

ICC-ES Evaluation Report

ESR-1143*

Reissued April 1, 2011

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**DIVISION: 07 00 00—THERMAL AND MOISTURE
PROTECTION****Section: 07 40 00—Roofing and Siding Panels****REPORT HOLDER:****KINGSPAN INSULATED PANELS, INC.**
726 SUMMERHILL DRIVE
DELAND, FLORIDA 32724
www.kingspanpanels.us
olovera@kingspanpanels.com**EVALUATION SUBJECT:****R-SPAN FOAM CORE PANELS (AP 200/300/900,
and CWP)****1.0 EVALUATION SCOPE****Compliance with the following code:**2006 *International Building Code*® (IBC)**Properties evaluated:**

- Structural
- Fire resistance

2.0 USES

R-SPAN Foam Core Panels are used as interior or exterior nonload-bearing wall, ceiling or roof panels. The AP 200/300 and CWP panels are interior or exterior nonbearing wall or ceiling (AP 300 only) panels used at locations where combustible, nonfire-resistance-rated building construction is permitted by the IBC. For use as exterior wall panels where noncombustible construction is required, the panels shall conform to Section 4.5 of this report. The AP 900 panels are for use as roof panels in combustible nonfire-resistance-rated construction.

3.0 DESCRIPTION**3.1 General:**

The R-SPAN foam core panels are factory-assembled sandwich panels with metal facings and a foamed-in-place foam plastic core. The AP 200 and AP 300 panels are available in thicknesses of 2 to 6 inches (51 to 152 mm) and are 42 inches (1067 mm) wide and up to 50 feet (15 240 mm) long. CWP panels are available in 2- to 3-inch (51 to 76 mm) thicknesses in 24-, 30- and 36-inch (610, 762 or 914 mm) widths, and in lengths up to 36 feet (11 m). The AP 900 panels are available in thicknesses of 1.5 to 6 inches (39 to 152 mm) and are 39⁵/₈ inches

(1000 mm) wide and up to 50 feet (15.2 m) long. The “V” and “H” designations on the CWP panel indicate the vertical and horizontal orientation of the longitudinal edges of the installed panel. Panels are formed with either a single or double tongue-in-groove interlocking longitudinal edge, and straight ends. Panel exterior and interior liners are available in the profiles noted in Table 1 and shown in Figure 1.

3.2 Panel Core:

The core is a polyurethane foam plastic designated BASF Elastopor 14000 series, which is covered under the quality control program. This foam plastic can be continuously foamed in place into the core of the panel or prepared for use in lamination of CWP panels. The cores have a nominal density of 2.5 pcf (40 kg/m³). The foam plastic has a maximum flame-spread index of 25 and a maximum smoke-developed index of 450 when tested in accordance with ASTM E 84.

3.3 Panel Facings:

Panel facings, unless noted, are fabricated from No. 26, No. 24 or No. 22 gage [0.0187, 0.023 or 0.029 inch (0.475, 0.599 or 0.737 mm), respectively, base-metal thickness] steel conforming to ASTM A 653 SS Grade 33 with a Class G90 galvanized coating or ASTM A 792 SS Grade 33 with a Class AZ-50 galvalume coating. The panel facings are also fabricated from 304 series stainless steel conforming to ASTM A 240 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 gage [0.0175, 0.0225 or 0.0295 inch (0.44, 0.57 or 0.75 mm), respectively]. Panel facings for CWP panels may also be fabricated from aluminum with a thickness of 0.040 inch (1 mm) exterior, and 0.025 inch through 0.032 inch (0.64 mm through 0.82 mm) interior, Grade 3003 H14 or better. The panel facings are available with various finishes, such as Kynar™, ceramic polyester, and Plastisol XL applied over an epoxy primer. The finishes have a Class A flame-spread classification and a smoke density not exceeding 450 in accordance with IBC Section 803.1. The panel facings are available in four configurations: Minor Rib, Flat, Striated, and Fluted. The minor rib is ¹/₈ inch by 1 inch (3.2 mm by 25.4 mm) and is spaced 3¹/₂ inches (89 mm) on center.

