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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.
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www.kingspanpanels.com

REPORT SUBJECT:
KS and OPTIMO Foam Core Insulated Metal Panels

1.0 SCOPE OF EVALUATION

This Research Report addresses compliance with the following Codes:

- 2015 and 2012 *International Building Code (IBC)*

The KS and Optimo Series Foam Core Panels have been evaluated for the following properties:

- Structural
- Fire Resistance
- Water Penetration

2.0 USES

KS and OPTIMO Foam Core Insulated Metal Panels are intended for use as exterior panels on non-load bearing walls. The panels are used in locations where combustible, non-fire-resistance-rated building construction is permitted by the IBC and on buildings of Type I, II, III, or IV construction as further described in Section 5.5.

3.0 DESCRIPTION

3.1 General:

KS and OPTIMO Foam Core Insulated Metal Panels are sandwich panels with metal facings and foam plastic insulation cores. KS panels are 42 inches wide and up to 53 feet in length, and are available in thicknesses of 2, 2.5, 3, 4, 5, and 6 inches. OPTIMO panels are 24, 30, or 36 inches

wide and up to 30 feet in length, and are available in thicknesses of 2, 2.5, 3, and 4 inches. Panels are formed with straight ends and double tongue and groove interlocking edges along the length of the panels. See Figures 1 and 2.

3.2 Panel Core:

The KS and OPTIMO polyisocyanurate core and Quadcore is continuously poured-in-place. The density of the panel core is 2.3 pcf for the polyisocyanurate core and 2.2 pcf for Quadcore.

3.3 Panel Facings:

3.3.1 Steel panel facings for the KS and OPTIMO panels conform to ASTM A653 SS Grade 33 with a G90 galvanized coating. The KS panel facings are minimum 26 gauge steel on the interior face and minimum 26 gauge steel on the exterior face. The OPTIMO panel facings are minimum 24 gauge steel on the interior face and minimum 22 gauge steel on the exterior face,

3.3.2 The panel facings are finished with a fluoropolymer (PVDF) multi-coat system using Kynar™ 500 color coat, applied over an epoxy primer.

3.3.3 Panel facings are available in flat, micro-rib profiles, mini-micro-rib, mini-wave, and shadow line.

4.0 PERFORMANCE CHARACTERISTICS

4.1 Allowable Load Capacity:

Allowable positive and negative transverse wind loads based on panel stiffness, strength, and fastener capacity are set forth in Tables 2 through 13.

4.2 The panels, when installed in accordance with this report, provide a weather-resistive exterior wall envelope when tested per ASTM E331 in accordance with the requirements of IBC Section 1403.2.



4.3 The foam plastic core has a flame spread index and a smoke developed index not exceeding 25 and 450, respectively, when tested in accordance with ASTM E84.

4.4 All panel finishes have a Class A: flame spread rating not exceeding 25 and a smoke developed index not exceeding 450, in accordance with IBC Section 803.1.

4.5 Wall assemblies constructed in accordance with Intertek Design Numbers KIP/IMWP 30-03 and KIP/IMWP 30-04 (see Section 5.5) with steel-faced KS and OPTIMO panels respectively, comply with IBC Section 2603.5 for walls of any height in Type I, II, III, or IV construction permitted to be of non-fire-resistance-rated construction.

5.0 INSTALLATION

5.1 General Installation:

Panels may be installed in either a vertical or horizontal orientation. The panels are fastened to steel framing support members with clips and fasteners as described in Section 5.2. Structural support members shall provide a minimum panel bearing width of 1-5/8 inches.

5.2 Fasteners:

Panels are attached to the steel supports with 14 gage stainless steel panel clips (See Figure 3) fastened with minimum two #14-14 HWH SDS zinc coated self-tapping screws.

5.3 Sealant:

KS and OPTIMO dual tongue and groove panel joints are sealed with a 1/4 inch bead of non-skinning butyl sealant. The sealant is applied at the side joints between adjacent panels before panel engagement. The panels are interlocked to make continuous seal contact. Installation proceeds along the wall elevation with successive panels being in accordance with the manufacturer's installation instructions.

