy conditions, altitude, container residue, equipment characteristics & temperatures, applicator technique, etc. For help estimating yield for this and other spray foams, please consult Spray Polyurethane Foam Alliance's SPFA-121 SPF Estimating Reference Guide.

CAUTIONS AND RECOMMENDATIONS:

The HYBRID System is NOT designed for use as an EXTERIOR roofing system. PSI offers a separate line of products for exterior roofing applications. For more information, please contact your sales representative.

Cold-storage structures such as coolers and freezers require special design considerations with regard to thermal insulation and moisture/vapor drive. The HYBRID System should NOT be installed in these types of constructions unless the structure was designed by a design professional for specific use as cold storage.

The HYBRID System is designed for installation onto most standard construction materials such as wood, wood-based products, plastics, metal and concrete. The HYBRID System has performed successfully when sprayed onto wood substrates down to 20°F using special cold weather application techniques. For heat sink-materials such as metal or concrete, the HYBRID System can be sprayed onto substrates down to 30°F, using a flash pass method. PSI recommends the use of mock ups or sample spray before starting the full-scale project. This will provide an opportunity to see how all materials are installed and evaluate their properties prior to proceeding.

In addition to reading and understanding the SDS, all contractors and applicators must use appropriate respiratory, skin and eye Personal Protective Equipment (PPE) when handling and processing polyurethane chemical systems. Personnel should

review the following documents published by Spray Polyurethane Foam Alliance (SPFA): AX-171 Course 101-R Chapter 1: Health, Safety and Environmental Aspects of Spray Polyurethane Foam and Coverings.
www.spraypolyurethane.org

Also, the following document is available from the Center for the Polyurethanes Industries (CPI): Model Respiratory Protection Program for Compliance with the Occupational Safety and Health Administration's Respiratory Protection Program Standard 29 C.F.R. §1910.134.

As with all SPF systems, improper application techniques should be avoided. Examples of improper application techniques include, but are not limited to, excessive thickness of SPF, off-ratio material and spraying into or under rising SPF. Potential results of improperly installed SPF include: dangerously high reaction temperatures that may result in fire and offensive odors that may or may not dissipate. Improperly installed SPF must be removed and replaced with properly installed materials.

Large masses of SPF should be removed to an outside safe area, cut into smaller pieces and allowed to cool before discarding into an appropriate trash receptacle. SPF insulation is combustible. High-intensity heat sources such as welding or cutting torches should not be used in contact with the HYBRID System. The insulation must not be used in areas that have a maximum service temperature greater than 180°F (82°C).

SHELF LIFE AND STORAGE CONDITIONS:

Both products comprising the HYBRID System have a shelf life of approximately six (6) months from the date of manufacture when stored in original, unopened containers at 50°F- 80°F. As with all industrial chemicals this material should be stored in a covered, secure location and never in direct sunlight. Storage temperatures above the recommended range will shorten shelf life. Storage temperatures above the recommended range may also result in elevated headspace pressure within packages.

LIMITED WARRANTY INFORMATION – PLEASE READ CAREFULLY:
The information herein is to assist customers in determining whether our products are suitable for their applications. Our products are only intended for sale to industrial and commercial customers. Customer assumes full responsibility for quality control, testing and determination of suitability of products for its intended application or use. We warrant that our products will meet our written liquid component specifications. We make no other warranty of any kind, either express or implied, by fact or law, including any warranty of merchantability or fitness for a particular purpose. Our total liability and customer's exclusive remedy for all proven claims is replacement of nonconforming product and in no event shall we be liable for any other damages.

While descriptions, designs, data and information contained herein are presented in good faith and believed to be accurate, they are provided for guidance only. Because many factors may affect processing or application/use, PSI recommends that the reader make tests to determine the suitability of a product for a particular purpose prior to use. No warranties of any kind, either expressed or implied, including warranties of merchantability or fitness for a particular purpose, are made regarding products described or designs, data or information set forth, or that the products, designs, data or information may be used without infringing the intellectual property rights of others. In no case shall the descriptions, information, data or designs provided be considered a part of PSI's terms and conditions of sale. Further the descriptions, designs, data, and information furnished by PSI hereunder are given gratis and PSI assumes no obligation or liability for the description, designs, data or information given or results obtained, all such being given and accepted at the reader's risk.