3.4 Fasteners:

The fasteners used to attach the panels to steel supports with clips are ¹/₄-4 TEK 3 HWH corrosion-resistant screws, 1 to 6 inches (25.4 to 152 mm) long; or 12-24 TEK 5 HWH 1- to 3-inch-long (25.4 to 76 mm), corrosion-resistant,

***Revised May 2011**

self-tapping, self-drilling screws. The PC series clips are fabricated from No. 16 gage [0.0157 inch (0.4 mm)] galvanized steel, and have two $\frac{5}{16}$ -inch-diameter (7.9 mm) predrilled holes. The AP series clips are fabricated from No. 20 gage [0.036 inch (0.91)], 304 2B stainless steel with three $\frac{5}{16}$ -inch-diameter (7.9 mm) predrilled holes, or No. 16 gage [0.0157 inch (0.4 mm)] galvanized steel with one $\frac{5}{16}$ -inch-diameter (7.9 mm) hole. CWP panels are attached with PC-12, 12.5, or PC-13 clips, depending on the panel thickness. The AP-7 clips are used with AP 900 panels. Figure 2 illustrates clip configurations and dimensions. The $\frac{1}{4}$ -14 TEK 3 HWH self-tapping, self-drilling-screw through-fastener is used without the clips, and must be of sufficient length to penetrate through the steel supports. The Fab-Lok[®] FAS/FAC 10-4, 10-8 and 10-12 fasteners are expansion fasteners used to attach the panels to steel supports. Steel support thicknesses must range between No. 16 gage [0.0598 inch (1.5 mm)] and $\frac{5}{16}$ inch (8 mm). Figure 2 illustrates panel clips.

3.5 Sealant:

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

4.0 INSTALLATION

4.1 General:

The individual panel spans are in a single-span condition between supports. On wall installations, the panels are placed with the longest longitudinal joint oriented in the vertical or horizontal position. The panels are erected from either left to right or from bottom to top, leading with the male edge. The panels are fastened to structural support members by means of clips and mechanical fasteners, as described in Section 3.4 of this report. The structural support members must have a minimum width of $2\frac{1}{2}$ inches (63.5 mm). The PC series clips and fasteners are used with single or double tongue-in-groove panels. Joints are installed as shown in the Figure 3 connection details. As an alternative, panels can be installed using the through-fasteners to attach panels to structural members with $\frac{1}{4}$ -14 TEK 3 HWH self-tapping, self-drilling screws that penetrate through the panel's metallic facings into the structural member, as shown in Figure 3.

A $\frac{1}{4}$ -inch (6.4 mm) bead of butyl sealant is factory- or field-applied into one or both of the grooves of the panel side joints. Sealant is applied to side joints of adjacent panels prior to the panels' being engaged. Panels are firmly interlocked to make continuous contact with the sealant. Erection proceeds along the wall elevation, with installation of successive panels being in accordance with the manufacturer's installation instructions.

Provided the sealants and application of the sealants are satisfactory to the code official, panels exposed to weather do not require a weather-resistive barrier in accordance with Section 1405 of the IBC or roof covering in accordance with Section 1503 of the IBC when panels are installed with sealant as specified in this section (Section 4.1) and are flashed. Flashing must be placed in accordance with Section 1405.3 of the 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 $\frac{1}{4}$ -inch (6.4 mm) 14 TEK 1 HWH (Stitch tek) or No. 10 by $\frac{3}{4}$ -inch (19 mm) Phillips pan-head, self-tapping, self-drilling screws, or pop rivets in accordance with the manufacturer's installation guide.

Figure 4 shows typical installation details.

4.2 Roof Panels:

4.2.1 AP 900 Panels: R-SPAN AP 900 roof panels are installed at a minimum slope complying with the requirements for standing seam roof systems in Section 1507.4.2 of the IBC, and are attached to structural members at each panel side joint, using the AP series clips. Butyl sealant is placed at each underlying panel side lap before the adjacent panel covers the joint. Each AP series clip is secured to the structural support member using No. 14, TEK 3, self-tapping fasteners, or through-fasteners. See Figure 4 for installation details.

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

4.3 Allowable Load Capacity:

The allowable positive and negative panel out-of-plane (transverse) loads for panels installed over a single span are based on panel stiffness, thickness, strength and fastener capacity as set forth in Tables 2 through 4. The fastener capacity in the applicable substrate is outside the scope of this report. The allowable spans for the AP 300 panels used as ceiling panels are noted in Table 5.

4.4 Combustible Construction:

Panels having thicknesses of $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, 4, 5 or 6 inches (51, 63.5, 76, 102, 127 or 152 mm) are permitted to be used in combustible construction.

