

## STAYCELL ONE STEP® 255 INTUMESCENT SPRAY FOAM INSULATION

QAI EVALUATION REPORT B1020-1, EDITION 6

### DESCRIPTION:

**STAYCELL ONE STEP 255** is a two-component closed-cell spray polyurethane foam system utilizing an EPA-approved, zero ozone-depleting blowing agent. It is designed for use in residential construction and common commercial insulation applications.

This product has Class A/Class 1 flame spread and smoke developed ratings and is classified as an Alternative Thermal Barrier Assembly when installed without thermal barriers, ignition barriers or other fire protective surfaces in accordance with QAI Evaluation Report No. B1020-1, Edition 6.

The benefits of **STAYCELL ONE STEP 255** include:

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

### TYPICAL PROPERTIES<sup>(1)</sup>

PROPERTY	METHOD	VALUE
<b>Resin:</b>		
Specific Gravity @ 70°F	ASTM D 1638	1.25
Viscosity @ 70°F (cps)	Brookfield	1,000
<b>Cured Foam:</b>		
Density, core (pcf @ 2" lifts)	ASTM D 1622	2.0 +/- 10%
Thermal Resistance (aged) R-value (ft <sup>2</sup> hr °F/Btu in) <sup>(2)</sup>	ASTM C 518	4.60 @ 1" thick
Compressive Strength (psi)	ASTM D 1621	26
Water Vapor Transmission Permeance (perms)	ASTM E 96	0.99 @ 2.4" thick
Water Absorption (vol %)	ASTM D 2842	0.80
Tensile Strength (psi)	ASTM D 1623	28
Response to Thermal and Humid Aging (% linear chg) 158°F/97% RH/168 hrs	ASTM D 2126	3
Closed Cell Content (%)	ASTM D 6226	90
Surface Burning Characteristics		
Flame Spread <sup>(3)</sup>	ASTM E 84	≤ 25
Smoke Developed	ASTM E 84	≤ 450

### ADDITIONAL TESTING, APPROVALS & CERTIFICATIONS:

- ASTM E 84 (Class I) with Product Listing<sup>(3) (4)</sup>
- NFPA 285 complying assemblies; see Table 1 & 2
- Fire Resistant assemblies available
- ASTM C 1029 - Type II Compliant
- Air Leakage

PROPERTY	METHOD	VALUE
Air Leakage (L/s*m <sup>2</sup> @ 75 Pa)	ASTM E 283	0.008 @ 1" thick

- 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 **STAYCELL ONE STEP 255** properties, approvals, or certifications.

(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.

# STAYCELL ONE STEP® 255

## BUILDING ENVELOPE THERMAL INSULATION

### QAI EVALUATION REPORT B1020-1, EDITION 6

#### **GENERAL INFORMATION:**

STAYCELL ONE STEP 255 is an intumescent spray polyurethane foam (SPF) 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.

STAYCELL ONE STEP 255 has an estimated theoretical yield range of 4,000 board feet per set. Actual yield performance can be in excess of or below the referenced estimated theoretical range based on factors affecting density including, however, 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*.

#### **RECOMMENDED SUBSTRATE TEMPERATURES:**

Minimum substrate and air temp: 40°F Maximum substrate and air temp: 120°F. For applications below 40°F, contact PSI Technical Services for cold temperature application guidelines.

#### **APPLICATION AND EQUIPMENT INFORMATION:**

For detailed technical and application information and instructions, please refer to the installation guide for this product. The proportioning equipment shall be manufactured specifically for heating, mixing and spray application of polyurethane foam and be able to maintain 1:1 metering by volume with +/- 2% variance. All proportioners shall have adequate main heating capacity to deliver heated and pressurized materials up to 130°F. Heated hose shall be able to maintain pre-set temperatures for the full length of the hose. Minimum 2:1 pressure ratio feeder pumps and 3/4 inch supply hoses are required to transfer material from container to the proportioner.

Recommended equipment (contact PSI for more details):

- Graco Reactor proportioners or equivalent set at 1:1 volume ratio.
- Graco GAP or Fusion AP spray gun with #2 mixing chamber
- Graco T2 2:1 transfer pumps or equivalent

#### **CAUTIONS AND RECOMMENDATIONS:**

STAYCELL ONE STEP 255 is designed for an application rate of ½ inch minimum to 4 inches maximum per pass. Once installed and material has cooled it is possible to add additional applications in order to increase the overall installed thickness of SPF. This application procedure is in compliance with the Spray Polyurethane Foam Alliance (SPFA). STAYCELL ONE STEP 255 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.

EQUIPMENT SETTING GUIDELINES		
Climate	A side, B side, Hose Temp (Adjust +/- 5° increments)	Proportioner set pressure (Spraying pressure)
Colder	120°F to 130°F	1400-1600 psi (1100-1300 psi)
Warmer	110°F to 125°F	1400-1600 psi (1100-1300 psi)

Cold-storage structures such as coolers and freezers demand special design considerations with regard to thermal insulation and moisture/vapor drive. STAYCELL ONE STEP 255 should NOT be installed in these types of constructions unless the structure was designed by a design professional for specific use as cold storage.

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](http://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 must not be used in contact with STAYCELL ONE STEP 255. 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:**

STAYCELL ONE STEP 255 has 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 customers' 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.

