Project Information

STEEL FRAMING STUDS

Project Name: **Cal State Los Angeles Student Housing**

North Campus

Metal Framing Start Date:

General Contractor
McCarthy
20401 SW Birch St
Newport Beach, CA 92660
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10580 Donald Rd, NE
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Donald, OR 97020
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Architect
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KPFF
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Red List Free

mindful MATERIALS

ZERO ZERO ENERGY READY OREGON

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R-STUD, LLC

R-STUD SLOTTED STEEL FRAMING

The patented R-stud is the lightest, quietest, strongest, most cost effective, energy saving steel stud available on the market today. R-stud is interchangeable with conventional metal framing systems. It is manufactured with supplemental flanges (openings) every foot that make it much stronger than conventional steel studs. The larger openings also allow for quick and easy installation of utilities. The acoustical test results prove R-stud's performance to be significantly higher than generic steel studs. R-stud can achieve a 50 STC (Sound Transmission Class) with just one layer of 5/8 inch Type X gypsum on each side, beating generic steel studs by 9 points! Less gypsum board means less job-site waste. The R-stud significantly outperforms generic steel studs, including greater load bearing capacity, higher limiting wall heights, better acoustical ratings, and 40% less thermal transfer than conventional steel studs. R-stud sources its steel coils from USS-POSCO in Pittsburg, California for rolling in our manufacturing facility in Donald, Oregon. Our coils contain approximately 34.2% recycled steel. Approximately 19.8% is Post-consumer content, while Pre-consumer content is approximately 14.4%. Steel is one of the most sustainable building materials in the world. It is recycled content, recyclable, durable, safe, zinc coated, dimensionally stable and strong, as well as not susceptible to rot, termites, or mold.

DECLARE ID RSD-1001
LICENSE EXPIRATION 01 MAR 2020
DECLARATION STATUS RED LIST FREE
FINAL ASSEMBLY LOCATION DONALD, OR, USA
LIFE EXPECTANCY 100 YEARS
END OF LIFE 100% RECYCLABLE
VOC CONTENT IN G/L N/A
CDPH STANDARD METHOD V1.1 COMPLIANT N/A

INGREDIENT LIST

COMPONENT	INGREDIENT NAME	CAS#	%	SOURCE
Steel Framing	Steel A1003 and A653	N/A	100%	

COMPANY INFORMATION

R-stud, LLC

PO Box 692
Donald, OR 97020

PHONE: 888-241-1985
EMAIL: patrick@rstud.com

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THERMAL ANALYSIS

The thermal performance of the different assembly scenarios was evaluated by 3D thermal modelling using the Nx software package from Siemens, which is a general purpose computer aided design (CAD) and finite element analysis (FEA) package. The thermal solver and modelling procedures utilized for this study were extensively calibrated and validated to within 5% of hotbox testing for *ASHRAE Research Project 1365-RP Thermal Performance of Building Envelope Details for Mid- and High-Rise Construction* and for the *Building Envelope Thermal Bridging Guide*[1]. The thermal analysis utilized steady-state conditions, published thermal properties of materials and information provided by R-Stud. Additional assumptions for the thermal analysis are listed in Appendix B.

The assembly U-Values and effective R-values are shown in Table 1. Example temperature profiles for each configuration are provided in Appendix C.

Table 2: Effective R-value of the Cal State Los Angeles Clear Wall with R-Studs

	Scenario	R-Stud Size in	R-Stud Spacing in	U-Value Btu/h ft² °F (W/m² °K)	Effective R-Value ft² hr °F/Btu (m² °K/W)
1	6 inch R-Stud with R-21 Batt Insulation in Stud Cavity	6	24	0.062 (0.35)	R-16.2 (2.86)
2	4 inch R-Stud with R-13 Batt Insulation in Stud Cavity	4	24	0.031 (0.17)	R-32.5 (5.72)

We believe that this report meets your objectives for evaluating the thermal performance of the proposed assembly. If you have any questions or comments related to the above, please do not hesitate to contact the undersigned.

Yours truly,
MORRISON HERSHFIELD LIMITED

Katie Hay, P.Eng.
Building Science Consultant

Ivan Lee, P.Eng.
Building Science Consultant

[1] https://www.bchydro.com/thermalguide.

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MORRISON HERSHFIELD

October 4, 2019

MH Ref: 1905729.00

Mr. Patrick Lucas
CEO
R-Stud LLC
P.O. Box 692
Donald, OR 97020

email: patrick@rstud.com

Dear Patrick:

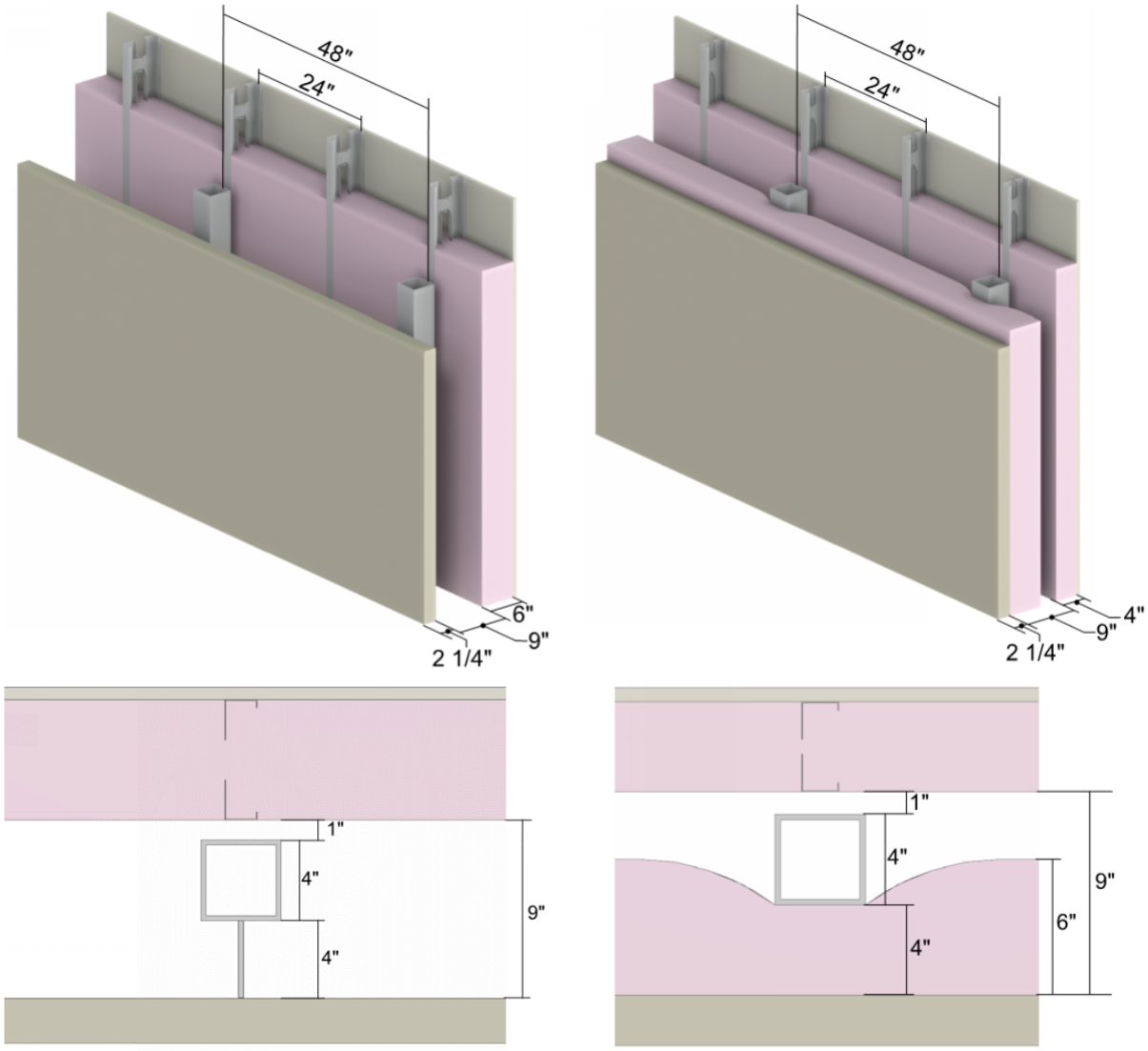
Re: R-Stud Thermal Analysis for Cal State Los Angeles, Los Angeles, CA

Morrison Hershfield Ltd. (MH) was retained by R-Stud LLC to analyze the proposed wall assemblies for Cal State Los Angeles, in Los Angeles, CA. This report is a summary of the analysis.

BACKGROUND INFORMATION

The proposed wall designs for Cal State Los Angeles consist of an R-Stud backup wall with batt insulation in the cavity and a Clark Composite Architectural Precast Panel (C-CAPP). The C-CAPP panel is attached to the structure at the intermediate slabs, spaced such that there is a minimum of 1 inch between the R-Stud flange and the panel frame.

The assembly geometry was based on correspondence the week of September 23, 2019 and the C-CAPP Panel System sheet dated September 2017 provided in Appendix A. Figure 1 illustrates the proposed wall assemblies. The material properties of the detail components are given in Appendix B.



Top View

6 inch R-Stud Assembly

- 2 1/4 inch C-CAPP Skin
- 4 inch x 4 inch HSS Frame spaced 48 inches o.c., fastened with intermittent pins (not modelled)
- 1 inch gap between the HSS frame and R-Stud
- 6 inch R-Stud spaced 24 inches o.c. with R-21 batt insulation in cavity
- 5/8 inch interior gypsum

Top View

4 inch R-Stud Assembly

- 2 1/4 inch C-CAPP Skin
- 4 inch x 4 inch HSS Frame spaced 48 inches o.c., fastened with intermittent pins (not modelled)
- 6 inch nominal R-21 batt compressed to 4 inches outboard the HSS Frame
- 1 inch gap between the HSS frame and R-Stud
- 4 inch R-Stud spaced 24 inches o.c. with R-13 batt insulation in cavity
- 5/8 inch interior gypsum

Figure 1: Evaluated Wall Assemblies

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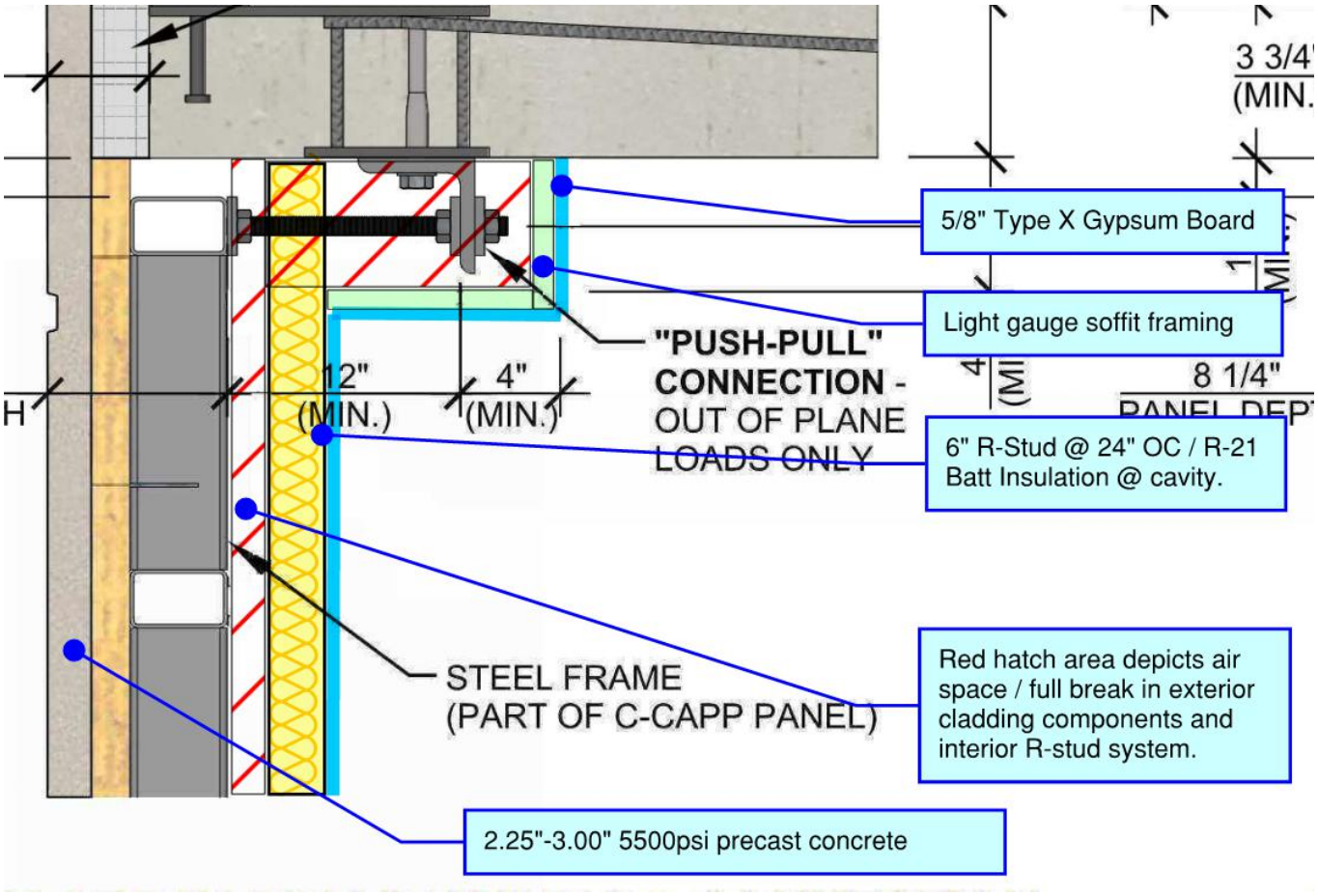
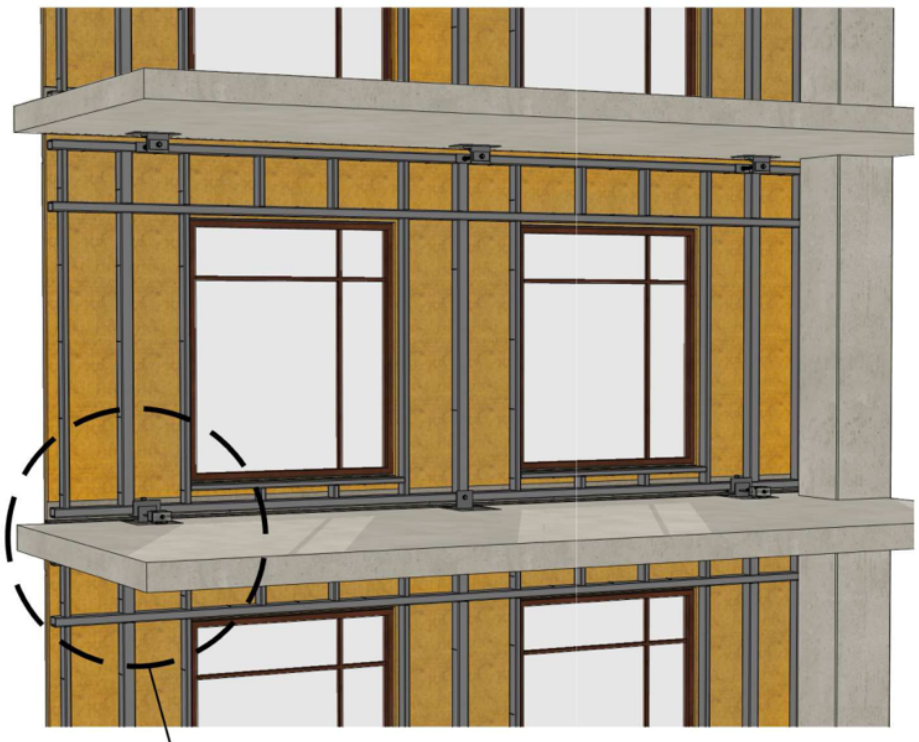
APPENDIX A: DETAIL DRAWINGS

