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EVALUATION REPORT

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Valid Through: 02/28/2025

KINGSPAN INSULATED PANELS 726 Summerhill Dr. #2021 DeLand, FL 32724 www.kingspan.com

KINGSPAN FOAM CORE PANELS (KINGSEAM AND KINGRIB ROOFS)

CSI Division:

07 00 00-THERMAL AND MOISTURE PROTECTION

CSI Section:

07 40 00-Roofing and Siding Panels

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2018 and 2015 International Building Code[®] (IBC)
- 2018 and 2015 International Residential Code (IRC)
- 2020 City of Los Angeles Building Code (LABC) – attached Supplement
- 2020 City of Los Angeles Residential Code (LARC) – attached Supplement

1.2 Evaluated in accordance with:

- ICC-ES AC04
- ICC-ES AC12

1.3 Property evaluated:

- Structural
- Fire Resistance

2.0 USES

Kingspan Foam Core Panels are used as interior or exterior non-load-bearing roof panels. The KingSeam and KingRib panels are for use as roof panels in combustible non-fireresistance-rated construction. All panels comply with requirements for prefabricated construction set forth in Section K107 of Appendix K of the IBC.

3.0 PRODUCT DESCRIPTION

3.1 General: Kingspan Foam Core Panels are factoryassembled sandwich panels with metal facings and a foamedin-place foam plastic core.

The KingSeam and KingRib roof panels are available in thicknesses of 2.5 to 6 inches (63.5 to 152 mm) and are 40 inches (1016 mm) wide and up to 62 feet (18897 mm) long. Panels are formed with both a single tongue-and-groove interlocking longitudinal edge and straight ends. Panel

exterior and interior liners are available in the profiles shown in Figure 1 of this report.

3.2 Panel Core: The core is a polyisocyanurate foam plastic compliant with ASTM C1029. This polyisocyanurate foam plastic insulation described in the approved quality control manual is continuously foamed in place into the core of the panel. The core has a nominal density of 2.0 through 2.5 pcf (33.6 through 40.0 kg/m³). The polyisocyanurate foam plastic insulation has a flame spread index of not more than 25 and a smoke developed index of not more than 450 when tested in accordance with ASTM E84.

3.3 Panel Facings: Panel facings, unless noted, are fabricated from No. 26, No. 24, or No. 22 gauge [0.0187, 0.023 or 0.029 inch (0.475, 0.599 or 0.737 mm)], respectively, basemetal thickness carbon steel conforming to ASTM A653SS Grade 33 with a Class G90 galvanized coating or ASTM A792 SS Grade 33 with a Class AZ-50 galvalume coating. The panel facings are also fabricated from 304 series stainless steel conforming to ASTM A240 with a minimum yield strength of 35 ksi (241 MPa). The stainless-steel panels are formed from steel having a base-metal thickness of No. 26, No. 24, or No. 22 gauge [0.0175, 0.0225, or 0.0295 inch (0.44, 0.57 or 0.75 mm)], respectively. The panel facings are available with various finishes, such as PVDF, SMP, Polyester, and Plastisol applied over an epoxy primer. The finishes have a Class A flame-spread classification and a smoke density not exceeding 450 in accordance with Section 803.1 of the 2018 and 2015 IBC. The Roof Panel exterior facings roll-formed trapezoidal ribbed. All interior facings are Mesa profiled. Figure 1 of this report shows panel types and profiles.

3.4 Fasteners: The KingSeam roof clips are fabricated from No. 24 gauge 0.0225 inch (0.57 mm) thick 304 2B stainless steel with three $5/_{16}$ -inch-diameter (7.9 mm) predrilled holes. The EC-01 Standing Seam Enhancement Clips are fabricated from No. 20 gauge 0.0344-inch (0.87 mm) painted steel at a 6 inch (150 mm) length and installed over the completed panel standing seam over the SR clips.

The KingRib SW-01 roof saddle washers are fabricated from No. 16 gauge [0.0157-inch (0.4mm)] galvanized steel with one $^{5}/_{16}$ -inch diameter (7.9 mm) hole.

3.5 Sealant: Non-skinning butyl sealant shall be used for panel joints and trim. Sealants shall conform to AAMA Voluntary Specification and Test Methods for Non-drying Sealants (AAMA 809.2-92). The sealant shall be applied to clean and dry surfaces at temperatures ranging from 40° F to 120° F (5°C to 49° C).



The product described in this Uniform Evaluation Service (UES) Report has been evaluated as an alternative material, design or method of construction in order to satisfy and comply with the intent of the provision of the code, as noted in this report, and for at least equivalence to that prescribed in the code in quality, strength, effectiveness, fire resistance, durability and safety, as applicable, in accordance with IBC Section 104.11. This document shall only be reproduced in its entirety.