4.5 Noncombustible Exterior Wall Construction:

AP 200/300 and CWP series wall panels using BASF Elastopor 14000 series insulation and having a 3-inch (80 mm) maximum thickness are permitted to be used in exterior, nonload-bearing, noncombustible, nonfire-resistance-rated, multistory wall construction. Panels with aluminum facings must be installed with the panel length oriented horizontally over steel framing, and $\frac{5}{8}$ -inch thick (15.9 mm) Type X gypsum wallboard installed on the interior side of the steel wall framing. Wall stud cavities at floor-to-wall joints must be blocked with 4 lb/ft³ density (64 kg/m³) mineral wool batt insulation. Wall openings must be framed with steel having a minimum 0.0179-inch (0.45 mm) base-metal thickness.

5.0 CONDITIONS OF USE

The R-SPAN Foam Core Panels (AP 200/300/900 and CWP) described in this report comply with the code indicated in Section 1.0 of this report, subject to the following conditions:

- 5.1** Panels must be installed in accordance with this report and the manufacturer's published installation instructions, a copy of which must be available at the jobsite.
- 5.2** Panels installed on walls must be limited to nonload-bearing wall applications.
- 5.3** Plans and details on wall and roof framing and panel attachments must be approved by the building official before panel installation.
- 5.4** The R-SPAN AP 200, AP 300, CWP and AP 900 panels with steel facings have been justified for installation without the thermal barrier required by IBC Section 2603.4. The panels with aluminum facings must be installed with a thermal barrier complying with the applicable code, unless the panels with panel

facings of minimum 0.032-inch-thick aluminum are installed as permitted in accordance with the provisions in IBC Section 2603.4.1.2, 2603.4.1.3 or 2603.4.1.4.

- 5.5 Construction plans and calculations for actual loading conditions must be submitted to the code official for approval.
- 5.6 Roof panels are permitted to be part of a Class A roof covering assembly as described in Section 1505.2 of the IBC and Section 4.2.2 of this report.
- 5.7 Panels are fabricated by Kingspan Insulated Panels at its manufacturing facility in Modesto, California, under a quality control program with inspections by Columbia Research & Testing Corporation (AA-527)

6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with the ICC-ES Acceptance Criteria for Sandwich Panels (AC04), dated October 2009, the ICC-ES Acceptance Criteria for Sandwich Panel Adhesives (AC05), dated June 2005, and the

ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated February 2007.

- 6.2 Reports of tests in conformance with (ASTM E 84-84), 26-1 NFPA 259, 26-3, 26-6 (ASTM D 1929-68), 26-9 and 15-2.

7.0 IDENTIFICATION

Each panel is identified by a label indicating the name of the manufacturer (Kingspan Insulated Panels, Inc.); product name and type; foam plastic insulation type; facing gage; name of the inspection agency (Columbia Research & Testing); flame-spread and smoke-developed ratings; and the evaluation report number (ESR-1143).

Clips and caps, used as accessories, must be identified with the name of the manufacturer (Kingspan Insulated Panels, Inc.); the product name and type; and the evaluation report number (ESR-1143).

Sealants must be identified with the name of the sealant manufacturer; the product name and type; and the sealant expiration date.

TABLE 1—R-SPAN PANEL PROFILES

PANEL DESIGNATION	PROFILE ¹	
	Exterior	Interior
AP 300	Minor Rib, Striated, Flat	Minor Rib
AP 200	Inverted Rib (Fluted)	Minor Rib
CWP-V and CWP-H2	Flat, Striated	Flat, Minor Rib
AP 900 (Roof)	Rib ³	Shadowline Rib, Minor Rib

¹See Figure 1 for profiles.

²The “V” and “H” designations indicate the vertical and horizontal orientations of the longitudinal edge of installed panel.

³Panels feature standing ribs spaced at 13³/₈ inches (340 mm) on center.

TABLE 2—ALLOWABLE POSITIVE AND NEGATIVE TRANSVERSE LOADS FOR THE R-SPAN AP 200/300 WALL PANELS (^L/₁₈₀) (psf)^{1,2,3,4,5}

PANEL THICKNESS (inches)	FASCIA/LINER STEEL THICKNESS 26/26 GAGE							
	Span (feet)							
	5	8	10	12	14	16	18	20
2	57	27	17	12	8	NP	NP	NP
2 ¹ / ₂	72	36	24	17	12	8	NP	NP
3	86	44	30	22	16	11	7	NP
4	109	59	40	28	20	16	11	8
5	126	70	46	32	23	18	14	11
6	137	75	49	34	25	19	15	12

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

¹Wind pressure values are based on panels having No. 26 gage steel facing liners on both faces.

²Wind pressure is based on a single-span condition and ^L/₁₈₀ deflection limitation.

³The allowable loads are based on the lesser of deflection, and panel strength, with consideration of the effects of fastener location and fastener-to-panel connection on the allowable negative loads.