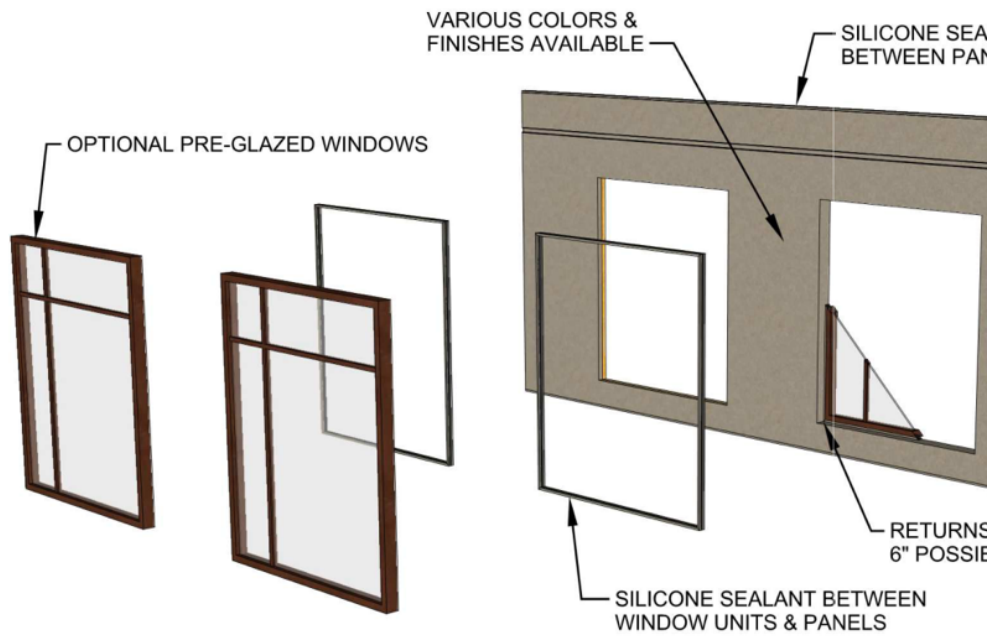


Panel System:

C-CAPP (Clark Composite Architectural Precast Panels) - Cast in Pla

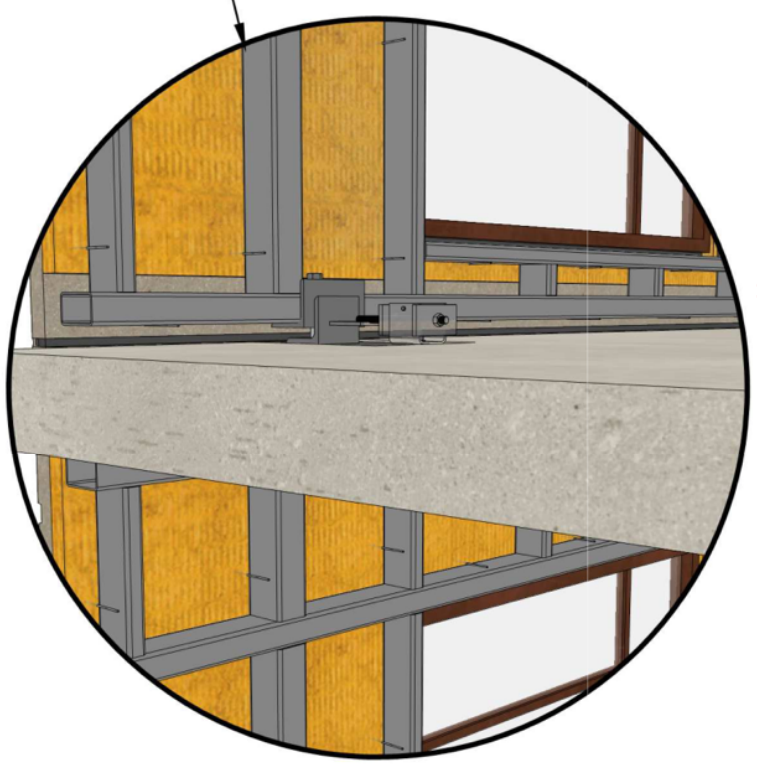


PANEL INTERIOR VIEW



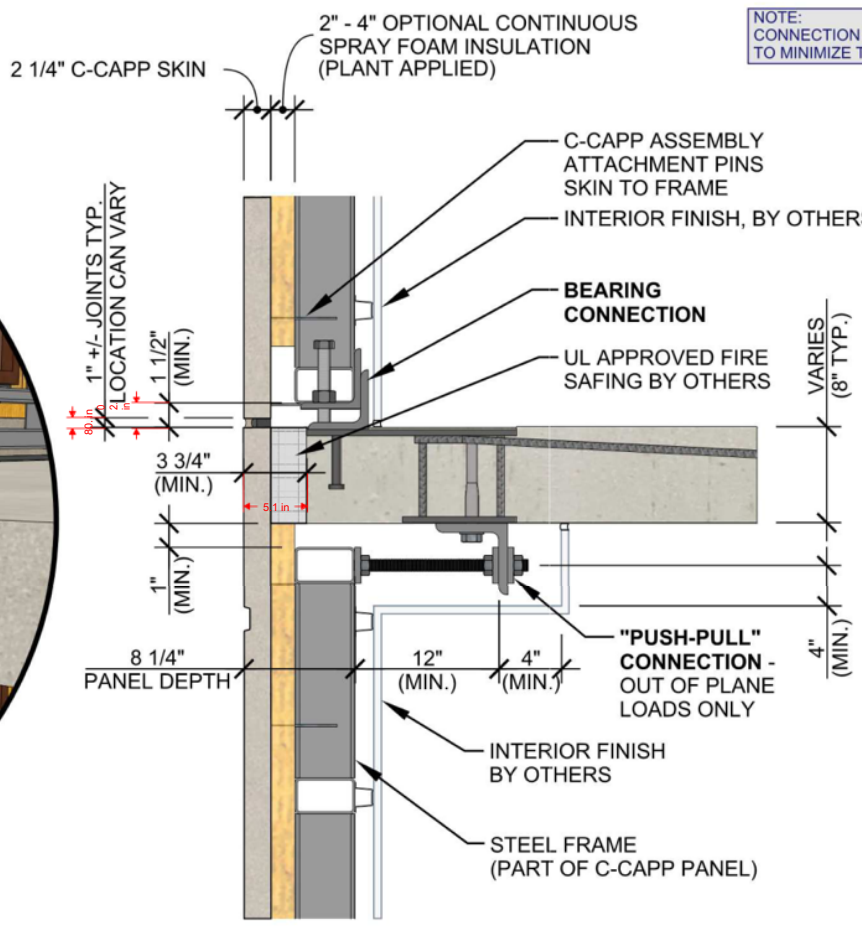
NOTE:
USE OF SPRAY FOAM REQUIRES AN "NFPA 285" AND/OR "ASTM E119" TESTED ASSEMBLY.
CONTACT CLARK PACIFIC FOR DETAILS ON OUR TESTED ASSEMBLIES.

EXPLODED VIEW (ASSEMBLY)

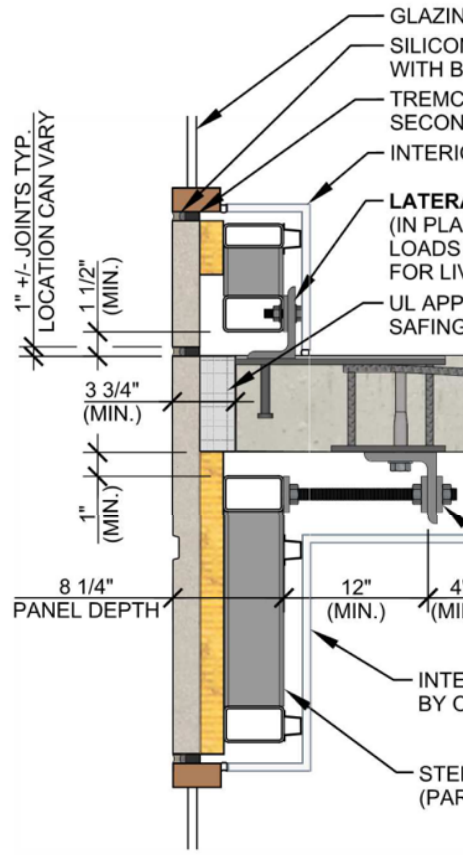


INTERIOR PERSPECTIVE VIEW

NOTE:
CONNECTION OPTIONS ARE AVAILABLE
TO MINIMIZE TOTAL ASSEMBLY DEPTH.



SECTION AT BEARING/PUSH PULL CONNECTION

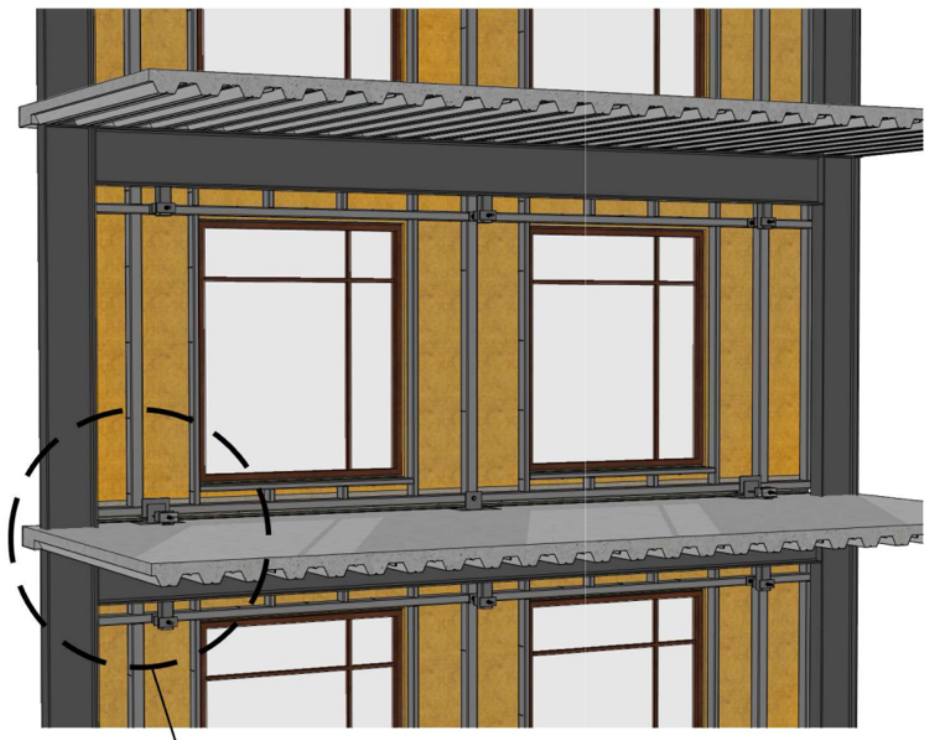


SECTION AT MI
LATERAL/PUSH PULL

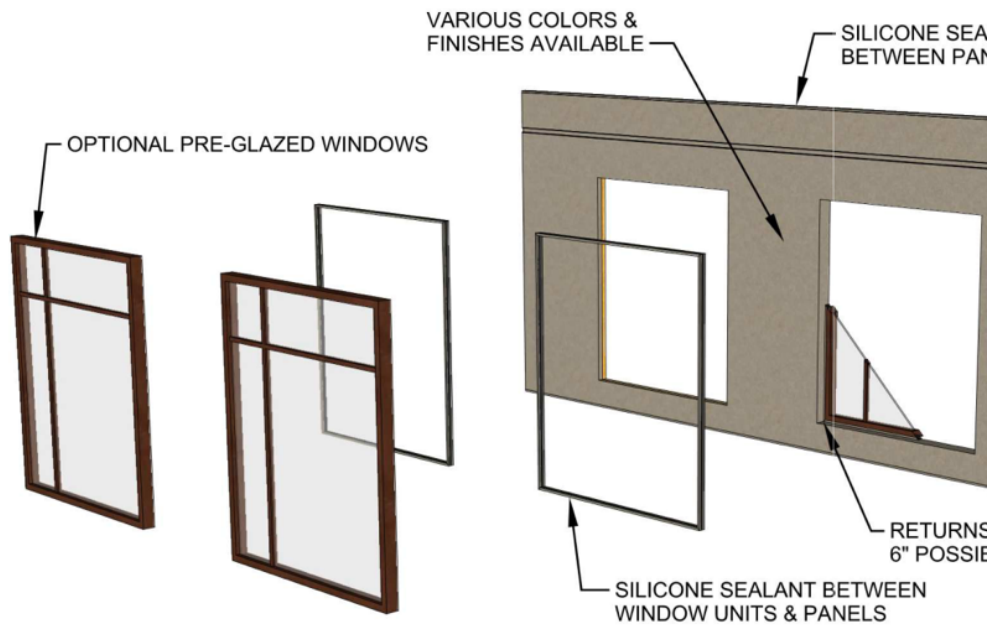
Date: 8.18.2017 | Version: 1 | By: E.L.B. | Checked: D.W.