Warning: These products can be used to prepare a variety of polyurethane products. Polyurethanes are organic materials and must be considered combustible.

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COMPLIANCE WITH INTERNATIONAL BUILDING CODES AND INTERNATIONAL RESIDENTIAL CODES:

The HYBRID System is listed, labeled and certified by QAI Laboratories (www.qai.org/listing-directory) in accordance with QAI Evaluation Report No. B1020-1, Edition 6 indicating Class A flame spread and smoke developed ratings per ASTM E-84 and classification as an *Alternative Thermal Barrier Assembly* as a result of passing the UL 1715 large- scale fire test prescribed by all editions of the International Building Code and International Residential Code.

QAI is accredited by International Accreditation Services, Inc., a division of the International Code Council that publishes the International Building Code and International Residential Code. QAI is accredited for fire testing, quality control inspections of manufacturing facilities and certification of listed and labeled products in accordance with IAS Registration Nos. AA-723, TL-220 and PCA-119.

The STAYCELL 265/STAYCELL ONE STEP 255 HYBRID System was fire tested separately for installation exposed on either walls only or the underside of ceilings/roofs only and wall-roof transitions. AS A RESULT, THE HYBRID SYSTEM IS NOT TO BE INSTALLED EXPOSED ON ENTIRE WALLS AND ENTIRE ROOFS/CEILING WHEN ADJACENT TO EACH OTHER. Contact PSI for tested wall/roof transition applications, approvals and certifications.



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STAYCELL[®] 265 / STAYCELL ONE STEP[®] 255 HYBRID Intumescent Spray Foam Insulation System

Fire performance in accordance with ASTM E-84:

STAYCELL[®] 265 spray foam insulation (base layer):

Tested thickness: 4 inches Flame spread index: ≤ 25 Smoke developed index: ≤ 450

STAYCELL ONE STEP[®] 255 intumescent spray foam insulation (exposed surface layer):

Tested thickness: 4 inches Flame spread index: ≤ 25 Smoke developed index: ≤ 450

Alternative Thermal Barrier Assembly when installed exposed; no thermal barrier or ignition barrier required based on compliance with UL1715 large-scale, room fire test:

Exposed applications on walls only:

STAYCELL[®] 265 base layer installed at nominal 4 inch or less thickness covered with nominal 1 inch thick STAYCELL ONE STEP[®] 255 as the exposed surface layer.

Exposed applications on the underside of roofs and ceilings only:

STAYCELL[®] 265 base layer installed at nominal 8 inch or less thickness covered with nominal ½ inch thick STAYCELL ONE STEP[®] 255 as the exposed surface layer.



**STAYCELL® HYBRID INTUMESCENT
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TABLE 1

NFPA 285 COMPLYING WALL ASSEMBLIES

**STAYCELL® 265/STAYCELL ONE STEP® 255 HYBRID INTUMESCENT SPRAY FOAM
 INSULATION SYSTEM APPLIED TO INTERIOR OF WALL ASSEMBLIES**

WALL COMPONENT	MATERIAL DESCRIPTION
Base Wall System (BWS) Use either 1, 2 or 3	1 - Concrete wall (with or without steel studs) 2 - Concrete masonry wall (with or without steel studs) 3 - Steel studs, minimum 3½-inch deep, minimum 20-gauge, maximum 24-inch on center; lateral bracing every 4 feet vertically or as required and with one layer of minimum ½-inch thick Type X gypsum wallboard installed on the interior face of the studs.
Floorline Firestopping	4 pcf density mineral wool (e.g. Thermafiber) friction-fit in each wall stud cavity at each floor line.
Interior Insulation Use either 1 or 2 or combinations of 1 with 3 or 2 with 3 or 1 with 4 or 2 with 4	1 - Maximum 2½-inch thick Staycell® 265 insulation applied onto the interior surface of BWS 1 or 2 with Staycell ONE STEP® 255 insulation, minimum 1-inch thick, applied onto the Staycell® 265 as the fire-protective surface layer exposed to the interior of the building without steel studs (see Note 1). 2 - Maximum 2½-inch thick Staycell® 265 insulation applied onto the interior surface of the gypsum sheathing of BWS 3 or the interior surface of BWS 1 or 2 with Staycell ONE STEP® 255 insulation, minimum 1-inch thick, applied onto the Staycell® 265 and exposed to the interior of the building. The ½-inch thick Type X gypsum wallboard on the interior face of the studs may be omitted. Insulation shall cover the width of the cavity and the inside of the steel wall stud framing flange (see Note 1). 3 - Fiberglass batt insulation (faced or unfaced) 4 - Mineral wool insulation (faced or unfaced)
Exterior Sheathing Use either 1 or 2	1 - None (for BWS 1 or 2) 2 - Minimum ½-inch thick Type X exterior type gypsum sheathing (for BWS 3)
Exterior Wall Covering	Any non-combustible exterior wall covering material using any standard installation technique.
Flashing of window, door and other exterior wall penetrations	As an option, flash around windows, doors and other exterior penetrations with limited amounts of maximum 12-inch wide flashing tape (acrylic, asphalt or butyl-based) or liquid-applied membrane material with or without fiber mesh reinforcement.