5.4 Flashing:

Flashing must be installed in accordance with Section 1405.4 of the IBC including, but not limited to, panel ends, eaves, openings, and corners. The flashing and trim are attached

to the panels with No. 10, 12, or 14 × 7/8 inch PPH, self-tapping, self-drilling screws. Pop rivets may also be used in accordance with the manufacturer's installation instructions.

5.5 Use on Exterior Walls of Type I, II, III, or IV Construction:

The panels may be used on non-fire-resistance-rated exterior walls of buildings of Type I, II, III, or IV construction of any height, when the construction conforms with Intertek Design Number KIP/IMWP 30-03 (KS) or KIP/IMWP 30-04 (OPTIMO).

6.0 CONDITIONS OF USE

KS and OPTIMO Foam Core Insulated Metal Panels described in this Research Report comply with the Codes listed in Section 1.0 of this report, subject to the following conditions:

6.1 Installation must comply with this Research Report, the manufacturer's published installation instructions, and the applicable Code. In the event of a conflict between the manufacturer's instructions and this report, this report governs.

6.2 Wall panel installation shall be limited to non-load bearing walls.

6.3 The panels may be installed without a thermal barrier complying with IBC Section 2603.4.

6.4 the panels may be installed on buildings of Types I, II, III, and IV construction, permitted to be of non-fire-resistance-rated construction, as follows:

6.4.1 One-Story Buildings: Panels up to 4 inches thick in buildings equipped throughout with automatic sprinkler system in accordance with IBC Section 903.3.1.1.

6.4.2 Buildings of Any Height: Wall assemblies described in Intertek Design Numbers KIP/IMWP 30-03 and KIP/IMWP 30-04. See design listings at the [Intertek Directory of Building Products](#) for listed assembly details.

6.5 Details on wall framing must be approved by the Building Code official prior to installation.





6.6 Wind design loads determined from nominal design wind speeds (V_{asd}) in accordance with Section 1609.3.1 of the IBC shall not exceed the maximum allowable design pressure given in Tables 2 through 12.

6.7 All construction plans and calculations for load conditions must be submitted to the Code official for approval.

6.8 KS and OPTIMO Foam Core Insulated Metal Panels are manufactured in Caledon, Ontario under a quality control program with inspections by Intertek Testing Services NA, Inc.

7.0 SUPPORTING EVIDENCE

7.1 Intertek evaluation and testing reports in accordance with ICC-ES Acceptance Criteria for Sandwich Panels AC04, dated February 2012 (editorially revised July 2015), Acceptance Criteria for Sandwich Panel Adhesives AC05, dated June 2009 (editorially revised July 2015), and Acceptance Criteria for Foam Plastic Insulation AC12, dated June 2012 (editorially revised May 2016).

7.2 Test reports in conformance with ASTM E84 and NFPA 285.

7.3 Test reports for water penetration resistance in conformance with ASTM E331.

8.0 IDENTIFICATION

KS and OPTIMO Foam Core Insulated Metal Panels are identified by a marking bearing the Report holder’s name, the product name, flame spread and smoke developed indices, the Intertek Mark, and the Code Compliance Research Report number (CCRR-1074).

9.0 OTHER CODES

This section is not applicable.

10.0 CODE COMPLIANCE RESEARCH REPORT USE

10.1 Approval of building products and/or materials can only be granted by a building official having legal authority in the specific jurisdiction where approval is sought.

10.2 Code Compliance Research Reports shall not be used in any manner that implies an endorsement of the product by Intertek.

10.3 Reference to the Intertek website address: <https://bpdirectory.intertek.com> is recommended to ascertain the current version and status of this report.