Panel System:

C-CAPP (Clark Composite Architectural Precast Panels) - Steel Struc



PANEL INTERIOR VIEW



NOTE:
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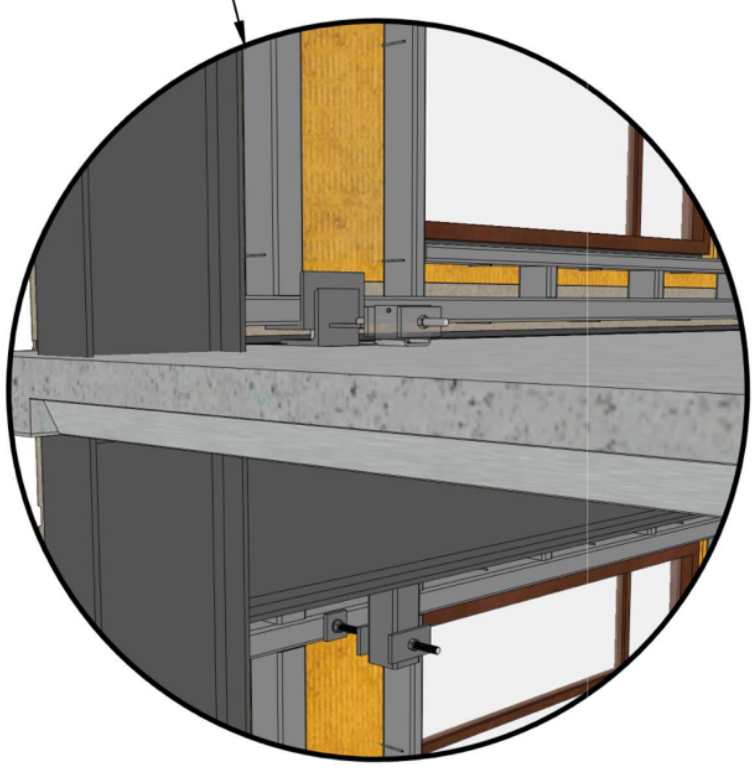
EXPLODED VIEW (ASSEMBLY)



INTERIOR PERSPECTIVE VIEW

NOTE:
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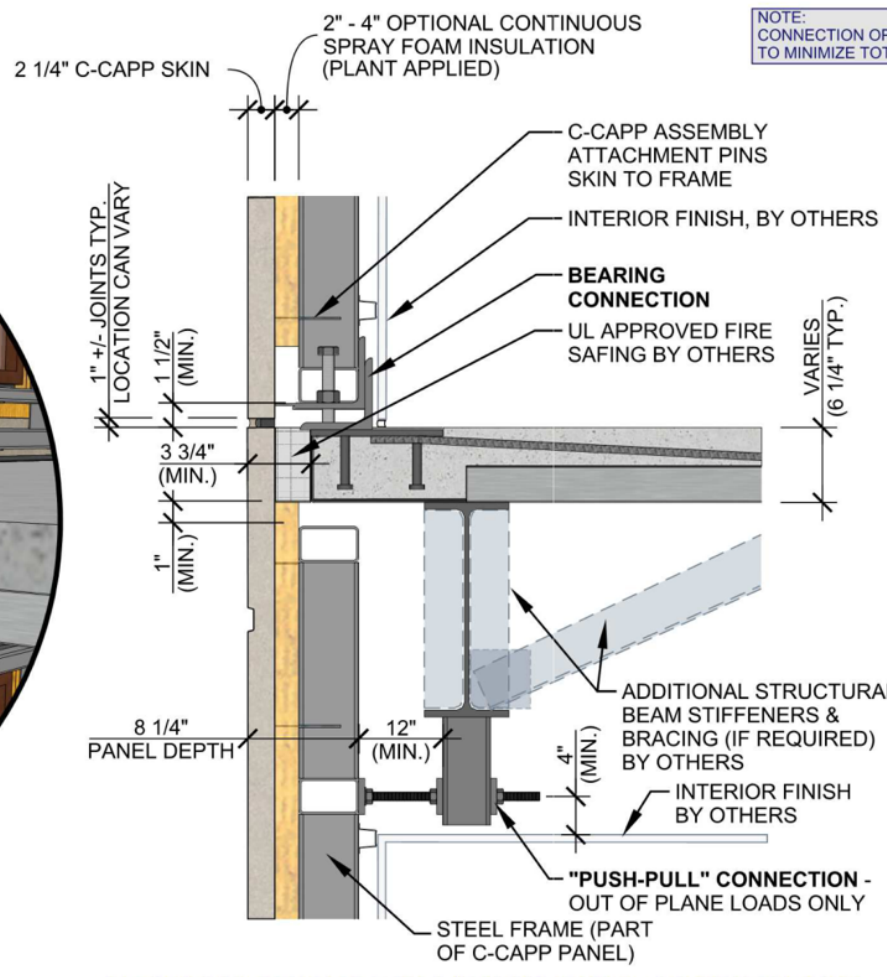
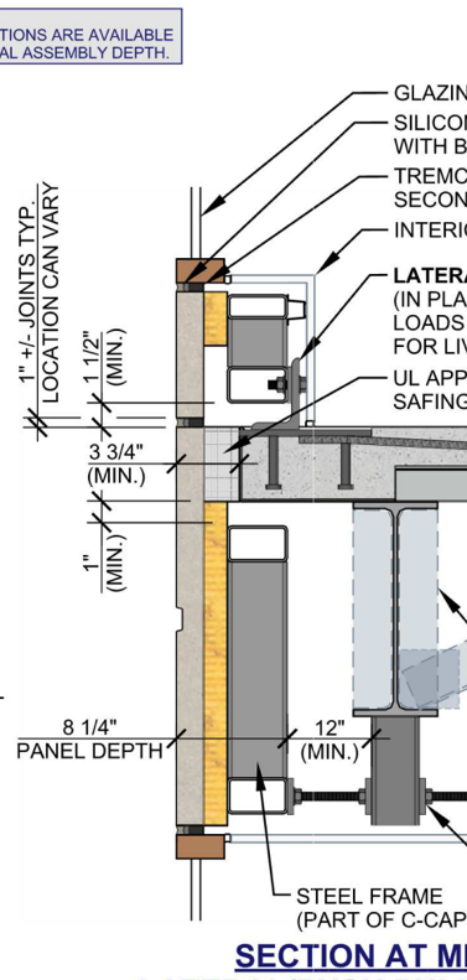
TO MINIMIZE TOTAL ASSEMBLY DEPTH.



SECTION AT BEARING/PUSH PULL CONNECTION

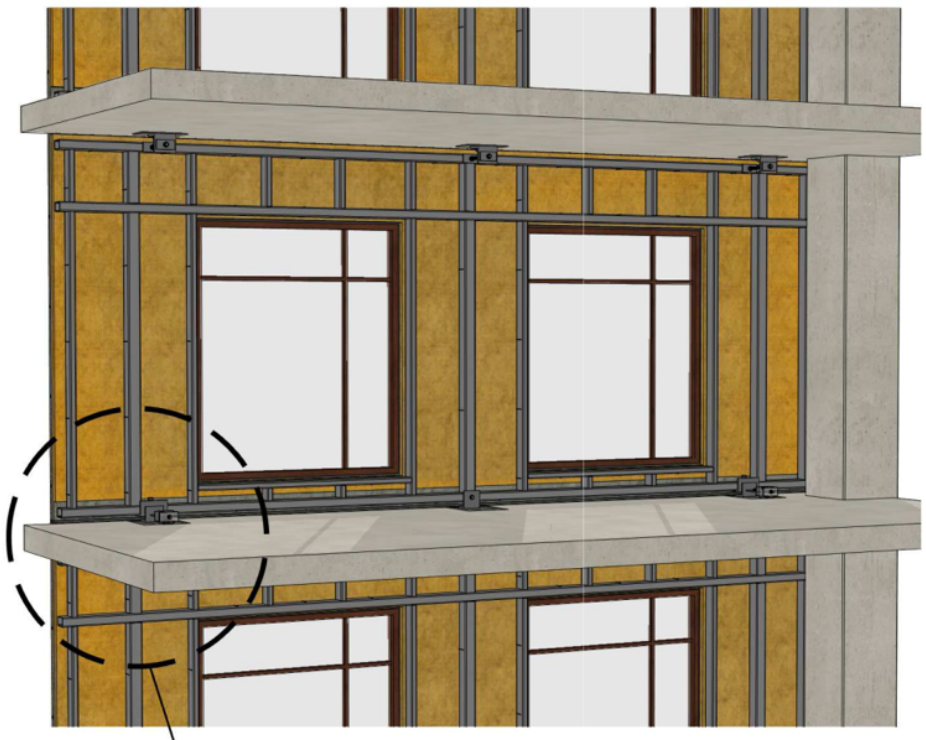


SECTION AT MI
LATERAL/PUSH PULL

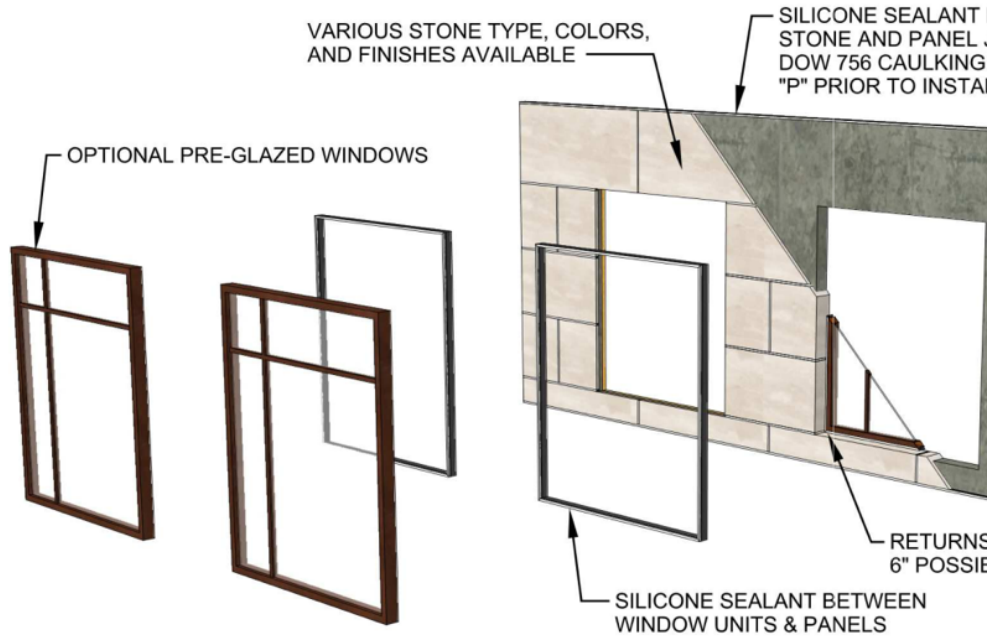
Date: 8.18.2017 | Version: 1 | By: E.L.B. | Checked: D.W.

Panel System:

Stone on C-CAPP (Clark Composite Architectural Precast Panels) - C



PANEL INTERIOR VIEW



NOTE:
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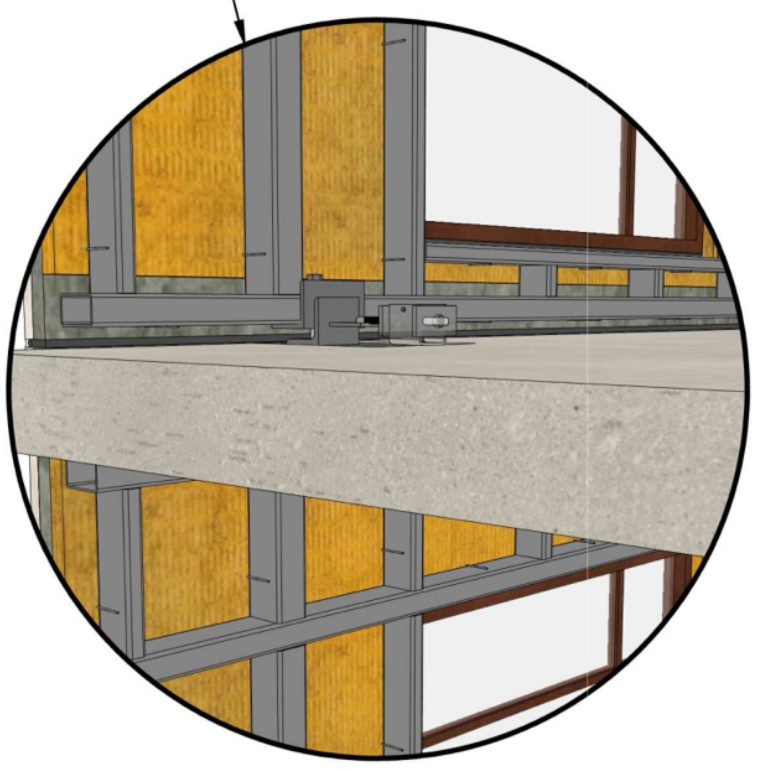
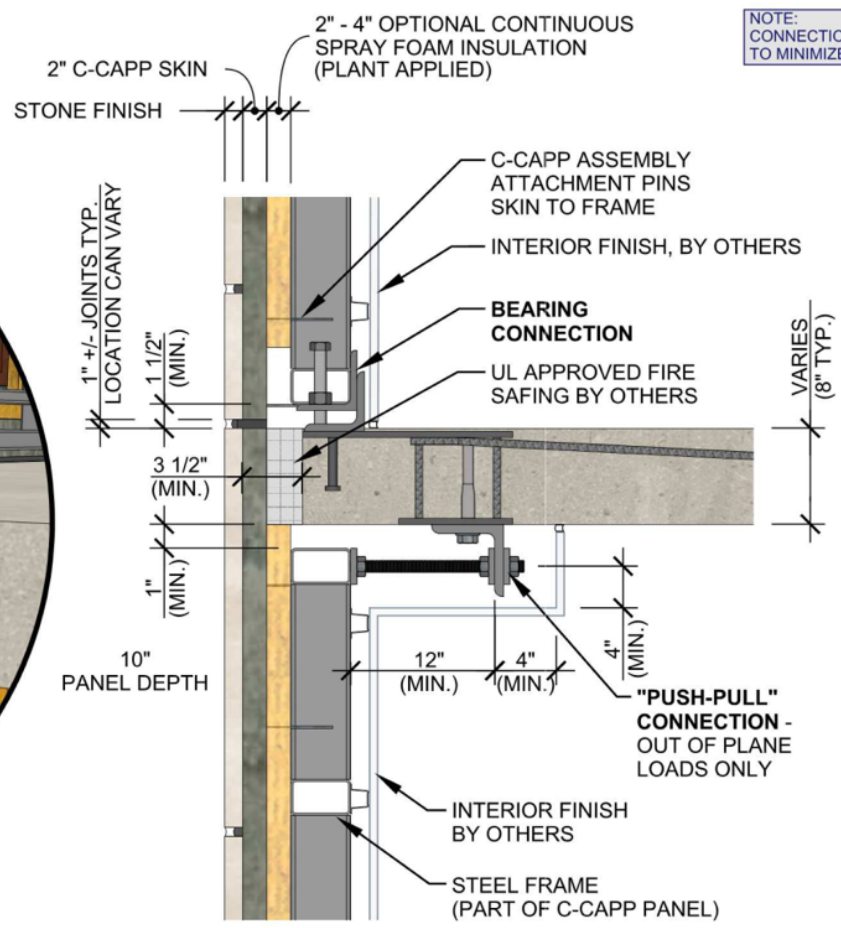
CONTACT CLARK PACIFIC FOR DETAILS ON OUR TESTED ASSEMBLIES.

EXPLODED VIEW (ASSEMBLY)

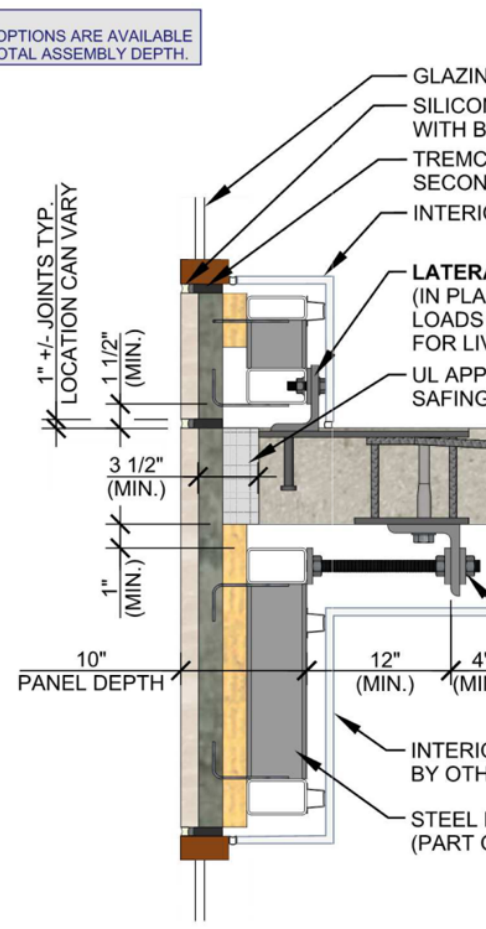


INTERIOR PERSPECTIVE VIEW

NOTE:
CONNECTION OPTIONS ARE AVAILABLE
TO MINIMIZE TOTAL ASSEMBLY DEPTH.



SECTION AT BEARING/PUSH PULL CONNECTION

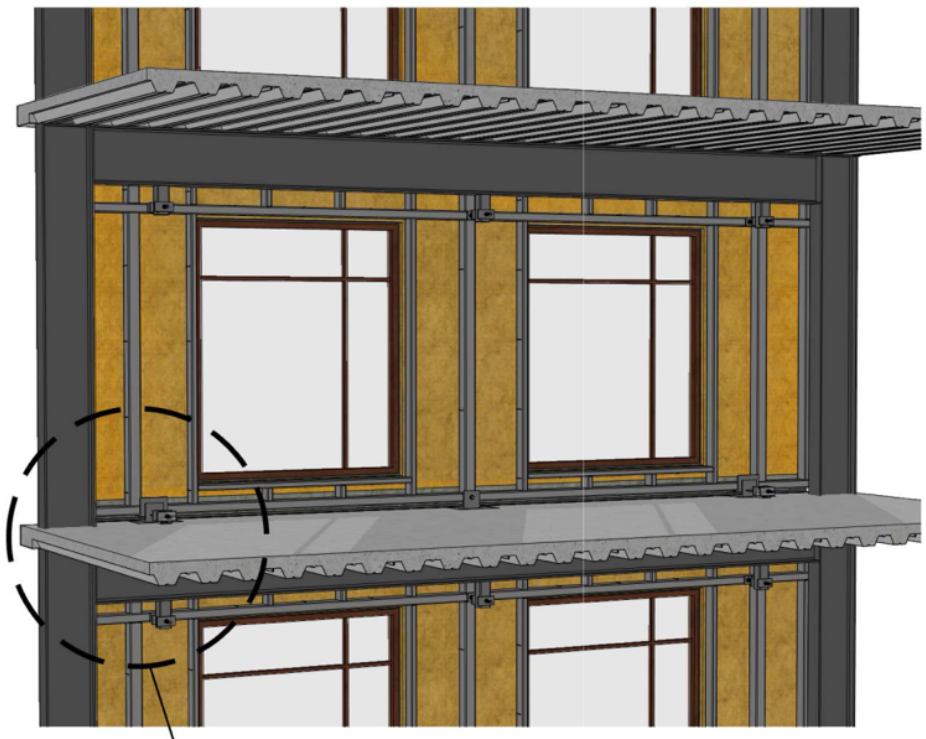


SECTION AT MI
LATERAL/PUSH PULL

Date: 8.22.2017 | Version: 1 | By: E.L.B. | Checked: D.W.

Panel System:

Stone on C-CAPP (Clark Pacific Architectural Precast Panels) - Steel



PANEL INTERIOR VIEW

NOTE:
USE OF SPRAY FOAM REQUIRES AN "NFPA 285" AND/OR "ASTM E119" TESTED ASSEMBLY.
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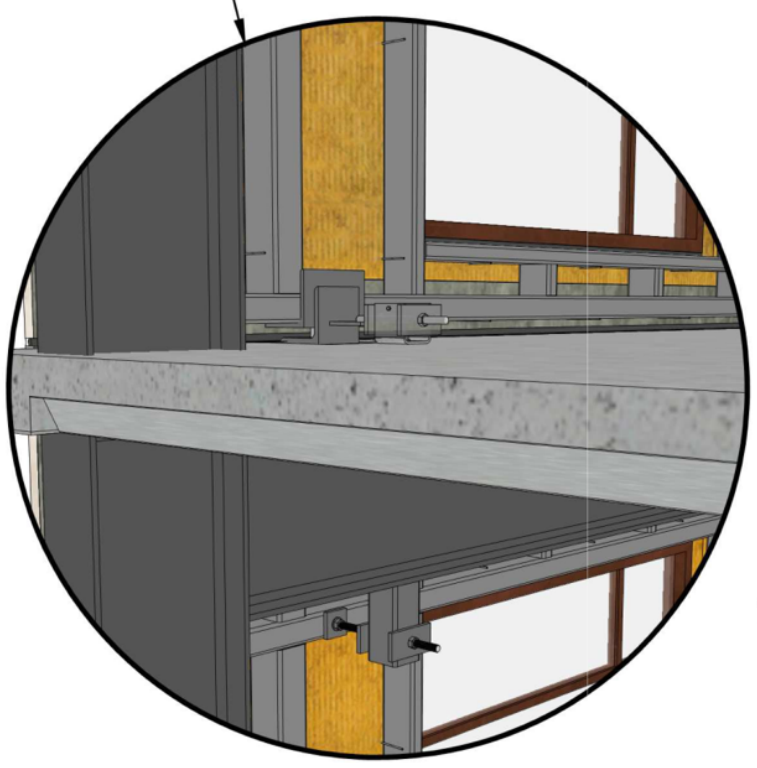
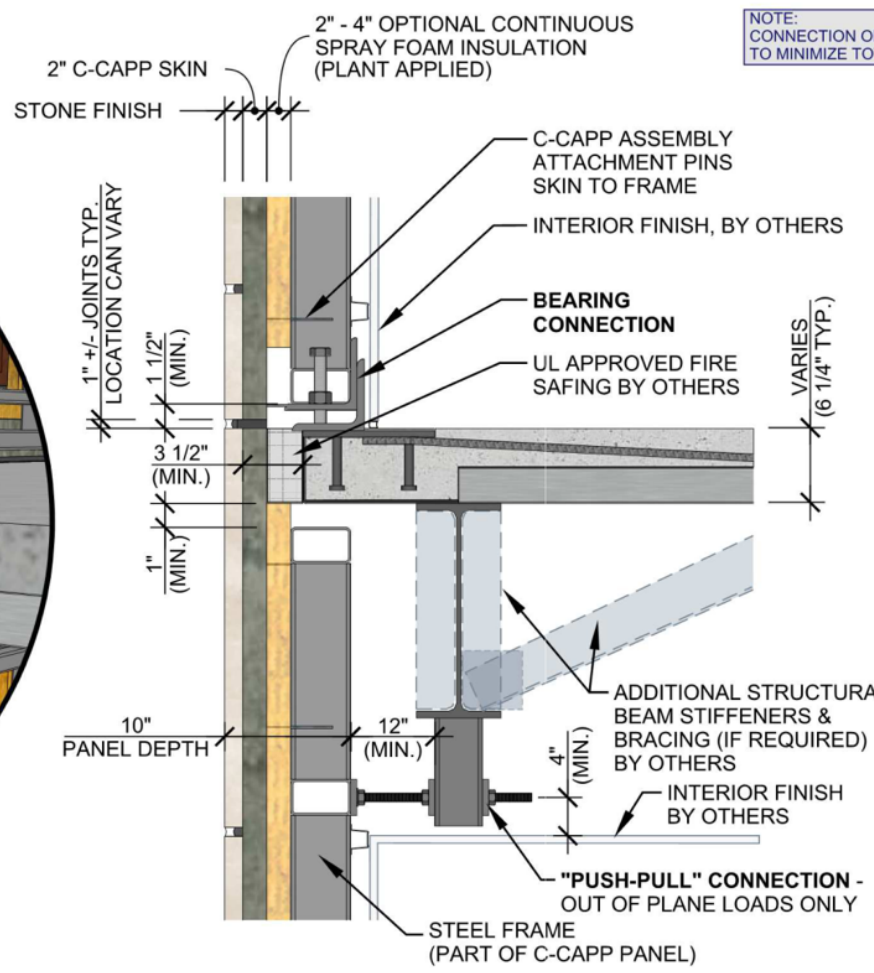
EXPLODED VIEW (ASSEMBLY)

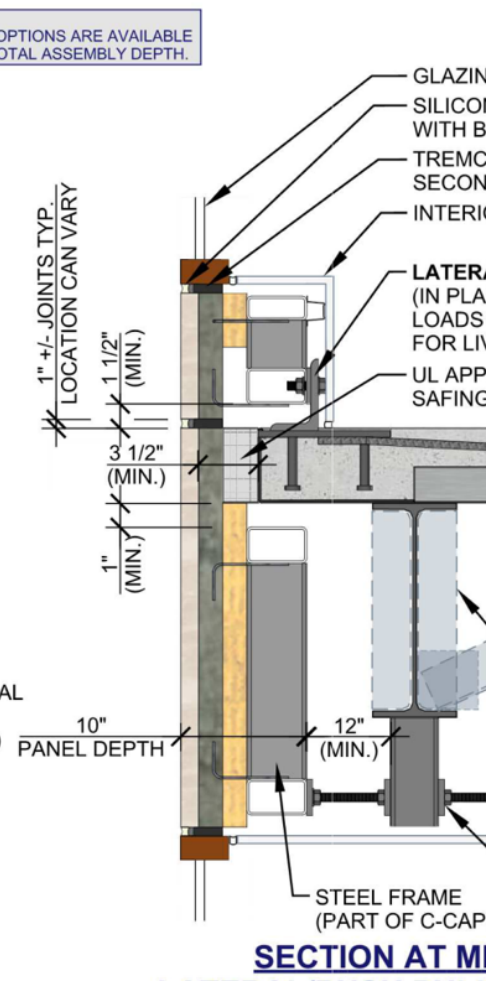


INTERIOR PERSPECTIVE VIEW



SECTION AT BEARING/PUSH PULL CONNECTION

NOTE:
CONNECTION OPTIONS ARE AVAILABLE
TO MINIMIZE TOTAL ASSEMBLY DEPTH.



SECTION AT MI
LATERAL/PUSH PULL

Date: 8.22.2017 | Version: 1 | By: E.L.B. | Checked: D.W.