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3.6 Panel Supports: Steel support thicknesses shall range between No. 16 gauge [0.0568 inch (1.44 mm)] and $^{3}/_{16}$ inch (4.8 mm). Figures 4A and 4B of this report illustrate all panel clips.

The KingSeam roof panel supports shall have a No.16, No. 12 and $^{3}/_{16}$ inch [minimum 0.0568, 0.1046, and 0.1875 inch (1.44 mm, 2.47 mm, and 4.7 mm)], respectively, base metal thickness and have a minimum yield strength of 50 ksi (345 MPa).

The KingRib panel supports shall have a minimum No. 16 [minimum 0.0568 inch (1.44 mm)] base metal thickness and have a minimum yield strength of 50 ksi (345 MPa).

4.0 DESIGN AND INSTALLATION

4.1 Design: Allowable loads for all panel types are shown in Tables 2A and 2B of this report. Analyses and fastening schedules may also be provided as required by the building official to demonstrate acceptability for specific applications. The structural steel support members and the connection of the panels to the support members shall be designed to resist the applied forces.

4.2 Installation: Panels may be installed in single or multiple span conditions. Panels shall always run perpendicular to the supporting steel members. Seams shall be in direction of the slope.

4.3 Sealant: A minimum ³/₈-inch diameter (9.6 mm) bead of non-skinning butyl sealant described in Section 3.5 of this report shall be factory or field applied into the panel side joints. Sealant shall be applied to side joints of adjacent panels prior to the panels' being engaged. Complete installation of the panel assembly shall be in accordance with the sealant manufacturer's installation instructions.

Provided the sealants and application of the sealants are satisfactory to the building official, panels exposed to weather do not require a roof covering in accordance with Section 1503 of the 2018 and 2015 IBC when panels are installed with sealant as specified in this section (Section 4.2) and are flashed. Flashing shall be placed in accordance with Section 1405 of the 2018 and 2015 IBC on both ends of panels when installation is at the building's base, and at eaves, openings, and horizontal and vertical corners. The flashing and trim are attached to the panels using a minimum ¹/₄-inch diameter (6.4 mm) bead of non-skinning butyl sealant, No. 14 TEK 1 HWH (Stitch tek) and No. 10 by ³/₄-inch (19 mm) Phillips pan-head, self-tapping, self-drilling screws, or pop rivets in accordance with the manufacturer's installation guide.

4.4 Roof Panels

4.4.1: Kingspan KingSeam roof panels are installed at a minimum slope of one-quarter unit vertical in 12 units horizontal (2-percent slope) complying with the requirements

for standing seam roof systems in Section 1507.4.2 of the 2018 and 20015 IBC and are attached to structural members at each panel side joint, using the KingSeam series clips. Butyl sealant shall be placed at each underlying panel side lap before the adjacent panel covers the joint.

The KingSeam insulated standing seam roof panels with minimum No.26 gauge [minimum 0.0187 inch (0.475 mm) base metal thickness] exterior facers and No. 26 gauge [minimum 0.0170 inch (0.43 mm) base metal thickness] interior facers that are installed perpendicular to each steel support at each panel side rib with KingSeam series clip appropriate for use with the panel thickness using $\frac{1}{4}$ -14, $\frac{1}{4}$ -20 or $\frac{1}{4}$ -28 ITW Buildex TEKS[®] Self-Drilling Fasteners with TEK 3 or TEK 5 drill tips secured to each structural support at each panel side rib, as shown in Figure 2 of this report. EC-01 clip is attached after installation and seaming of panels over the KingSeam series clip as described in Table 2A and Section 3.4 of this report.

The KingRib insulated roof panels with No. 26 gauge [minimum 0.0170 inch (0.43 mm base metal thickness)] exterior facers and No. 26 gauge [minimum 0.0170 inch (0.43 mm base metal thickness)] interior facers are installed perpendicular to each steel support at each panel high rib with one $\frac{1}{4}$ -14, $\frac{1}{4}$ -20 or $\frac{1}{4}$ -28 ITW Buildex TEKS[®] Self-Drilling Fasteners with TEK 3 or TEK 5 drill tips through an SW-01 saddle washer, as shown in Figure 3 of this report.

4.4.2 Additional Considerations: Roof panels without coverings are Class A roof covering assemblies. Class A roof coverings complying with Section 1505.2 of the 2018 and 2015 IBC are permitted to be installed over the panels. The fasteners shall be of sufficient length to penetrate through the panel skins. Underlayment and flashing shall be installed in accordance with the 2018 and 2015 IBC, or a current evaluation report.