# STAYCELL ONE STEP® 255 BUILDING ENVELOPE THERMAL INSULATION QAI EVALUATION REPORT B1020-1, EDITION 6

## COMPLIANCE WITH INTERNATIONAL BUILDING CODES AND INTERNATIONAL RESIDENTIAL CODES:

STAYCELL ONE STEP 255 is listed, labeled and certified by QAI Laboratories ([www.qai.org/listing-directory](http://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 ONE STEP 255 and the STAYCELL 265/STAYCELL ONE STEP 255 HYBRID System were fire tested separately for installation exposed on either walls only or the underside of ceilings/roofs only. AS A RESULT, THE STAYCELL ONE STEP 255 AND THE STAYCELL 265/STAYCELL ONE STEP 255 HYBRID SYSTEM ARE NOT TO BE INSTALLED EXPOSED ON ENTIRE WALLS AND ENTIRE ROOF/CEILINGS WHEN ADJACENT TO EACH OTHER. Contact PSI for tested wall/roof transition applications, approvals and certifications.



## EVALUATION REPORT NO. B1020-1, EDITION 6

### STAYCELL ONE STEP® 255 Intumescent Spray Foam Insulation

#### Fire performance in accordance with ASTM E-84:

Tested thickness: 4 inches Flame spread index:  $\leq 25$  Smoke developed index:  $\leq 450$

### STAYCELL® 265 Spray Foam Insulation

#### Fire performance in accordance with ASTM E-84:

Tested thickness: 4 inches Flame spread index:  $\leq 25$  Smoke developed index:  $\leq 450$

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

#### Single-layer, MONOLITHIC System (STAYCELL ONESTEP® 255 only):

Exposed applications on walls only: Nominal 4 inch or less thickness

Exposed applications on the underside of roofs, floors and ceilings only: Nominal 8 inch or less thickness

#### Two-layer, HYBRID System:

Exposed applications on walls only: STAYCELL® 265 base layer at nominal 4 inch or less thickness covered with nominal 1 inch thick STAYCELL ONE STEP® 255 exposed surface layer.

Exposed applications on underside of roofs, floors and ceilings only: STAYCELL® 265 base layer at nominal 8 inch or less thickness covered with nominal ½ inch thick STAYCELL ONE STEP® 255.



**STAYCELL ONE STEP® 255  
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**TABLE 1**

**NFPA 285 COMPLYING WALL ASSEMBLIES**

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

<b>WALL COMPONENT</b>	<b>MATERIAL DESCRIPTION</b>
<b>Base Wall System (BWS)</b> 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.
<b>Floorline Firestopping</b>	4 pcf density mineral wool (e.g. Thermafiber) friction-fit in each wall stud cavity at each floor line.
<b>Interior Insulation</b> Use either 1, 2, 3 or 4 or combinations of 1 with 3 or 1 with 4 or 2 with 3 or 2 with 4	1 - Maximum 3 $\frac{3}{8}$ -inch thick Staycell ONE STEP® 255 insulation applied onto the interior surface of BWS 1 or 2 and exposed to the interior of the building without steel studs (see Note 1). 2 - Maximum 3 $\frac{3}{8}$ -inch thick Staycell ONE STEP® 255 insulation applied in the wall steel stud cavity and onto the interior surface of the gypsum sheathing of BWS 3 or the interior surface of BWS 1 or 2 and exposed to the interior of the building. The $\frac{5}{8}$ -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 wall stud framing flange (see Note 1). 3 - Fiberglass batt insulation (faced or unfaced) 4 - Mineral wool insulation (faced or unfaced)
<b>Exterior Sheathing</b> Use either 1 or 2	1 - None (for BWS 1 or 2) 2 - Minimum $\frac{5}{8}$ -inch thick Type X exterior type gypsum sheathing (for BWS 3)
<b>Exterior Wall Covering</b>	Any non-combustible exterior wall covering material using any standard installation technique.
<b>Flashing of window, door and other exterior wall penetrations</b>	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: Staycell ONE STEP® 255 intumescent spray foam insulation 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 as described in Quality Auditing Institute Evaluation Report No. B1020-1, Revision 6, 9/8/2016.



**STAYCELL ONE STEP® 255  
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**TABLE 2**

**NFPA 285 COMPLYING WALL ASSEMBLIES**

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

<b>WALL COMPONENT</b>	<b>MATERIAL DESCRIPTION</b>
<b>Base Wall System (BWS)</b> 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.
<b>Floorline Firestopping</b>	4 pcf density mineral wool (e.g. Thermafiber) friction-fit in each wall stud cavity at each floor line.
<b>Interior Insulation</b> Use either 1, 2 or 3	1 - None 2 - Fiberglass batt insulation (faced or unfaced) 3 - Mineral wool insulation (faced or unfaced)
<b>Exterior Sheathing</b> Use either 1, 2 or 3	1 - None (for BWS 1 or 2 above) 2 - ½-inch thick exterior type gypsum sheathing (for BWS 3) 3 - ⅝-inch thick exterior gypsum sheathing (for BWS 3)
<b>Exterior Insulation</b>	Maximum 3-inch thick Staycell ONE STEP® 255 insulation applied onto BWS 1, 2 or 3.
<b>Exterior Wall Covering</b> Use either 1, 2, 3, 4 or 5	1 - Brick: Standard type brick veneer anchors, installed at 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 ¾-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 ½-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 ¼-inch thick Terra Cotta non-open jointed. Any standard non-open jointed installation method may be used.
<b>Flashing of window, door and other exterior wall penetrations</b>	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.