⁴See Figures 1 and 3 for panel profiles and fastening details.

⁵NP = Not permitted.

TABLE 3—ALLOWABLE POSITIVE AND NEGATIVE TRANSVERSE LOADS FOR THE R-SPAN CWP WALL PANEL (^L/₁₈₀) (psf)^{1,2,3,4}

PANEL THICKNESS (inches)	FASCIA/LINER STEEL THICKNESS							
	22/22 Gage				22/26 Gage			
	Span (feet)							
	5	7	9	11	5	7	9	11
2	63	40	27	18	54	28	17	11
2 ¹ / ₂	78	51	32	22	64	33	20	13
3	92	61	43	32	90	58	40	29

TABLE 3A—ALLOWABLE POSITIVE AND NEGATIVE TRANSVERSE LOADS FOR THE R-SPAN CWP ALUMINUM WALL PANEL ($L/180$) (psf)^{1,2,3,4}

PANEL THICKNESS (inches)	FASCIA/LINER ALUMINUM THICKNESS							
	0.040/0.032				0.040/0.025			
	Span (feet)				Span (feet)			
	5	7	9	11	5	7	9	11
2	53	30	18	12	47	28	16	10
2 ¹ / ₂	70	41	26	17	NP	NP	NP	NP
3	81	49	32	22	NP	NP	NP	NP

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

¹Wind pressure values are based on panels having interior and exterior facings as indicated above, and 36-inch-wide panels.

²Wind pressure is based on a single-span condition and $L/180$ deflection limitation.

³The allowable loads are based on the lesser of deflection and panel strength, with consideration of the effects of fastener location and fastener-to-panel connection on the allowable negative loads.

⁴See Figures 1 and 3 for panel profiles and fastening details.

TABLE 4—ALLOWABLE POSITIVE AND NEGATIVE TRANSVERSE LOADS FOR THE AP 900 ROOF PANELS ($L/240$) (psf)^{1,2,3,4,5}

PANEL THICKNESS (inches)	FASCIA/LINER STEEL THICKNESS							
	Span (feet)							
	5	8	10	12	14	16	18	20
1 ¹ / ₂	15	NP	NP	NP	NP	NP	NP	NP
2	52	13	NP	NP	NP	NP	NP	NP
2 ¹ / ₂	54	27	18	12	NP	NP	NP	NP
3	65	33	23	16	12	NP	NP	NP
4	82	44	32	23	17	13	10	NP
5	95	53	39	29	23	18	14	11
6	102	59	44	34	25	19	15	12

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

¹Wind pressure values are based on panels having No. 26 gage steel facer liners on both faces.

²Wind pressure is based on a single-span condition and $L/240$ deflection limitation.

³The allowable loads are based on the lesser of deflection, and panel strength, with consideration of the effects of fastener-location and fastener-to-panel connection on the allowable negative loads.

⁴See Figures 1, 3, and 5 for panel fastening details.

⁵NP = Not permitted.

TABLE 5—ALLOWABLE SPAN FOR THE R-SPAN AP 300 CEILING PANEL (feet)^{1,2}

LIVE LOAD (psf)	PANEL THICKNESS (inches)					
	2	2 ¹ / ₂	3	4	5	6
10	9	11	12	15	17	19

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

¹Single spans are based on panels having No. 26 gage steel facer liners on both sides.

²Panel deflection is limited to $L/240$.