APPENDIX B: MODELLING PARAMETERS AND ASSUMPTIONS

B.1 THERMAL MODELLING ASSUMPTIONS

For this report, a steady-state conduction model was used. The following parameters were also assumed:

- Material properties were taken from information provided by R-Stud LLC and ASHRAE Handbook – Fundamentals for common materials.
- Where the insulation is compressed, the R-value and conductivity of the insulation was determined using the methodology in ASHRAE 90.1-2013, Section A.9.4.3.
- The C-CAPP cavity insulation is compressed between the C-CAPP panel and the HSS frame. It was assumed that the insulation thus exhibits a parabolic curved cross-section until the insulation is fully uncompressed.
- Enclosed air spaces were modelled with an equivalent thermal conductivity of the air that include the impacts of convection and radiation within the enclosure. Calculations for this equivalent conductivity were based on ISO 10077.
- Interior/exterior air films were taken from Table 1, p. 26.1 of 2009 ASHRAE Handbook – Fundamentals depending on surface orientation. The exterior air films were based on an exterior windspeed of 15 mph.
- The exterior temperature was taken to be the 99% design temperature for Los Angeles, CA from 2017-ASHRAE Handbook of Fundamentals.
- From the calibration in 1365-RP, contact resistances between materials were modeled and varied between R-0.01 and R-0.2 depending on the materials and interfaces.
- Insulation and other components were considered tight to adjacent interfaces.
- The clear field transmittances included in this analysis include uniform thermal bridges, such as studs and HSS framing.

B.2 BOUNDARY CONDITIONS

Table B2.1: Boundary Conditions

Boundary Location	Surface Temperature °F	Combined Convective and Radiation Heat Transfer Coefficient BTU/hft²°F (W/m²K)
Exterior Surfaces	46.8	6.0 (34)
Interior Walls	68	1.5 (8.3)

B.3 MATERIAL PROPERTIES

B3.1: 6 inch R-Stud with R-21 in Stud Cavity

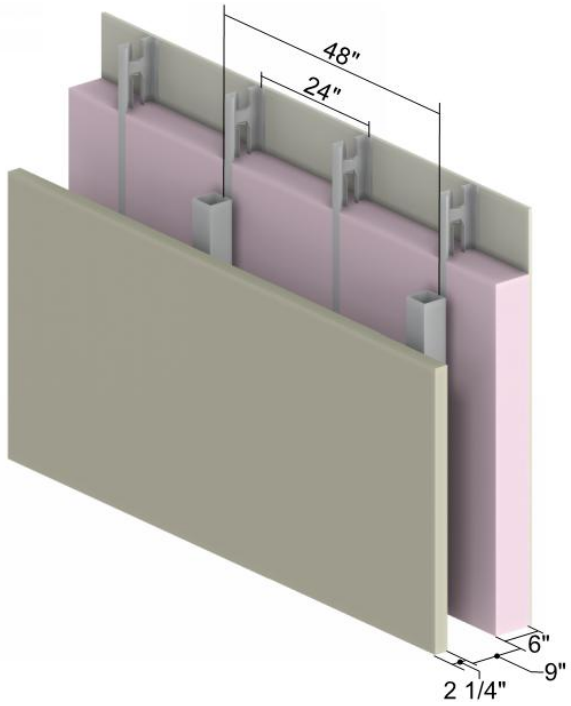


Table B3.1.1: Material Properties

Component	Material	Thickness In (mm)	Thermal Conductivity Btu in / ft² hr °F (W/m K)	Nominal Resistance ft² hr °F / Btu (m² K/W)
Interior Film	-	-	-	R-0.7 (0.12 RSI)
Gypsum	Gypsum	5/8 (16)	1.1 (0.16)	R-0.6 (0.10 RSI)
R-Stud	Galvanized Steel	18 Gauge	430 (62)	-
Stud Cavity	R-21 Batt Insulation	6 (152)	0.29 (0.041)	R-21 (3.7 RSI)
Framing Airspace	Air	-	-	R-0.9 (0.16 RSI)
HSS Frame	Steel	1/4 (6.4)	347 (50)	-
Precast Concrete Panel	Precast Concrete	2 1/4 (89)	12.5 (1.8)	R-0.18 (0.032 RSI)
Air Spaces[1]	Air	Varies	Varies	-
Exterior Film	-	-	-	R-0.2 (0.03 RSI)
Overall Assembly 1D	-	-	-	R-23.5 (4.1 RSI)

[1] The thermal conductivities of the air spaces were determined according to ISO 10077

B3.2: 4 inch R-Stud with R-13 in Stud Cavity

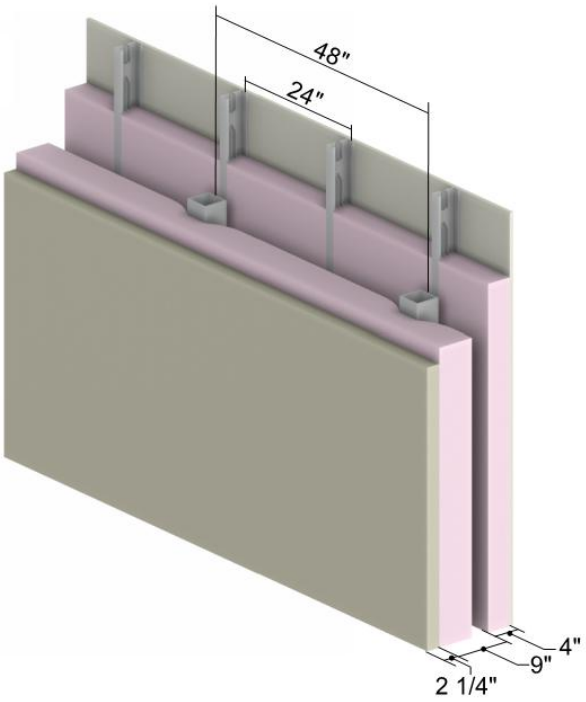


Table B3.2.1: Material Properties

Component	Material	Thickness In (mm)	Thermal Conductivity Btu in / ft² hr °F (W/m K)	Nominal Resistance ft² hr °F / Btu (m² K/W)
Interior Film	-	-	-	R-0.7 (0.12 RSI)
Gypsum	Gypsum	5/8 (16)	1.1 (0.16)	R-0.6 (0.10 RSI)
R-Stud	Galvanized Steel	18 Gauge	430 (62)	-
Stud Cavity	R-13 Batt Insulation	4 (102)	0.31 (0.044)	R-13 (2.9 RSI)
HSS Frame	Steel	1/4 (6.4)	347 (50)	-
C-CAP Frame Airspace	Air	Varies	-	R-0.9 (0.16 RSI)
C-CAPP Frame Cavity	R-21 Batt Insulation	Varies	-	R-21 (3.7 RSI)
Precast Concrete Panel	Precast Concrete	2 1/4 (89)	12.5 (1.8)	R-0.18 (0.032 RSI)
Air Spaces[1]	Air	Varies	Varies	-
Exterior Film	-	-	-	R-0.2 (0.03 RSI)
Overall Assembly 1D	-	-	-	R-36.5 (6.4 RSI)

[1] The thermal conductivities of the air spaces were determined according to ISO 10077

APPENDIX C: SIMULATED TEMPERATURE PROFILES

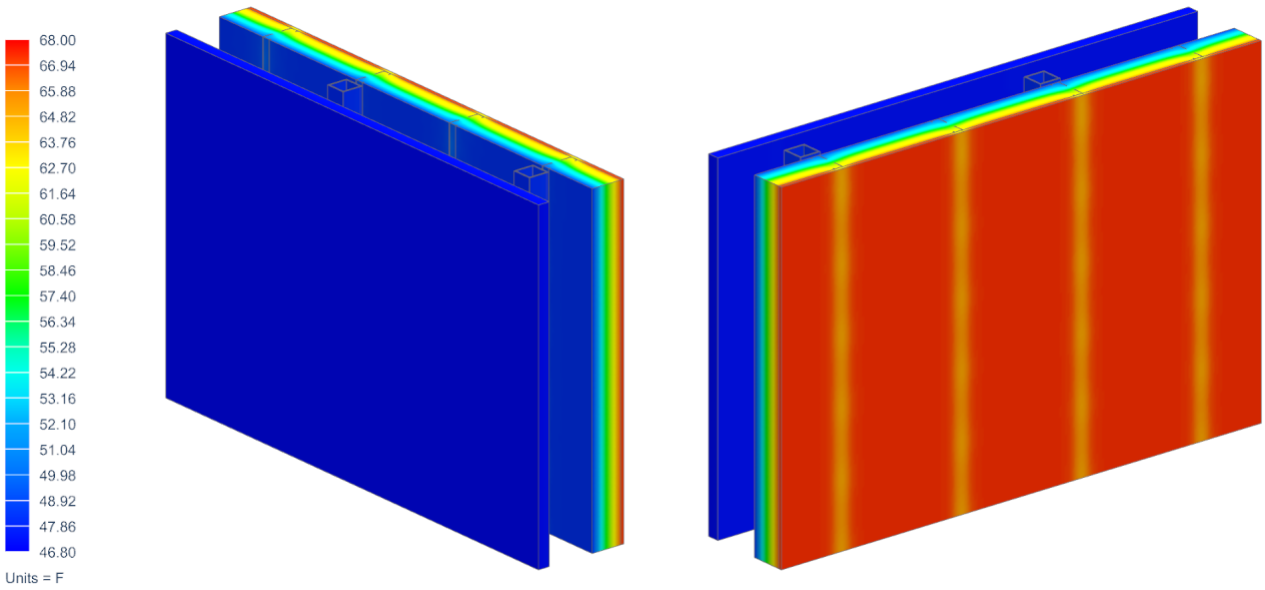


Figure C1.1: 6 inch R-Stud Spaced 24 inches o.c. with R-21 Batt Insulation in Stud Cavity: Isometric view from exterior and interior

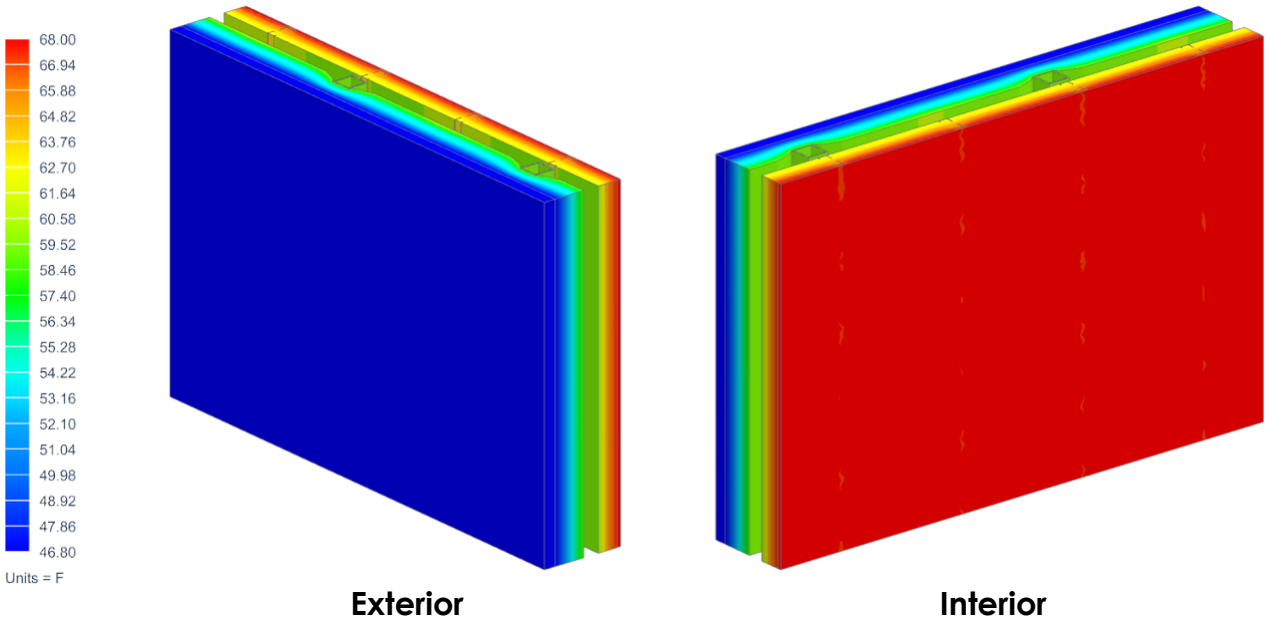


Figure C1.2: 4 inch R-Stud Spaced 24 inches o.c. with R-13 Batt Insulation in Stud Cavity: Isometric view from exterior and interior

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Product Submittal Sheet

Specification and Code Information

This submittal is for Engineers, Architects, Contractors, and Professionals for the purpose of submitting R-stud products for review and approval.

Specification and Code: 2012 and 2015 International Building Code (IBC) North American Specification for the Design of Cold Formed Steel Structural Members, NASPEC.

Gypsum Association Fire Resistance Design Manual Underwriters Laboratories, Inc.

Material Specifications

R-stud products are cold-formed shaped manufactured from steel coils meeting ASTM A653/A653M or ASTM A1003/A1003M Specifications from Grade 50 to Grade 55 with material thicknesses from 18 mil (0.0179 inches) to 60 mil (0.060 inches). For material strength, members shall be marked legibly in the web identifying the material yield strength.

Corrosion Protection

R-stud products have protective coating specified as G60 and G90 coating designations.
Material thicknesses from 18 to 43 mil have a minimum of G60 coating, and 54 to 60 mil have a minimum of G90 coating.

Design Specifications

R-stud products are designed in accordance with 2001 NASPEC and 2004 Supplement Specifications and/or 2007 NASPEC and 2010 Supplement Specifications.

Material Tolerances

R-stud products comply with manufacturing tolerances listed in ASTM C955 for structural members and ASTM C645 for non-structural framing members.

Product Identification

R-stud products are identified with legible stamps spaced at a maximum of 24 inches on center located on the web of the framing member in accordance with ASTM C654, C955, A1003, and AISI S102-07 Specifications.

Design Specifications

R-stud products are designed in accordance with 2001 NASPEC and 2004 Supplement Specifications and/or 2007 NASPEC and 2010 Supplement Specifications.