Note 1: The Staycell® 265/Staycell ONE STEP® 255 Hybrid Intumescent Spray Foam Insulation System is qualified as an Alternative Thermal Barrier Assembly when installed exposed to the interior of the building in accordance with Special Approval Section 2603.9 of the IBC and as described in Quality Auditing Institute Evaluation Report No. B1020-1, Revision 6, 9/8/2016.



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TABLE 2

NFPA 285 COMPLYING WALL ASSEMBLIES

**STAYCELL® 265/STAYCELL ONE STEP® 255 HYBRID INTUMESCENT SPRAY FOAM
 INSULATION SYSTEM APPLIED TO EXTERIOR OF WALL ASSEMBLIES**

WALL COMPONENT	MATERIAL DESCRIPTION
Base Wall System (BWS) Use either 1, 2 or 3	1 - Concrete wall (with or without steel studs) 2 - Concrete masonry wall (with or without steel studs) 3 - Steel studs minimum 3 $\frac{3}{8}$ -inch deep, minimum 20-gauge, maximum 24-inch on center; lateral bracing every 4 feet vertically or as required and with one layer of minimum $\frac{5}{8}$ -inch thick Type X gypsum wallboard installed on the interior face of the studs.
Floorline Firestopping	4 pcf density mineral wool (e.g. Thermafiber) friction fit at each floorline.
Interior Insulation Use either 1, 2 or 3	1 - None 2 - Fiberglass batt insulation (faced or unfaced) 3 - Mineral wool insulation (faced or unfaced)
Exterior Sheathing Use either 1, 2 or 3	1 - None (for BWS 1 or 2 above) 2 - $\frac{1}{2}$ -inch thick exterior type gypsum sheathing (for BWS 3) 3 - $\frac{5}{8}$ -inch thick exterior gypsum sheathing (for BWS 3)
Exterior Insulation	Maximum 2 $\frac{1}{2}$ -inch thick Staycell® 265 insulation applied onto the exterior surface of BWS 1, 2 or 3 with Staycell ONE STEP® 255 insulation, minimum of 1-inch thick, applied onto the Staycell® 265 as the fire protective surface.
Exterior Wall Covering Use either 1, 2, 3, 4 or 5	1 - Brick: Standard type brick veneer anchors, installed at a minimum 24-inches on center, vertically on each stud with maximum 1-inch air gap between exterior insulation and brick. Brick to be standard nominal 4-inch thick clay brick installed in a running bond pattern using Type S mortar. 2 - Stucco: Minimum $\frac{3}{4}$ -inch thick, exterior cement plaster and lath. A secondary water-resistive barrier (WRB) may be installed between the exterior insulation and lath. The secondary WRB shall not be full coverage asphalt or butyl-based, self-adhered membranes. 3 - Natural Stone: Minimum 2-inch thick natural stone (granite, limestone, marble, sandstone). Any standard non-open jointed installation technique may be used. 4 - CMU and others. Minimum 1 $\frac{1}{2}$ -inch thick concrete masonry unit (CMU), pre-cast concrete or artificial stone. Any standard non-open jointed installation method may be used. 5 - Terra Cotta: Minimum 1 $\frac{1}{4}$ -inch thick Terra Cotta non-open jointed. Any standard non-open jointed installation method may be used.
Flashing of window, door and other exterior wall penetrations	As an option, flash around windows, doors and other exterior penetrations with limited amounts of maximum 12-inch wide flashing tape (acrylic, asphalt or butyl-based) or liquid-applied membrane material with or without fiber mesh reinforcements.