4.5 Allowable Load Capacity: The allowable loads on roof panels are based on transverse load testing in accordance with ASTM E72 as set forth in Tables 2A and 2B of this report.

4.6 Combustible Construction: Panels having thicknesses of 2.5 through 6 inches (51 to 152 mm) are permitted to be used in Type V combustible construction.

5.0 LIMITATIONS

All Kingspan Foam Core Panels described in this report comply with the code indicated in Section 1.0 of this report, subject to the following limitations:

5.1 The Kingspan Panels shall be installed in accordance with this report and the manufacturer's published installation instructions, a copy of which shall be available at the job site. Where conflicts occur, the more restrictive shall govern.

5.2 Construction plans, details, and calculations for roof framing and panel attachments shall be approved by the building official before panel installation. Calculations and

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details shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.3 All Kingspan panels described in this report with steel facings have been justified for installation without the thermal barrier required by Section 2603.4 of the *2018* and *2015* IBC.

5.4 The Kingspan Roof panels are permitted to be part of a Class A roof covering assembly as described in Section 1505.2 of the *2018* and *2015* IBC and Section 4.4.2 of this report.

5.5 The Kingspan Panels are produced in Vacaville, California, under a quality control program with inspections by Columbia Research & Testing Corporation (AA-527).

6.0 SUBSTANTIATING DATA

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Sandwich Panels (AC04), approved June 2019.

6.2 Data in accordance with ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), Approved June 2015, editorially revised October 2017.

6.3 Reports of tests in conformance with ASTM E72.

7.0 IDENTIFICATION

Each panel is identified by a label indicating the name of the manufacturer (Kingspan); Each panel bundle is identified by a packing list indicating the product name and type; facing gauge; the name of the inspection agency (Columbia Research & Testing); and the Evaluation Report number (ER-782). Clips and caps, used as accessories, shall be identified with the name of the manufacturer (Kingspan); the product name and type; and the evaluation report number.

Sealants shall be identified with the name of the sealant manufacturer; the product name and type; and the sealant expiration date. A die-stamp label may also substitute for the label. Either IAPMO UES Mark of Conformity may also be used as shown below:



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Panel Type	Panel Width (inches)	Available Panel Thickness (inches)	Exterior Profile	Interior Profile	Substrate (Steel Grade 33)	Steel Thickness No. 26, 24 and 22 (inch)	Coatings
Kingseam	40	3.25-6	Standing Seam	Mesa	G90/AZ50	0.0187, 0.023, 0.029	PVDF, SMP
Kingrib 3	40	2.5 -6	Three High Rib	Mesa	G90/AZ50	0.0187, 0.023, 0.029	PVDF, SMP
Kingrib 5	40	2.5 -6	Five High Rib	Mesa	G90/AZ50	0.0187, 0.023, 0.029	PVDF, SMP

TABLE 1: Panel Specification

For SI: 1 inch =25.4 mm

TABLE 2A: Allowable Load for KingSeam Roof Panels (psf)

	Panel Weight (psf)	Design Criteria	Panel Span (ft)									
Panel Inickness (In)			2'-6''	3'-0''	3'-6''	4'-0''	4'-6''	5'-0"	5'-6"	6'-0''	7'-0''	
3.25"	2.48	Panel/Deflection Limit	149	123	104	90	79	70	62	56	46	
4''	2.65	Panel/Deflection Limit	185	153	130	112	98	87	78	71	59	
5''	2.86	Panel/Deflection Limit	233	192	164	142	125	111	100	90	75	
6''	3.12	Panel/Deflection Limit	262	233	198	172	151	135	121	110	92	

5.1.1.5.1	Connection Strength	Panel Span (ft)										
Fastening Pattern		2'-6''	3'-0''	3'-6''	4'-0''	4'-6''	5'-0"	5'-6"	6'-0''	7'-0''		
	No. 16 ga purlins	59	49	42	37	33	30	27	25	21		
(2) Fasteners per clip	No. 12 ga purlins	104	87	74	65	58	52	47	43	37		
	3/16" thick purlins	160	134	116	101	90	81	74	67	58		
	No. 16 ga purlins	89	74	63	55	49	44	40	37	32		
(3) Fasteners per clip	No. 12 ga purlins	160	134	116	101	90	81	74	67	58		

For SI: inch =25.4 mm, 1 foot=304.8mm, 1 psf=47.9Pa.