Material Tolerances

R-stud products comply with manufacturing tolerances listed in ASTM C955 for structural members and ASTM C645 for non-structural framing members.

Product Identification

R-stud products are identified with legible stamps spaced at a maximum of 24 inches on center located on the web of the framing member in accordance with ASTM C654, C955, A1003, and AISI S102-07 Specifications.

R-stud products are in accordance with the following referenced **AISI** (American Iron and Steel Institute; Washington, DC) and **ASTM** (American Society for Testing and Materials; West Conshohocken, PA) structural and material codes:

AISI S100-12, North American Specification for the Design of Cold-Formed Steel Structural Members; 2012.

AISI S201-07, North American Specification for the Design of Cold-Framing – Product Data; 2007.

AISI S902-08, Stub-Column Test Method for Effective Area of Cold-Formed Steel Columns; 2008.

AISI S909-13, Standard Test Method for Determining the Web Crippling Strength of Cold-Formed Steel Beams; 2013.

ASTM A1003/A1003M, Standard Specification for Sheet Steel, Carbon, Metallic and Non-Metallic Coated for Cold-formed Framing Members.

ASTM A370-17, Standard Test Method and Definitions for Mechanical Testing of Steel Products; 2017.

ASTM A653/A653M, Standard Specification for Steel Sheet Zinc-coated (Galvanized) or Zinc-Iron-coated (Galvanized) by the Hot-Kip Process.

ASTM A792/A792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

ASTM C1002, Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

ASTM C1513, Standard Specification for Steel Tapping Screws for Cold-formed Steel Framing Connections.

ASTM C645, Standard Specification for Non-structural Steel Framing Members.

ASTM C754, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

ASTM C954, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 to 0.112-inch Thickness.

ASTM C955, Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases.

AWS D1.3, Structural Welding Code-Sheet Steel, 1998 Edition; American Welding Society (AWS), Miami, FL.

CAN/CSA-S136, North American Specification for the Design of Cold-formed Steel Structural Members; Canadian Standards Association (CSA), Mississauga, Ontario, Canada.

ICC-ES AC46, Acceptance Criteria for Cold-Formed Steel Framing Members; International Code Council Evaluation Service, Inc. (ICC-ES), Whittier, CA, 2015.

R-stud (Structural and Non-Structural)

R-stud is registered as Red List Free by the Living Future Institute:
https://access.living-future.org/r-stud-slotted-steel-framing

R-stud sources its steel coils from USS-POSCO in Pittsburg, California. According to research by the Steel Recycling Institute, the coils used by R-stud contain approximately 34.2% recycled content.

R-stud Post-consumer scrap accounts for approximately 19.8% by weight.
R-stud Pre-consumer scrap accounts for approximately 14.4% by weight.

Description

Both Non-Structural and Structural R-studs are S-members (C-sections) and used as non-load bearing studs and joists. The are available in depths (webs) ranging from 3.625” – 6.000” with widths (flanges) ranging from 1.250” – 2.50.” Both Non-Structural and Structural (or Load Bearing) R-Studs, 400_RS_162_30mil_50ksi_G60 and 400_RS_162_30mil_50ksi_G60 are shown in Figures 1 and 2, respectively.

Materials

R-studs are fabricated from 14 to 25-gauge hot dipped galvanized steel. Designated minimum steel thicknesses range from 18 – 60 mil and are made from steel coils conforming to ASTM A653 SS Grade 50, Class 1, or Grade 55 mod 57, with a minimum G60 galvanized coating (other coatings [40, 90] are available) or ASTM A1003 Non-Structural Grade 33, Grade 50, or Grade 57.

P.O. Box 692
10580 Donald Rd. NE
Donald, OR 97020
888-241-1985
www.rstud.com

Product Submittal Sheet

Color Codes for Mil Callouts

Mil	Color
18	Clear
30	White
43	Yellow
54	Green
60	Orange

ASTM Code Standards

IBC
2009/2012

AISI
NASPEC 2007

Meets or Exceeds

ASTM C754 and ASTM C645
ASTM E119 and E90
ASTM A370
ASTM A1003
ASTM C1513

Manufacturer Contact Information: (888) 241-1985
Manufacturing Plant: 10580 Donald Road, NE, Donald, Oregon 97020
Mailing Address: P.O. Box 692, Donald, Oregon, 97020

Member Gauge	Design Thickness	Minimum Thickness
25	0.0188	0.0179
18 EQ	0.0312	0.0296
16 EQ	0.0451	0.0428
14 EQ	0.0566	0.0538
14	0.0713	0.0677

The R-stud is identified through the nomenclature:
600 is the stud depth, 600 = 6 inches.
RS denotes the R-stud.
162 calls out the flange width, 162 = 1.625 inches.
30 mil and 43 mil are the base steel thickness in mils (1000's of an inch).
50 Ksi (50,000 psi) is the yielding strength of the steel in thousands of pounds per square inch.
G60 is the galvanization rating.

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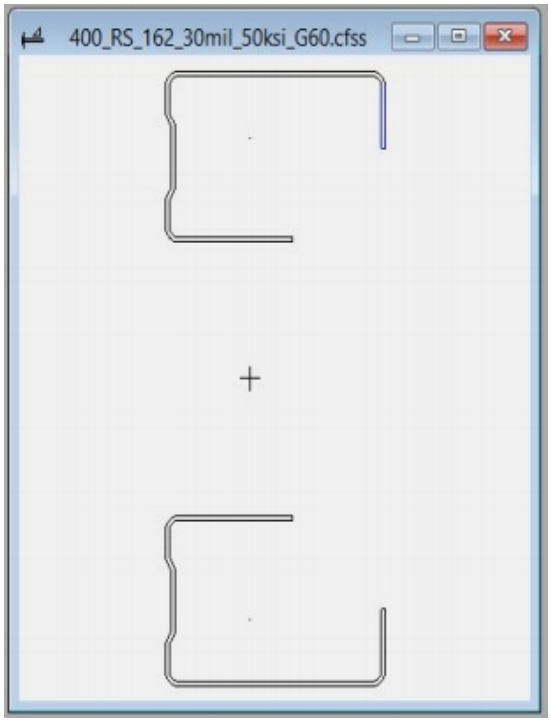


Figure 1. The 400_RS_162_30mil_50ksi_G60 R-stud.

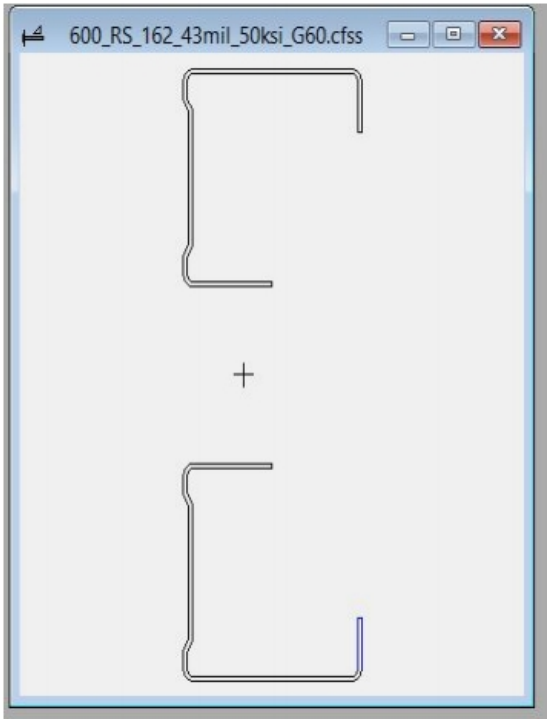


Figure 2. The 600_RS_162_30mil_50ksi_G60 R-stud.

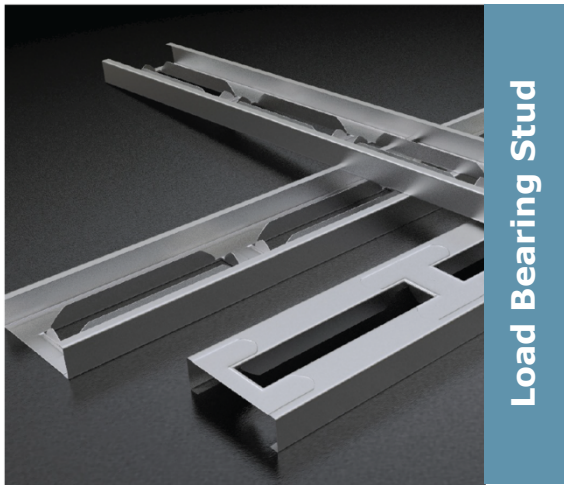
R-stud
STEEL FRAMING STUDS
P.O. Box 692
10580 Donald Rd. NE
Donald, OR 97020
888-241-1985
www.rstud.com

Product Data Sheet

U.S. Patent # US7866112
U.S. Patent # US7743578
U.S. Patent # US8424266

Product category: R-stud 54 mil Load Bearing Stud
Product name: 600RS200-54 50KSI G90
6" x 2" R-stud

Coating: G90
Color coding: Green



Web openings (not punch-outs) formed from web every 12 in. with Stamping at bridge every 12 in.

Geometric Properties

Web depth	6.000 in	Weight	1.991 lb/ft
Flange width	2.00 in	Web opening width	2.0 in
Stiffening lip	0.500 in	Web opening length	9-13/16 in
Design thickness	0.0566 in	Minimum thickness	0.0538 in
Yield stress, Fy	50 Ksi		

Gross Section Properties of Full Section, Strong Axis*

Cross sectional area (A)	0.59731 in^2
Moment of inertia (Ix)	3.3771 in^4
Radius of gyration (Rx, r1)	2.3778 in
Moment of inertia (Iy)	0.2870 in^4
Radius of gyration (Ry, r2)	0.6931 in
Max bending moment Ix (Maxo)	35.775 k-in
Max bending moment Iy (Mayo)	7.829 k-in
Allowable shear force in web (Vax)	4.399 k

Tension/Compression Properties*

Warping constant (Cw)	0.094432 in^6
Distance from shear center to neutral axis (Xo)	-0.9823 in
Radii of gyration (ro)	2.6644 in
Torsional flexural constant (Beta)	FEA-in^4
Compression Pao (max)	16.933 k
Tension Tao (Ta)	20.906 k
Unbraced Length (Lu)	Full / Non-braced

Fully Braced Strength (CFS) *CFS result

ASTM & Code Standards:

- ✓ ICC-NTA ESR
- ✓ IBC 2012 Compliant
- ✓ AISI S902-08 & S909-13
- ✓ AISI A370-17 & S100-12
- ✓ ASTM AC46, C645, & C745
- ✓ UL Two Hour Load Bearing Fire

Notes:

- Calculated properties are based on AISI S100-12, North American Specifications for Cold-Formed Steel Structure Members and ICC-ES AC46-2015, Acceptance Criteria for Cold-Formed Steel Framing Members.
- Effective properties herein incorporate the increased strength from cold working of the steel while forming. We only use 50Ksi coils.
- Tabulated gross properties, including torsional properties, are based on the added cross section properties of the web openings. R-studs do not have punch-outs.
- Allowable moment includes cold work of forming.
- Allowable moment is taken as the lowest value based on local or distortional buckling. Distortional buckling strength is based on K-phi=0
- For deflection calculations, use the effective moment of inertia.
- Web openings are every 12 inches and are 9-13/16 inches long with flanges being 0.94 inches tall and corners of the web openings enhanced.

Sustainability: R-stud sources its steel coils from USS-POSCO in Pittsburg, California for rolling in our manufacturing facility in Donald, Oregon. Our coils contain approximately 34.2% recycled steel. Approximately 19.8% is Post-consumer content, while Pre-consumer content is approximately 14.4%. R-studs are listed as "Red List Free" by the International Living Future Institute. Steel is one of the most sustainable building materials in the world. It is recycled content, recyclable, durable, safe, zinc-coated, dimensionally stable and strong, as well as not susceptible to rot, termites, or mold.

Supporting Documentation

- 2016 AISI - ASD, LRFD, and LSD
- 2012 AISI - ASD, LRFD, and LSD
- 2010 AISI - ASD, LRFD, and LSD
- 2007 AISI - ASD, LRFD, and LSD
- 2004 AISI - ASD, LRFD, and LSD
- 2001 AISI - ASD, LRFD, and LSD
- 1999 AISI - ASD and LRFD & 2002 ASCE – ASD and LRFD (stainless steel)

Project Information	Contractor Information	Architect Information
Name:	Name:	Name:
Address:	Contact:	Contact:
	Phone:	Phone:
	Fax:	Fax:

R-stud
STEEL FRAMING STUDS
P.O. Box 692
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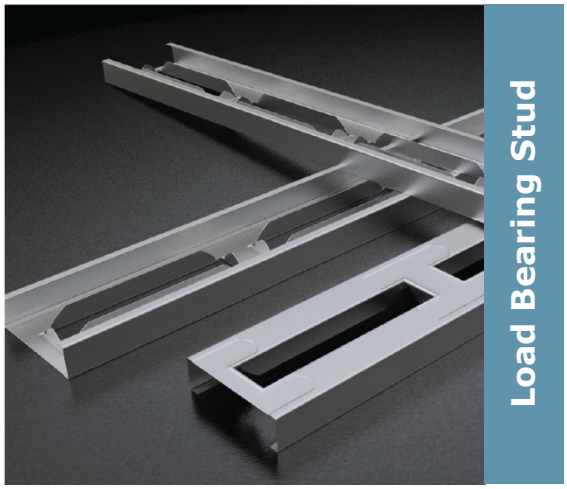
888-241-1985
www.rstud.com

Product Data Sheet

U.S. Patent # US7866112
U.S. Patent # US7743578
U.S. Patent # US8424266

Product category: R-stud 43 mil Load Bearing Stud
Product name: 600RS200-43 50KSI G90
6" x 2" R-stud

Coating: G60
Color coding: White



Web openings (not punch-outs) formed from web every 12 in. with Stamping at bridge every 12 in.