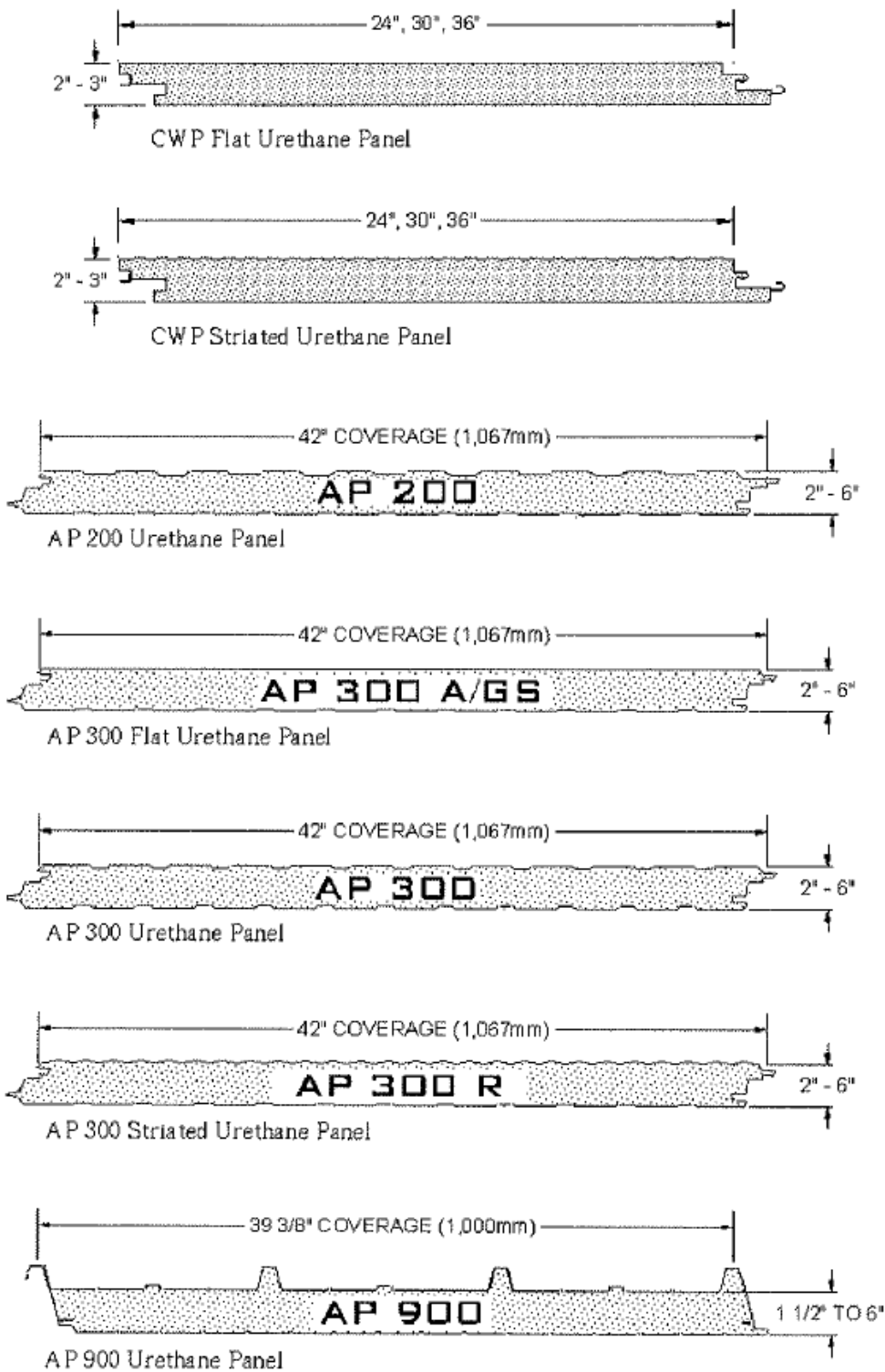
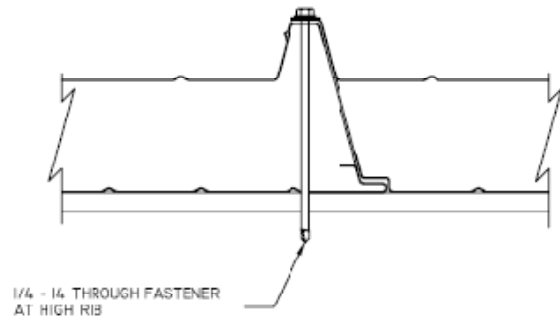
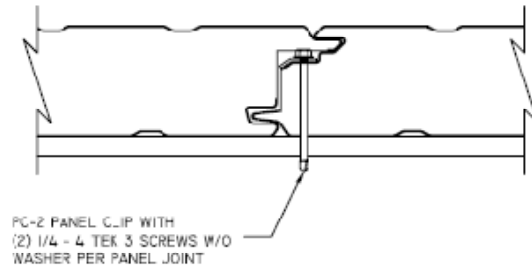