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TABLE 1 – PRODUCTS EVALUATED

Panel Designation	Profile	
	Exterior	Interior
KS Insulated Metal Panels	Smooth (Flat) Embossed (Flat) Shadowline (Corrugated Profile) Micro-Rib (Corrugated Profile) Mini-Micro Rib (corrugated Profile) Mini-Wave (Corrugated Profile)	Shadowline
KS and OPTIMO Foam Core Insulated Metal Panels	Flat or with non-directional embossed or smooth surface texture	Shadowline

TABLE 2 – TABLE 13: MAXIMUM ALLOWABLE WIND LOADS (PSF)

- Allowable loads are applicable to wind design pressure derived from nominal wind speed (V_{asd}) per IBC Section 1609.3.1.
- 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. Limiting factor for each allowable load is identified by the following notations:
 - (N) Negative Load/Connection Design Strength (2.0 SF applied to max. test load)
 - (S) Core Shear Design Strength (3.0 SF applied to shear strength per ASTM C273)
 - (B) Flexural Bending Design Strength (Allowable compressive stress per ADM and AISI S100 for aluminum and steel facing respectively)
 - (D) Deflection at L/180 (Core Shear Modulus, $G = 339$ psi)
- Design strength for panel connection addresses panel clip-to-panel connection only. Allowable load may be lower based upon the design value of fasteners in supporting structural framing and shall be checked by a qualified engineer.
- Allowable loads for double span and triple span apply to continuous panels installed over three supports and four supports respectively. Supports are equally spaced.

TABLE 2 – OPTIMO Allowable Positive and Negative Transverse Loads for Single Span (L/180)(PSF)

Panel Thickness (Inches)	24" Wide Panel - 22 Gage Exterior/24 Gage Interior Steel Skin													
	Span (Feet)													
	2		4		6		8		10		12		14	
2	115	S	58	S	38	S	29	S	21	D	15	D	11	D
2.5	144	S	72	S	48	S	36	S	29	S	21	D	16	D
3	173	S	87	S	58	S	43	S	35	S	27	D	20	D
4	232	S	116	S	77	S	58	S	46	S	39	S	31	D

Limiting Factor: (N) Negative Load/Connection, (S) Core Shear, (B) Flexural Bending, (D) Deflection





TABLE 3 – OPTIMO Allowable Positive and Negative Transverse Loads for Double Span (L/180)(PSF)

Panel Thickness (Inches)	24" Wide Panel - 22 Gage Exterior/24 Gage Interior Steel Skin													
	Span Between Supports (Feet)													
	2		4		6		8		10		12		14	
2	113	S	54	S	35	S	25	S	20	S	16	S	14	S
2.5	142	S	68	S	44	S	32	S	25	S	20	S	17	S
3	171	S	83	S	53	S	39	S	30	S	25	S	21	S
4	229	S	112	S	72	S	53	S	41	S	34	S	28	S

Limiting Factor: (N) Negative Load/Connection, (S) Core Shear, (B) Flexural Bending, (D) Deflection

TABLE 4 – OPTIMO Allowable Positive and Negative Transverse Loads for Triple Span (L/180)(PSF)

Panel Thickness (Inches)	24" Wide Panel - 22 Gage Exterior/24 Gage Interior Steel Skin													
	Span Between Supports (Feet)													
	2		4		6		8		10		12		14	
2	111	S	53	S	34	S	25	S	20	S	16	S	14	S
2.5	140	S	67	S	43	S	31	S	25	S	21	S	17	S
3	169	S	81	S	52	S	38	S	30	S	25	S	21	S
4	227	S	109	S	70	S	51	S	40	S	33	S	28	S

Limiting Factor: (N) Negative Load/Connection, (S) Core Shear, (B) Flexural Bending, (D) Deflection

TABLE 5 – OPTIMO Allowable Positive and Negative Transverse Loads for Single Span (L/180)(PSF)

Panel Thickness (Inches)	30" Wide Panel - 22 Gage Exterior/24 Gage Interior Steel Skin													
	Span (Feet)													
	2		4		6		8		10		12		14	
2	115	S	58	S	38	S	29	S	21	D	15	D	11	D
2.5	144	S	72	S	48	S	36	S	29	S	21	D	16	D
3	173	S	87	S	58	S	43	S	35	S	27	D	20	D
4	192	N	96	N	64	N	48	N	38	N	32	N	27	N

Limiting Factor: (N) Negative Load/Connection, (S) Core Shear, (B) Flexural Bending, (D) Deflection



TABLE 6 – OPTIMO Allowable Positive and Negative Transverse Loads for Double Span (L/180)(PSF)