Geometric Properties

Web depth	6.000 in	Weight	1.6514 lb/ft*
Flange width	2.00 in	Web opening length	9-13/16 in
Stiffening lip	0.625 in	Web opening width	2.00 in
Design thickness	0.0456 in	Minimum thickness	0.0428 in
Yield stress, Fy	50 Ksi		

Gross Section Properties of Full Section, Strong Axis*

Cross sectional area (A)	0.48571 in^2
Moment of inertia (Ix)	2.7462 in^4
Radius of gyration (Rx, r1)	2.3778 in
Moment of inertia (Iy)	0.2362 in^4
Radius of gyration (Ry, r2)	0.6973 in
Max bending moment Ix (Maxo)	28.417 k-in
Max bending moment Iy (Mayo)	6.162 k-in
Allowable shear force in web (Vax)	3.587 k

Tension/Compression Properties*

Warping constant (Cw)	0.079270-in^6
Distance from shear center to neutral axis (Xo)	-0.9848 in
Radii of gyration (Ro)	2.6665 in
Torsional flexural constant (Beta)	FEA-in^4
Compression Pao (max)	13.294 k
Tension Tao (Ta)	17.000 k
Unbraced Length (Lu)	Full / Non-braced

Fully Braced Strength (CFS) *CFS result

ASTM & Code Standards:

- ✓ ICC-NTA ESR
- ✓ IBC 2012 Compliant
- ✓ AISI S902-08 & S909-13
- ✓ AISI A370-17 & S100-12
- ✓ ASTM AC46, C645, & C745
- ✓ UL Two Hour Load Bearing Fire

Notes:

- Calculated properties are based on AISI S100-12, North American Specifications for Cold-Formed Steel Structure Members and ICC-ES AC46-2015, Acceptance Criteria for Cold-Formed Steel Framing Members.
- Effective properties herein incorporate the increased strength from cold working of the steel while forming. We only use 50Ksi coils.
- Tabulated gross properties, including torsional properties, are based on the added cross section properties of the web openings. R-studs do not have punch-outs.
- Allowable moment includes cold work of forming.
- Allowable moment is taken as the lowest value based on local or distortional buckling. Distortional buckling strength is based on K-phi=0
- For deflection calculations, use the effective moment of inertia.
- Web openings are every 12 inches and are 9-13/16 inches long with flanges being 0.94 inches tall and corners of the web openings enhanced.

Sustainability: R-stud sources its steel coils from USS-POSCO in Pittsburg, California for rolling in our manufacturing facility in Donald, Oregon. Our coils contain approximately 34.2% recycled steel. Approximately 19.8% is Post-consumer content, while Pre-consumer content is approximately 14.4%. R-studs are listed as "Red List Free" by the International Living Future Institute. Steel is one of the most sustainable building materials in the world. It is recycled content, recyclable, durable, safe, zinc-coated, dimensionally stable and strong, as well as not susceptible to rot, termites, or mold.

Supported Documentation

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- 2012 AISI - ASD, LRFD, and LSD
- 2010 AISI - ASD, LRFD, and LSD
- 2007 AISI - ASD, LRFD, and LSD
- 2004 AISI - ASD, LRFD, and LSD
- 2001 AISI - ASD, LRFD, and LSD
- 1999 AISI - ASD and LRFD & 2002 ASCE – ASD and LRFD (stainless steel)

Project Information	Contractor Information	Architect Information
Name:	Name:	Name:
Address:	Contact:	Contact:
	Phone:	Phone:
	Fax:	Fax:

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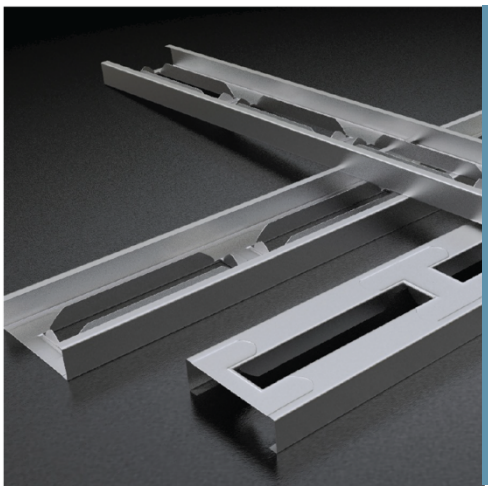
Product Data Sheet

U.S. Patent # US7866112
U.S. Patent # US7743578
U.S. Patent # US8424266

Product category: R-stud 54 mil Load Bearing Stud
Product name: 600RS162-54 50KSI G90
6" x 1-5/8" R-stud

Coating: G90
Color coding: Green



Web openings (not punch-outs) formed from web every 12 in. with Stamping at bridge every 12 in.

ASTM & Code Standards:
- ✓ ICC-NTA ESR
- ✓ IBC 2012 Compliant
- ✓ AISI S902-08 & S909-13
- ✓ AISI A370-17 & S100-12
- ✓ ASTM AC46, C645, & C745
- ✓ UL Two Hour Load Bearing Fire

Geometric Properties

Web depth	6.000 in	Weight	2.0805 lb/ft
Flange width	1.625 in	Web opening length	9-13/16 in
Stiffening lip	0.625 in	Web opening width	2-3/16 in
Design thickness	0.054 in	Minimum thickness	0.054 in
Yield stress, Fy	50 Ksi		

Gross Section Properties of Full Section, Strong Axis*

Cross sectional area (A)	0.56145 in^2
Moment of inertia (Ix)	2.9310 in^4
Radius of gyration (Rx, r1)	2.2848 in
Moment of inertia (Iy)	0.1714 in^4
Radius of gyration (Ry, r2)	0.5362 in
Max bending moment Ix (Maxo)	33.231 k-in
Max bending moment Iy (Mayo)	5.2591 k-in
Allowable shear force in web (Vax)	3.418 k

Tension/Compression Properties*

Warping constant (Cw)	0.077029 in^6
Distance from shear center to neutral axis (Xo)	-0.8367 in
Radii of gyration (Ro)	2.4916 in
Torsional flexural constant (Beta)	FEA-in^4
Compression Pao(max)	16.909 k
Tension Tao (Ta)	19.651 k
Unbraced Length (Lu)	Full / Non-braced

Fully Braced Strength (CFS) *CFS result

Notes:
- Calculated properties are based on AISI S100-12, North American Specifications for Cold-Formed Steel Structure Members and ICC-ES AC46-2015, Acceptance Criteria for Cold-Formed Steel Framing Members.
- Effective properties herein incorporate the increased strength from cold working of the steel while forming. We only use 50Ksi coils.
- Tabulated gross properties, including torsional properties, are based on the added cross section properties of the web openings. R-studs do not have punch-outs.
- Allowable moment includes cold work of forming.
- Allowable moment is taken as the lowest value based on local or distortional buckling. Distortional buckling strength is based on K-phi=0
- For deflection calculations, use the effective moment of inertia.
- Web openings are every 12 inches and are 9-13/16 inches long with flanges being 0.94 inches tall and corners of the web openings enhanced.

Sustainability: R-stud sources its steel coils from USS-POSCO in Pittsburg, California for rolling in our manufacturing facility in Donald, Oregon. Our coils contain approximately 34.2% recycled steel. Approximately 19.8% is Post-consumer content, while Pre-consumer content is approximately 14.4%. R-studs are listed as "Red List Free" by the International Living Future Institute. Steel is one of the most sustainable building materials in the world. It is recycled content, recyclable, durable, safe, zinc-coated, dimensionally stable and strong, as well as not susceptible to rot, termites, or mold.

Supported Documentation

- 2016 AISI - ASD, LRFD, and LSD
- 2012 AISI - ASD, LRFD, and LSD
- 2010 AISI - ASD, LRFD, and LSD
- 2007 AISI - ASD, LRFD, and LSD
- 2004 AISI - ASD, LRFD, and LSD
- 2001 AISI - ASD, LRFD, and LSD
- 1999 AISI - ASD and LRFD & 2002 ASCE – ASD and LRFD (stainless steel)

Project Information	Contractor Information	Architect Information
Name:	Name:	Name:
Address:	Contact:	Contact:
	Phone:	Phone:
	Fax:	Fax:

R-stud
STEEL FRAMING STUDS

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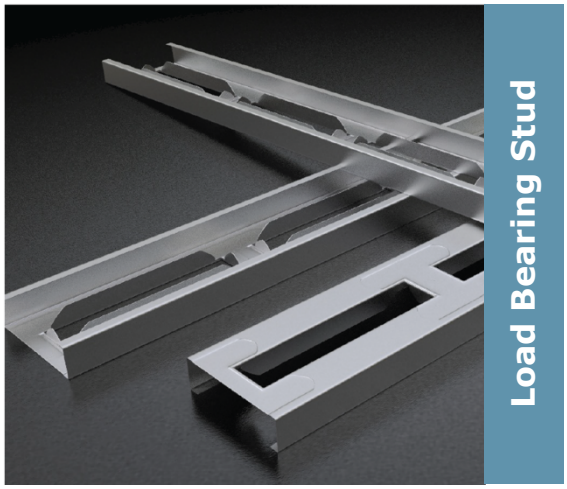
Donald, OR 97020
888-241-1985
www.rstud.com

Product Data Sheet

U.S. Patent # US7866112
U.S. Patent # US7743578
U.S. Patent # US8424266

Product category: R-stud 43 mil Load Bearing Stud
Product name: 600RS162-43 50KSI G60/G90
6" x 1-5/8" R-stud

Coating: G60/G90
Color coding: Yellow



Web openings (not punch-outs) formed from web every 12 in. with Stamping at bridge every 12 in.

Geometric Properties

Web depth	6.000 in	Weight	0.1.479 lb/ft
Flange width	1.625 in	Web opening length	9-13/16 in
Stiffening lip	0.500 in	Web opening width	2.00 in
Design thickness	0.0451 in	Minimum thickness	0.0428 in
Yield stress, Fy	50 Ksi		

Gross Section Properties of Full Section, Strong Axis

Cross sectional area (A)	0.43497 in^2
Moment of inertia (Ix)	2.3734 in^4
Radius of gyration (Rx, r1)	2.3359 in
Moment of inertia (Iy)	0.1312 in^4
Radius of gyration (Ry, r2)	0.5491 in
Max bending moment Ix (Maxo)	21.655 k-in
Max bending moment Iy (Mayo)	4.052 k-in
Allowable shear force in web (Vax)	2.355 k

Tension/Compression Properties

Warping constant (Cw)	0.050356 in^6
Distance from shear center to neutral axis (Xo)	-0.8337 in
Radii of gyration (Ro)	2.5403 in
Torsional flexural constant (Beta)	FEA-in^4
Compression Pao(max)	10.531 k
Tension Tao (Ta)	13.612 k
Unbraced Length (Lu)	Full / Non-braced

ASTM & Code Standards:
- ✓ ICC-NTA ESR
- ✓ IBC 2012 Compliant
- ✓ AISI S902-08 & S909-13
- ✓ AISI A370-17 & S100-12
- ✓ ASTM AC46, C645, & C745
- ✓ UL Two Hour Load Bearing Fire

Notes:
- Calculated properties are based on AISI S100-12, North American Specifications for Cold-Formed Steel Structure Members and ICC-ES AC46-2015, Acceptance Criteria for Cold-Formed Steel Framing Members.
- Effective properties herein incorporate the increased strength from cold working of the steel while forming. We only use 50Ksi coils.
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- Allowable moment is taken as the lowest value based on local or distortional buckling. Distortional buckling strength is based on K-phi=0
- For deflection calculations, use the effective moment of inertia.
- Web openings are every 12 inches and are 9-13/16 inches long with flanges being 0.94 inches tall and corners of the web openings enhanced.

Sustainability: **R-stud** sources its steel coils from USS-POSCO in Pittsburg, California for rolling in our manufacturing facility in Donald, Oregon. Our coils contain approximately 34.2% recycled steel. Approximately 19.8% is Post-consumer content, while Pre-consumer content is approximately 14.4%. R-studs are listed as "Red List Free" by the International Living Future Institute. Steel is one of the most sustainable building materials in the world. It is recycled content, recyclable, durable, safe, zinc-coated, dimensionally stable and strong, as well as not susceptible to rot, termites, or mold.

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- 2012 AISI - ASD, LRFD, and LSD
- 2010 AISI - ASD, LRFD, and LSD
- 2007 AISI - ASD, LRFD, and LSD
- 2004 AISI - ASD, LRFD, and LSD
- 2001 AISI - ASD, LRFD, and LSD
- 1999 AISI - ASD and LRFD & 2002 ASCE – ASD and LRFD (stainless steel)

Project Information	Contractor Information	Architect Information
Name:	Name:	Name:
Address:	Contact:	Contact:
	Phone:	Phone:
	Fax:	Fax:

R-stud
STEEL FRAMING STUDS
P.O. Box 692
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888-241-1985
www.rstud.com

Product Data Sheet

U.S. Patent # US7866112
U.S. Patent # US7743578
U.S. Patent # US8424266

Product category: R-stud 43 mil Load Bearing Stud
Product name: 600RS162-43 50KSI G60/G90
6" x 1-5/8" R-stud
18 Gauge actual / 16 Gauge EQ

Composite Limiting Wall Heights (unbraced)

Spacing (inches)	5 psf			7.5 psf			10 psf		
	L/120	L/240	L/360	L/120	L/240	L/360	L/120	L/240	L/360
12	45'4"	36'1"	31'4"	39'7"	31'5"	27'5"	35'11"	28'7"	24'11"
16	41'2"	32'7"	28'9"	35'11"	28'8"	24'10"	32'8"	25'11"	22'8"
24	35'11"	28'10"	24'11"	31'6"	25'1"	21'9"	28'9"	22'7"	19'11"

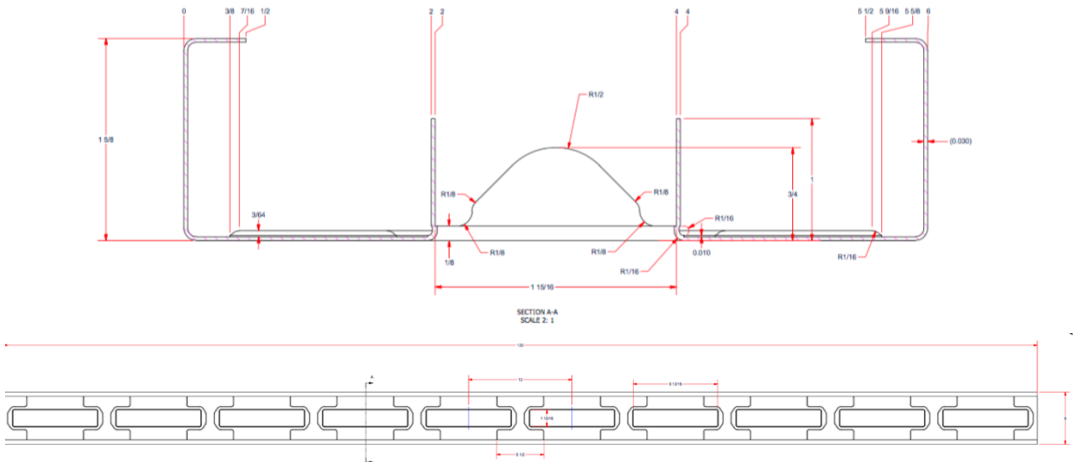
Composite Table Notes:
- Allowable composite limiting heights were determined from AC86-2012 testing by Intertek Testing / Architectural Testing, Inc.
- The composite limiting heights tables provided above are based on a single layer of Type X gypsum board from the following manufacturers, American, CertainTeed, Georgia Pacific, National, PABCO, and USG.
- The gypsum is to be applied full height in the vertical orientation to each stud flange and installed in accordance with ASTM C754-2004 using a minimum of No. 6 Type S Drywall spaced as listed below:
  - Screws spaced a minimum of 16 inches on-center to framing members spaced at 12 or 16 inches on-center.
  - Screws spaced a minimum of 12 inches on-center to framing members spaced at 24 inches on-center.
- No fasteners are required for attaching the stud to the track except as detailed in ASTM C754-2008.