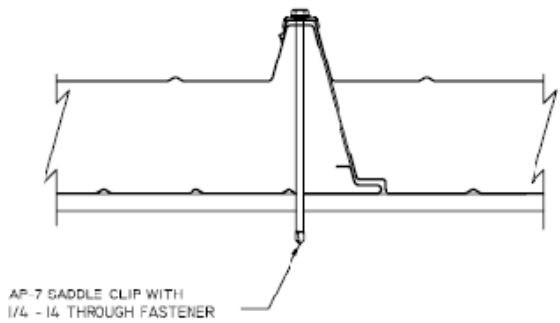
FIGURE 1—PANEL PROFILE



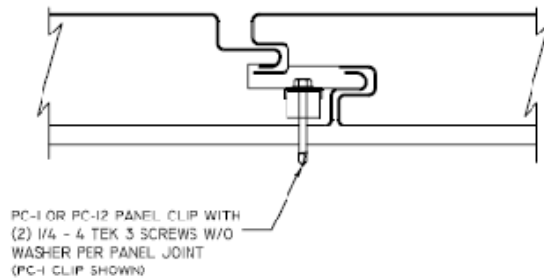
900 SERIES ROOF PANEL WITH THROUGH FASTENER



200/300 SERIES WALL PANEL WITH PC-2 CLIP



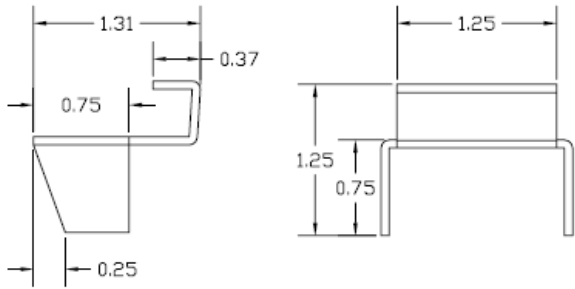
900 SERIES ROOF PANEL WITH AP-7 PANEL CLIP



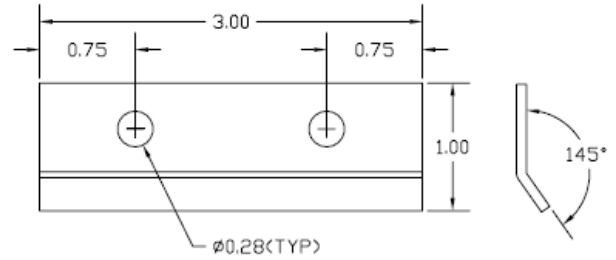
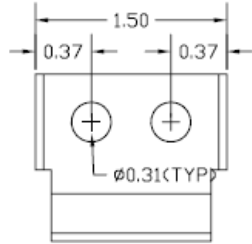
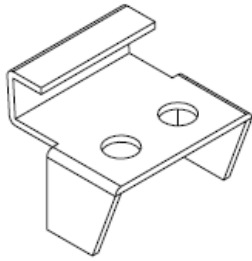
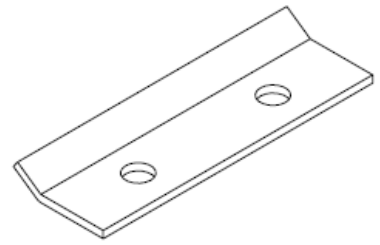
CWP PANEL WITH PC-1 OR PC-12 PANEL CLIP

FIGURE 2—PANEL CLIP DETAILS

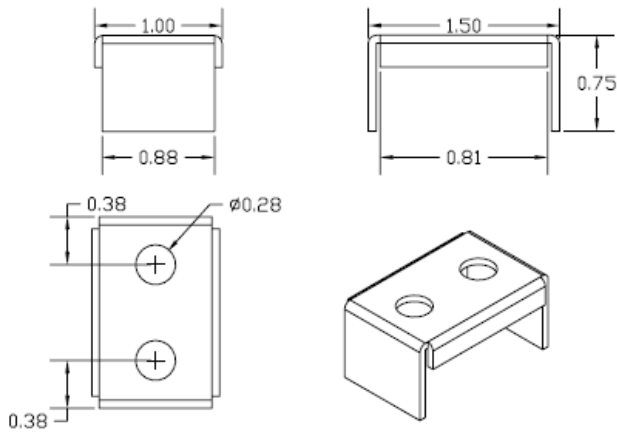
PC-12 (16 GA. GALV.)



PC-2 (14 GA. GALV.)



PC-1 (16 GA. GALV.)



AP-7 (16 GA. GALV.)