Panel Thickness (Inches)	30" Wide Panel - 22 Gage Exterior/24 Gage Interior Steel Skin													
	Span Between Supports (Feet)													
	2		4		6		8		10		12		14	
2	113	S	54	S	35	S	25	S	20	S	16	S	14	S
2.5	142	S	68	S	44	S	32	S	25	S	20	S	17	S
3	171	S	83	S	53	S	39	S	30	S	25	S	21	S
4	196	N	98	N	65	N	49	N	39	N	33	N	28	N

Limiting Factor: (N) Negative Load/Connection, (S) Core Shear, (B) Flexural Bending, (D) Deflection

TABLE 7– OPTIMO Allowable Positive and Negative Transverse Loads for Triple Span (L/180)(PSF)

Panel Thickness (Inches)	30" Wide Panel - 22 Gage Exterior/24 Gage Interior Steel Skin													
	Span Between Supports (Feet)													
	2		4		6		8		10		12		14	
2	111	S	53	S	34	S	25	S	20	S	16	S	14	S
2.5	140	S	67	S	43	S	31	S	25	S	21	S	17	S
3	169	S	81	S	52	S	38	S	30	S	25	S	21	S
4	223	N	109	S	70	S	51	S	40	S	33	S	28	S

Limiting Factor: (N) Negative Load/Connection, (S) Core Shear, (B) Flexural Bending, (D) Deflection

TABLE 8 – OPTIMO Allowable Positive and Negative Transverse Loads for Single Span (L/180)(PSF)

Panel Thickness (Inches)	36" Wide Panel - 22 Gage Exterior/24 Gage Interior Steel Skin													
	Span (Feet)													
	2		4		6		8		10		12		14	
2	115	S	80	D	38	S	29	S	21	D	15	D	11	D
2.5	144	S	80	N	48	S	36	S	29	S	21	D	16	D
3	160	N	80	N	53	N	40	N	32	N	27	N	20	D
4	160	N	80	N	53	N	40	N	32	N	27	N	23	N

Limiting Factor: (N) Negative Load/Connection, (S) Core Shear, (B) Flexural Bending, (D) Deflection



TABLE 9– OPTIMO Allowable Positive and Negative Transverse Loads for Double Span (L/180)(PSF)

Panel Thickness (Inches)	36" Wide Panel - 22 Gage Exterior/24 Gage Interior Steel Skin													
	Span Between Supports (Feet)													
	2		4		6		8		10		12		14	
2	113	S	81	D	35	S	25	S	20	S	16	S	14	S
2.5	142	S	82	N	44	S	32	S	25	S	20	S	17	S
3	163	N	82	N	53	S	39	S	30	S	25	S	21	S
4	163	N	82	N	54	N	41	N	33	N	27	N	23	N

Limiting Factor: (N) Negative Load/Connection, (S) Core Shear, (B) Flexural Bending, (D) Deflection

TABLE 10– OPTIMO Allowable Positive and Negative Transverse Loads for Triple Span (L/180)(PSF)

Panel Thickness (Inches)	36" Wide Panel - 22 Gage Exterior/24 Gage Interior Steel Skin													
	Span Between Supports (Feet)													
	2		4		6		8		10		12		14	
2	111	S	81	D	34	S	25	S	20	S	16	S	14	S
2.5	140	S	93	N	43	S	31	S	25	S	21	S	17	S
3	169	S	93	N	52	S	38	S	30	S	25	S	21	S
4	186	N	93	N	62	N	46	N	37	N	31	N	27	N

Limiting Factor: (N) Negative Load/Connection, (S) Core Shear, (B) Flexural Bending, (D) Deflection

TABLE 11 – KS Allowable Positive and Negative Transverse Loads for Single Span (L/180)(PSF)

Panel Thickness (Inches)	42" Wide Panel - 26 Gage Exterior/26 Gage Interior Steel Skin													
	Span (Feet)													
	2		4		6		8		10		12		14	
2	51	N	26	N	17	N	13	N	10	N	-	-	-	-
2.5	51	N	26	N	17	N	13	N	10	N	-	-	-	-
3	51	N	26	N	17	N	13	N	10	N	-	-	-	-
4	51	N	26	N	17	N	13	N	10	N	-	-	-	-
5	51	N	26	N	17	N	13	N	10	N	-	-	-	-
6	51	N	26	N	17	N	13	N	10	N	-	-	-	-