1. Spans shown are based on transverse load testing per ASTM E72.

2. Allowable deflection is L/240.

3. Allowable loads are based on a factor of safety of three.

4. Facings are No. 26/26 gauge.

5. Fastening calculated with 1/4 -14 Tek 3 for No.16 and 12-gauge purlins and 1/4-28 Tek 5 for 3/16 inch purlins

6. Fastener types used for design are ITW Buildex TEKS® Self-Drilling fasteners. Additional details are in evaluation report ICC-ES ESR-1976.

7. A Kingspan representative shall be consulted for project specific requirements.

8. Thermal effects due to temperature differentials have not been considered.

TABLE 2B: Allowable Load for KingRib Roof Panels (psf)

	Panel Weight	Design Criteria	Panel Span (ft)										
Panel Thickness (in)	(psf)		2'-6''	3'-0''	3'-6''	4'-0''	4'-6''	5'-0''	5'-6''	6'-0''	7'-0''		
1.5"	2.15	Panel/Deflection Limit	85	70	59	51	45	40	36	32	25		
2.5"	2.44	Panel/Deflection Limit	139	114	96	83	73	65	59	54	45		
4''	2.75	Panel/Deflection Limit	191	158	134	116	102	90	81	73	61		
5"	2.96	Panel/Deflection Limit	239	198	168	146	128	114	102	93	77		
6''	3.22	Panel/Deflection Limit	286	238	202	175	155	138	124	112	94		

	Connection Strength	Panel Span (ft)										
Fastening Pattern		2'-6"	3'-0''	3'-6''	4'-0"	4'-6''	5'-0''	5'-6''	6'-0''	7'-0'		
	No. 16 ga purlins	59	49	42	37	33	30	27	25	21		
(1) Fastener, 20" O.C.	No. 12 ga purlins	104	86	74	65	58	52	47	43	37		
	3/16" thick purlins	185	154	132	115	103	92	84	77	66		
	No. 16 ga purlins	118	99	84	74	66	59	54	49	42		
(1) Fastener, 10" O.C.	No. 12 ga purlins	207	173	148	130	115	104	94	86	74		

For SI: inch = 25.4 mm, 1 toot = 304.8mm, 1pst = 47.9Pa.

1. Spans shown are based on transverse load testing per ASTM E72.

2. Allowable deflection is L/240.

3. Allowable loads are based on a factor of safety of three.

4. Facings are No. 26/26 gauge.

5. Fastening calculated with 1/4 -14 Tek 3 for No.16 and 12-gauge purlins and 1/4-28 Tek 5 for 3/16 inch purlins

6. Fastener types used for design are ITW Buildex TEKS® Self-Drilling fasteners. Additional details are in evaluation report ICC-ES ESR-1976.

7. A Kingspan representative shall be consulted for project specific requirements.

8. Thermal effects due to temperature differentials has not been considered.

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FIGURE 1 – PANEL TYPES AND PROFILES



FIGURE 2 – KINGSEAM ROOF PANEL JOINT WITH FASTENERS

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SW-01 SADDLE WASHER (14 GA. GALVANIZED)



FIGURE 4B – PANEL CLIP DETAILS

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CITY OF LOS ANGELES SUPPLEMENT

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KINGSPAN FOAM CORE PANELS (KINGSEAM AND KINGRIB ROOFS)

CSI Division:

07 00 00 THERMAL AND MOISTURE PROTECTION

CSI Section: 07 40 00 Roofing Panels

1.0 RECOGNITION

Kingspan Foam Core Panels described in ER-782 and this supplement have been evaluated for use as roof panels for use in Type V construction. The Kingspan Foam Core Panels were evaluated for compliance with the following codes and regulations:

- 2020 City of Los Angeles Building Code (LABC)
- 2020 City of Los Angeles Residential Code (LARC)

2.0 LIMITATIONS

Use of Kingspan Foam Core Panels recognized in this report supplement are subject to the following limitations:

2.1 Panels shall be installed in accordance with ER-782, this report supplement, the manufacturer's published installation instructions, a copy of which shall be available at the job site. and the LABC or LARC, as applicable. Where conflicts occur, the more restrictive shall govern.

2.2 Construction plans, details, and calculations for roof framing and panel attachments shall be submitted to the Structural Plan Check Division for approval. Calculations must be completed by a licensed civil or structural engineer registered in the State of California.

2.3 The Kingspan roof panels are limited to use where roof live loads do not exceed 20 psf.

2.4 Wind design loads determined from nominal design wind speeds (V_{asd}) in accordance with Section 1609.3.1 of the Los Angeles Building Code shall not exceed the maximum allowable design pressures given in Tables 2A and 2B of ER-782.

2.5. This supplement expires concurrently with ER-782.

For additional information about this evaluation report please visit www.uniform-es.org or email at info@uniform-es.org