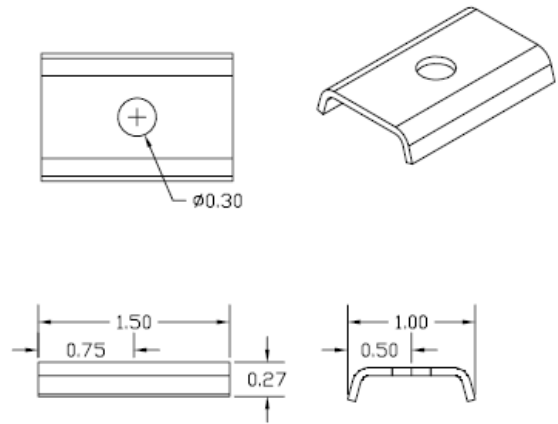


FIGURE 2A—PANEL CLIP DETAILS

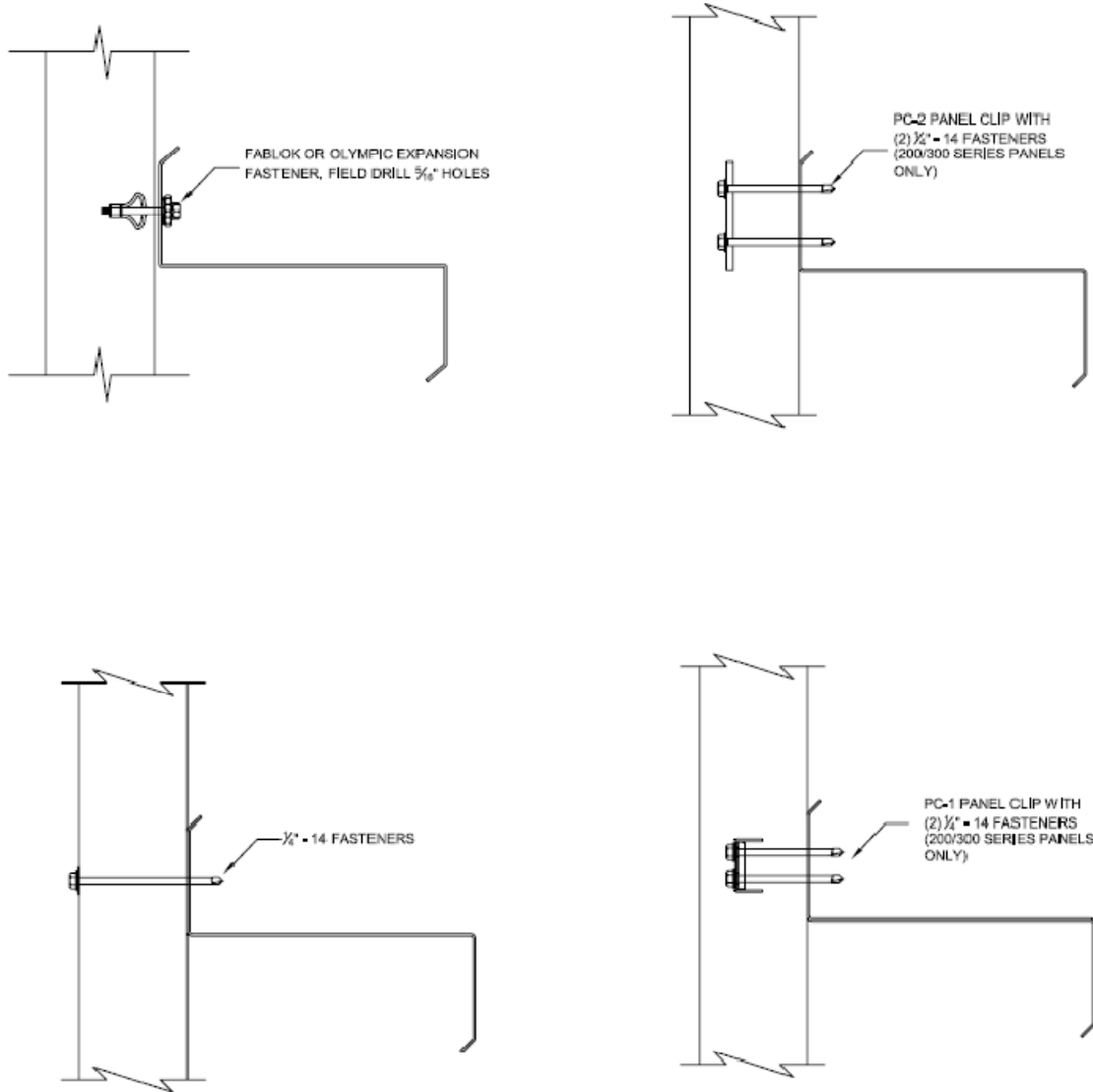
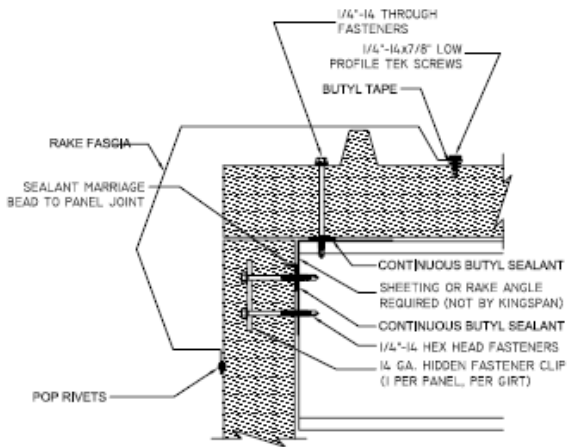