Limiting Factor: (N) Negative Load/Connection, (S) Core Shear, (B) Flexural Bending, (D) Deflection



TABLE 12 – KS Allowable Positive and Negative Transverse Loads for Double Span (L/180)(PSF)

Panel Thickness (Inches)	42" Wide Panel - 26 Gage Exterior/26 Gage Interior Steel Skin													
	Span Between Supports (Feet)													
	2		4		6		8		10		12		14	
2	58	N	29	N	19	N	14	N	12	N	-	-	-	-
2.5	58	N	29	N	19	N	14	N	12	N	-	-	-	-
3	58	N	29	N	19	N	14	N	12	N	-	-	-	-
4	58	N	29	N	19	N	14	N	12	N	-	-	-	-
5	58	N	29	N	19	N	14	N	12	N	-	-	-	-
6	58	N	29	N	19	N	14	N	12	N	-	-	-	-

Limiting Factor: (N) Negative Load/Connection, (S) Core Shear, (B) Flexural Bending, (D) Deflection

TABLE 13 – KS Allowable Positive and Negative Transverse Loads for Triple Span (L/180)(PSF)

Panel Thickness (Inches)	42" Wide Panel - 26 Gage Exterior/26 Gage Interior Steel Skin													
	Span Between Supports (Feet)													
	2		4		6		8		10		12		14	
2	64	N	32	N	21	N	16	N	13	N	11	N	-	-
2.5	64	N	32	N	21	N	16	N	13	N	11	N	-	-
3	64	N	32	N	21	N	16	N	13	N	11	N	-	-
4	64	N	32	N	21	N	16	N	13	N	11	N	-	-
5	64	N	32	N	21	N	16	N	13	N	11	N	-	-
6	64	N	32	N	21	N	16	N	13	N	11	N	-	-

Limiting Factor: (N) Negative Load/Connection, (S) Core Shear, (B) Flexural Bending, (D) Deflection

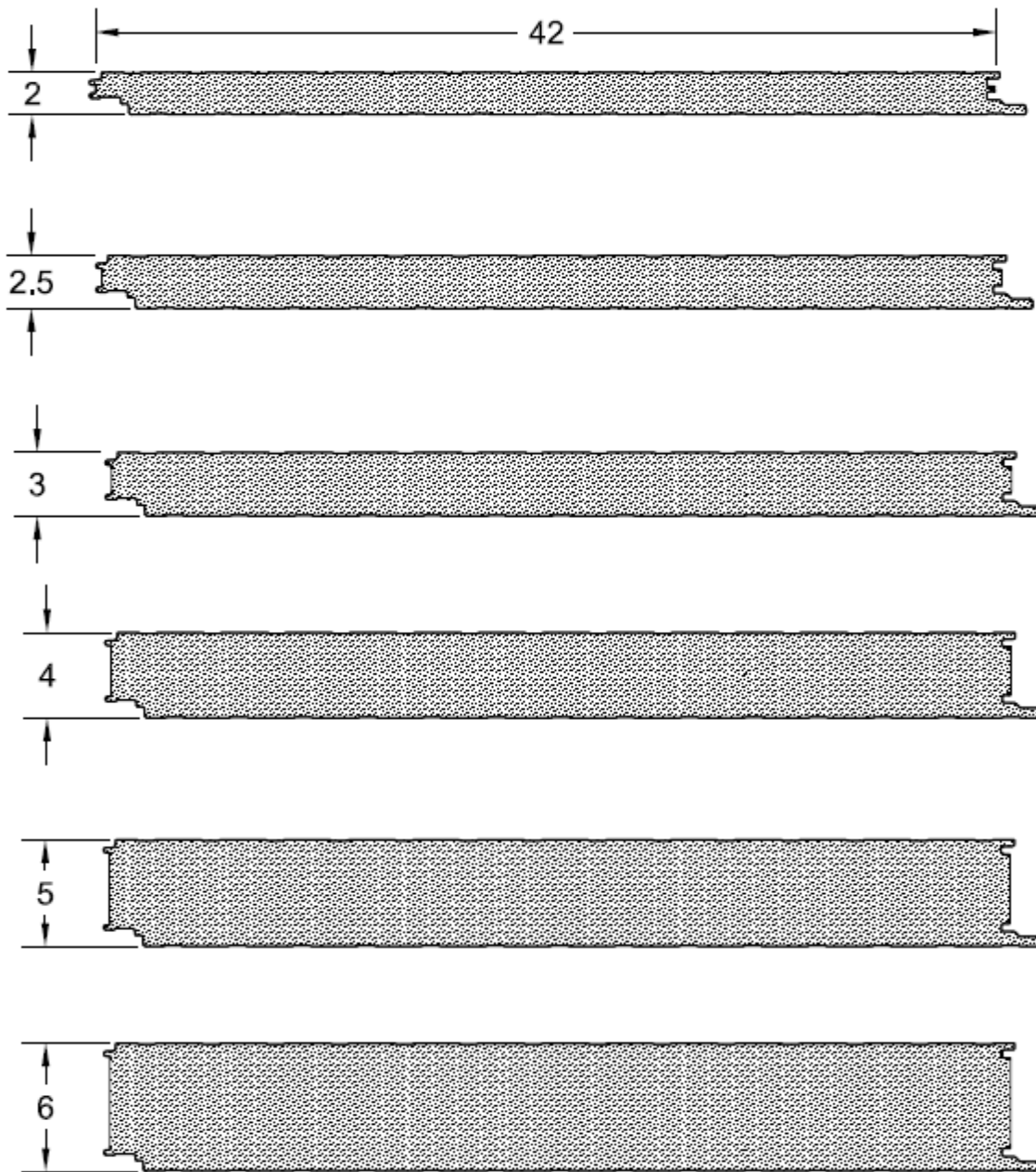


Figure 1a – KS 42 Inch Panel
2", 2.5", 3", 4", 5", 6"

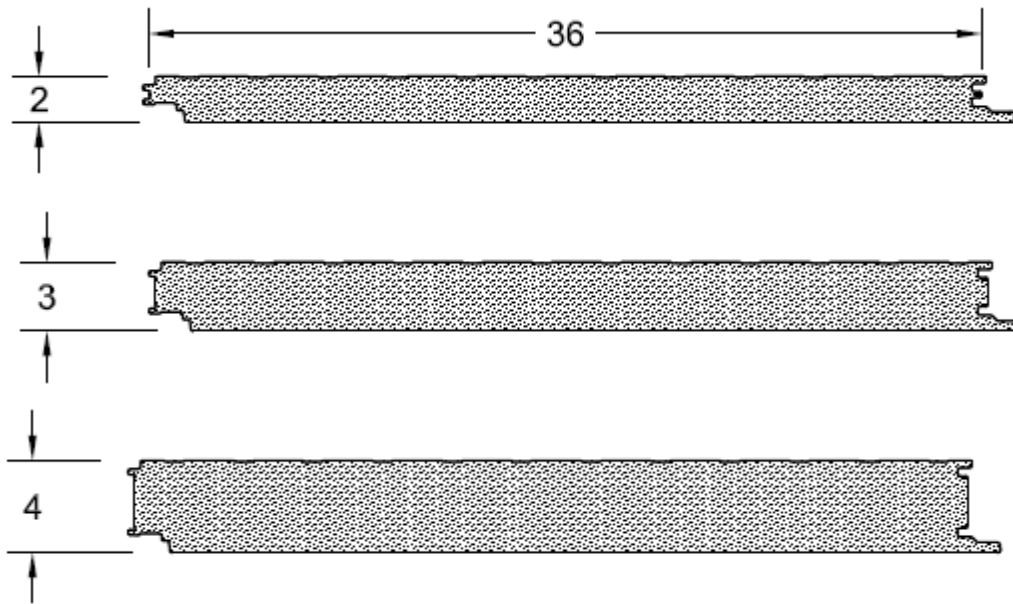


Figure 1b – OPTIMO 36 Inch Panel
2", 3", 4"