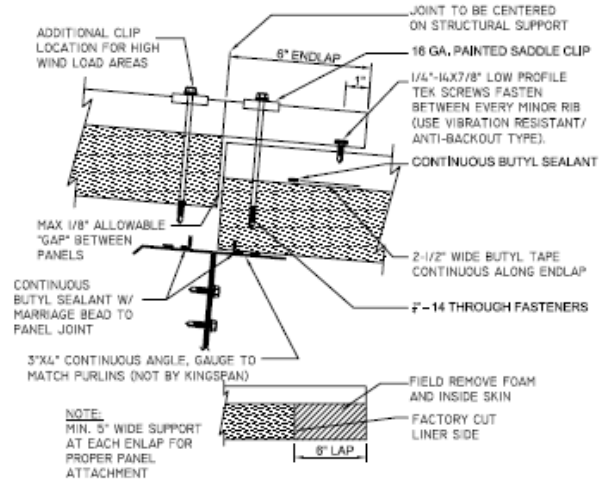
FIGURE 3—PANEL FASTENING DETAILS
FIGURE 4—TYPICAL INSTALLATION DETAILS (WALL AND ROOF)

RAKE-FASCIA



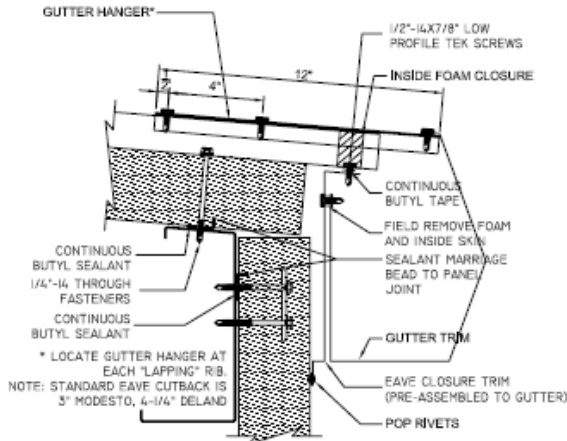
NOTE:
 1. FIELD REMOVAL OF THE FIRST HIGH RIB IS REQUIRED FOR THE INSTALLATION PURPOSES AT THE FIRST PANEL RAKE JOINT.
 2. TRIM FASTENERS ARE 12" O.C. UNLESS OTHERWISE NOTED.

ROOF PANEL ENDLAP



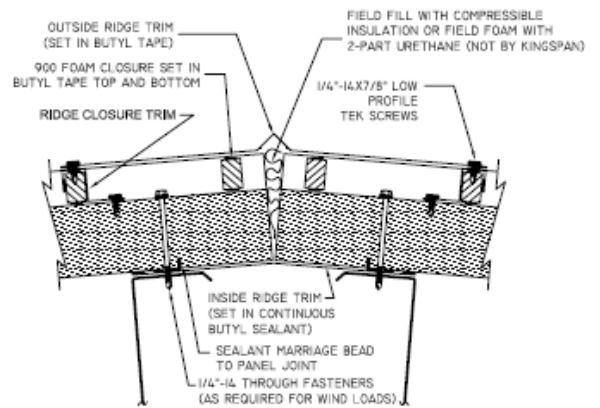
NOTE:
 1. COMPLETELY FILL VOIDS AT STANDING RIB OVERLAP WITH 1 PART URETHANE SEALANT (NOT BY KINGSPAN).

STANDARD EAVE WITH GUTTER



NOTE:
 1. TRIM FASTENERS ARE 12" O.C. UNLESS OTHERWISE NOTED.

RIDGE



NOTE:
 1. LAP OR-1 TRIM MINIMUM 3"
 2. STITCH FASTEN IR-1 TRIM TO ROOF LINER AS NECESSARY TO ELIMINATE TRIM SAG.
 3. TRIM FASTENERS ARE 12" O.C. UNLESS OTHERWISE NOTED.

FIGURE 4—TYPICAL INSTALLATION DETAILS (WALL AND ROOF)