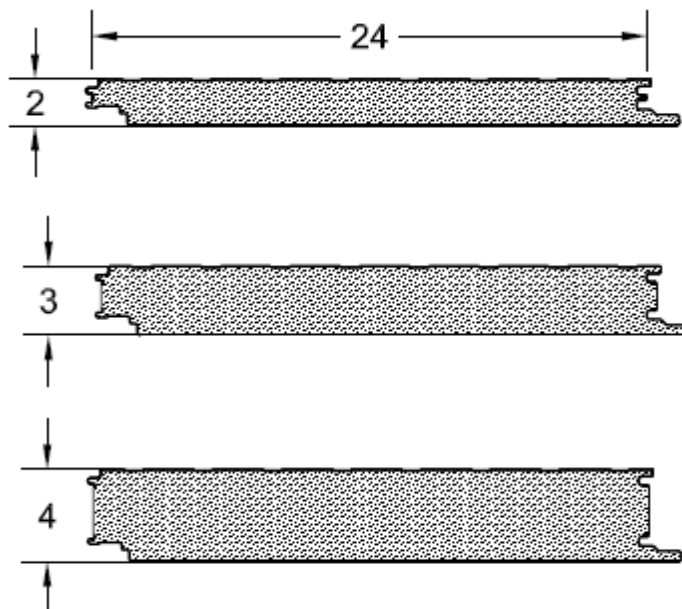


Figure 1c – OPTIMO 24 Inch Panel
2", 3", 4"

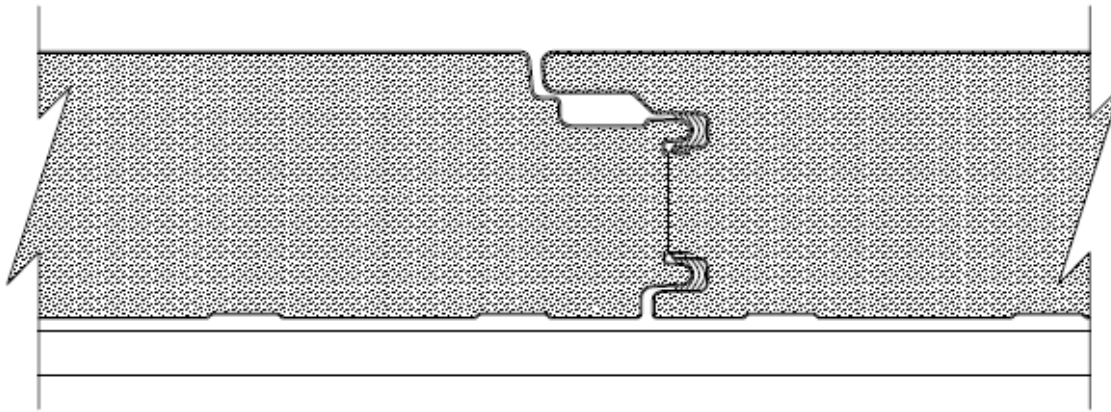


Figure 2 – KS and OPTIMO Panel Joint Engagement

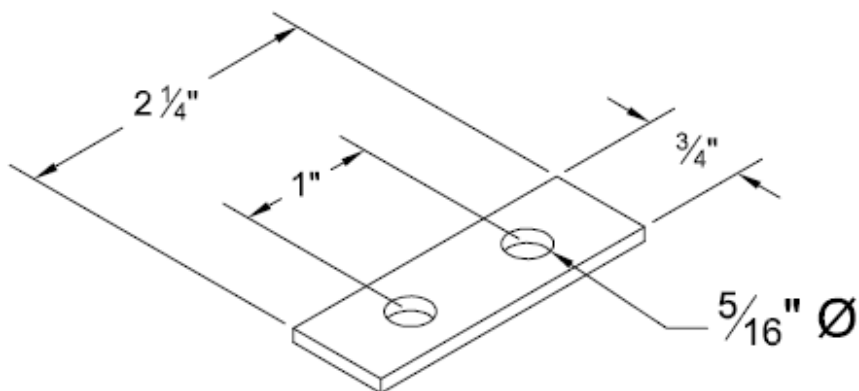


Figure 3 – KS and OPTIMO Panel 12 GA. Stainless Steel Two-Hole Hidden Fastener Clip