Non-Composite Limiting Wall Heights (unbraced)

Spacing (inches)	5 psf			7.5 psf			10 psf		
	L/120	L/240	L/360	L/120	L/240	L/360	L/120	L/240	L/360
12	39'5"	31'5"	27'6"	34'5"	27'4"	23'10"	31'3"	24'10"	21'8"
16	35'9"	28'7"	24'9"	31'3"	24'11"	21'8"	28'5"	22'7"	19'8"
24	31'3"	24'8"	21'8"	27'4"	21'9"	18'11"	25'1"	19'7"	12'6"

Non-Composite Table Notes:
- Heights are based on AISI S100-07, North American Specification, and AISI S220-11, North American Standard for Cold-Formed Steel Framing – Nonstructural Members.
- Above listed Non-Composite Limiting Wall Heights are applicable when unbraced length is less than or equal to Lu.
- Heights are limited by moment, deflection, shear, and web crippling (assuming 1" end reaction bearing).

Profile



Project Information	Contractor Information	Architect Information
Name:	Name:	Name:
Address:	Contact:	Contact:
	Phone:	Phone:
	Fax:	Fax:

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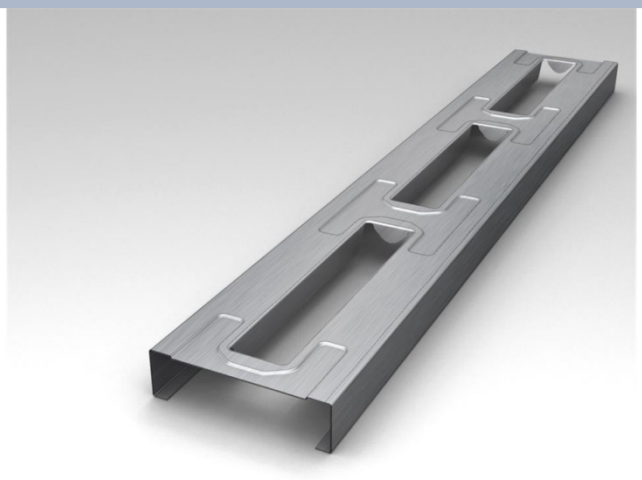

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5 PSF LATERAL LOAD

Wall Height	Spacing	600RS162 50 Ksi					600RS200 50 Ksi					600RS225 50 Ksi				
Ft	in OC	30 Mil	33 Mil	43 Mil	54 Mil	60 Mil	30 Mil	33 Mil	43 Mil	54 Mil	60 Mil	30 Mil	33 Mil	43 Mil	54 Mil	60 Mil
	12	2.92	3.67	6.06	7.98	8.23	3.15	4.41	7.56	10.07	10.12	3.34	4.51	7.66	10.17	10.22
8	16	2.87	3.62	6.02	7.91	8.16	3.09	4.36	7.51	10.02	10.07	3.28	4.46	7.61	10.12	10.17
	24	2.78	3.53	5.91	7.83	8.08	2.99	4.26	7.41	9.93	9.98	3.13	4.36	7.51	10.03	10.08
	12	2.88	3.60	5.99	7.91	8.16	3.08	4.33	7.41	9.89	9.94	3.29	4.43	7.51	9.99	10.04
9	16	2.82	3.53	5.87	7.86	8.11	3.01	4.26	7.36	9.83	9.88	3.21	4.36	7.46	9.93	9.98
	24	2.7	3.42	5.79	7.76	8.01	2.88	4.13	7.22	9.71	9.76	3.02	4.23	7.32	9.81	9.86
	12	2.83	3.59	5.97	7.87	8.12	3.00	4.23	7.24	9.68	9.73	3.24	4.33	7.34	9.78	9.83
10	16	2.75	3.51	5.78	7.80	8.05	2.92	4.16	7.16	9.60	9.65	3.11	4.26	7.26	9.70	9.75
	24	2.6	3.37	5.49	7.67	7.92	2.75	3.98	6.99	9.44	9.49	2.88	4.08	7.09	9.54	9.59
	12	2.67	3.36	5.86	7.75	8.00	2.81	3.98	6.77	9.10	9.15	3.00	4.08	6.87	9.20	9.25
12	16	2.58	3.29	5.75	7.66	7.91	2.68	3.86	6.66	8.99	9.04	2.85	3.96	6.86	9.09	9.14
	24	2.35	3.06	5.34	7.45	7.70	2.44	3.62	6.41	8.76	8.81	2.53	3.72	6.51	8.86	8.91
	12	2.45	3.11	5.43	7.27	7.52	2.55	3.76	6.17	8.35	8.40	2.69	3.86	6.27	8.45	8.50
14	16	2.31	2.95	5.29	7.13	7.38	2.39	3.50	6.01	8.20	8.25	2.48	3.60	6.11	8.30	8.35
	24	1.95	2.68	5.03	6.83	7.10	2.08	3.19	5.69	7.89	7.94	2.08	3.29	5.79	7.99	8.05
	12	2.18	2.81	4.79	6.53	6.85	2.26	3.28	5.48	7.48	7.53	2.34	3.38	5.58	7.58	7.63
16	16	1.96	2.62	4.54	6.35	6.66	2.06	3.05	5.28	7.27	7.32	2.09	3.15	5.38	7.37	7.42
	24	1.58	2.27	4.29	5.98	6.32	1.67	2.71	4.89	6.89	6.94	1.77	2.81	4.99	6.99	7.04

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15 PSF LATERAL LOAD

Wall Height	Spacing	600RS162					600RS200					600RS225				
		50 Ksi					50 Ksi					50 Ksi				
Ft	in OC	30 Mil	33 Mil	43 Mil	54 Mil	60 Mil	30 Mil	33 Mil	43 Mil	54 Mil	60 Mil	30 Mil	33 Mil	43 Mil	54 Mil	60 Mil
	12	2.14	3.64	5.87	7.72	7.97	2.77	4.11	7.26	9.79	9.84	3.06	4.21	7.36	9.89	9.94
8	16	2.00	3.52	5.75	7.60	7.85	2.63	3.96	7.11	9.65	9.70	3.01	4.06	7.21	9.75	9.80
	24	1.73	3.27	5.52	7.38	7.63	2.35	3.76	6.81	9.37	9.42	2.92	3.86	6.91	9.47	9.52
	12	2.02	3.53	5.76	7.61	7.86	2.63	3.94	7.02	9.53	9.58	3.00	4.04	7.12	9.63	9.68
9	16	1.86	3.37	5.61	7.46	7.70	2.46	3.75	6.83	9.35	9.40	2.94	3.85	6.93	9.45	9.50
	24	1.51	3.16	5.31	7.17	7.42	2.10	3.37	6.46	8.99	9.04	2.82	3.47	6.56	9.09	9.14
	12	1.89	3.41	5.64	7.45	7.73	2.48	3.76	6.76	9.22	9.27	2.93	3.86	6.86	9.32	9.37
10	16	1.67	3.21	5.44	7.30	7.55	2.28	3.51	6.51	8.99	8.74	2.85	3.61	6.61	9.09	8.84
	24	1.26	2.82	5.17	6.93	7.18	1.83	3.06	6.04	8.38	8.60	2.80	3.16	6.14	8.68	8.70
	12	1.54	3.16	5.26	7.15	7.41	2.11	3.29	6.06	8.43	8.48	2.75	3.39	6.16	8.53	8.58
12	16	1.25	2.78	4.98	6.87	7.12	2.00	2.96	5.73	8.00	8.15	2.64	3.06	5.83	8.20	8.25
	24	0.70	2.26	4.44	6.33	6.57	1.23	2.34	5.08	7.37	7.52	2.42	2.44	5.18	7.57	7.62
	12	1.15	2.63	4.65	6.40	6.70	1.69	2.76	6.24	7.44	7.49	2.52	2.86	6.34	7.54	7.59
14	16	0.79	2.28	4.29	6.13	6.33	1.31	2.34	4.81	7.02	7.07	2.37	2.44	4.91	7.12	7.17
	24	0.14	1.58	3.61	5.32	5.62	0.62	1.62	4.02	6.23	6.18	2.09	1.68	4.12	6.33	6.38
	12	0.76	2.17	3.96	5.53	5.83	1.26	2.19	4.36	6.35	6.40	2.26	2.29	4.46	6.45	6.50
16	16	0.36	1.72	3.53	5.09	5.39	0.82	1.76	3.86	5.85	5.90	2.07	1.82	3.96	5.95	6.00
	24	-	0.87	2.78	4.27	4.57	-	0.97	2.98	4.95	5.00	1.82	1.11	3.08	5.05	5.10

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20 PSF LATERAL LOAD

Wall Height	Spacing	600RS162 50 Ksi					600RS200 50 Ksi					600RS225 50 Ksi				
Ft	in OC	30 Mil	33 Mil	43 Mil	54 Mil	60 Mil	30 Mil	33 Mil	43 Mil	54 Mil	60 Mil	30 Mil	33 Mil	43 Mil	54 Mil	60 Mil
	12	2.00	3.52	5.87	7.72	7.97	2.52	3.96	7.11	9.66	9.70	2.77	4.06	7.21	9.96	9.80
8	16	1.82	3.36	5.75	7.60	7.85	2.35	3.76	6.91	9.46	9.51	2.63	3.86	7.01	9.56	9.61
	24	1.47	3.13	5.52	7.38	7.63	1.98	3.37	6.52	9.10	9.15	2.35	3.47	6.62	9.20	9.25
	12	1.85	3.27	5.76	7.61	7.86	2.36	3.75	6.83	9.35	9.40	2.63	3.85	6.93	9.45	9.50
9	16	1.62	3.06	5.61	7.46	7.70	2.12	3.50	6.58	9.11	9.16	2.46	3.60	6.68	9.21	9.26
	24	1.18	2.65	5.31	7.17	7.42	1.66	3.02	6.06	8.64	8.69	2.10	3.12	6.16	8.74	8.79
	12	1.67	3.01	5.64	7.45	7.73	2.16	3.51	6.51	8.99	9.04	2.48	3.61	6.61	9.09	8.94
10	16	1.40	2.76	5.44	7.30	7.55	1.87	3.21	6.20	8.79	8.74	2.28	3.31	6.30	8.89	8.84
	24	0.85	2.24	5.17	6.93	7.18	1.32	2.71	5.59	8.12	8.17	1.83	2.81	5.69	8.22	8.27
	12	1.25	2.48	5.26	7.15	7.41	1.70	2.96	5.73	8.10	8.15	2.11	3.06	5.83	8.20	8.25
12	16	0.88	2.12	4.98	6.87	7.12	1.32	2.54	5.29	7.98	7.83	2.00	2.64	5.39	8.08	7.93
	24	0.19	1.44	4.44	6.33	6.57	0.92	1.76	4.47	6.87	6.92	1.23	1.86	4.57	6.97	7.02
	12	0.79	1.98	4.65	6.45	6.70	1.21	2.34	4.81	7.02	7.07	1.69	2.44	4.91	7.12	7.17
14	16	0.16	1.53	3.83	6.18	6.33	0.36	1.83	4.28	6.49	6.53	1.31	1.93	4.38	6.59	8.83
	24	-	0.82	3.10	5.37	4.96	-	0.89	3.29	6.35	5.54	0.62	0.99	3.39	6.45	5.64
	12	-	1.46	3.53	6.58	5.39	-	1.72	3.86	6.85	5.90	1.26	1.82	3.96	6.95	6.00
16	16	-	0.96	3.12	4.58	4.83	-	1.14	3.26	6.24	5.29	0.82	1.24	3.36	6.34	5.39
	24	-	-	2.10	3.69	3.84	-	0.11	2.19	4.13	4.18	-	0.21	2.29	4.23	4.28

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25 PSF LATERAL LOAD

Wall Height	Spacing	600RS162 50 Ksi					600RS200 50 Ksi					600RS225 50 Ksi				
Ft	in OC	33 Mil	43 Mil	54 Mil	60 Mil	68 Mil	33 Mil	43 Mil	54 Mil	60 Mil	68 Mil	33 Mil	43 Mil	54 Mil	60 Mil	68 Mil
	12	2.17	3.39	5.64	7.49	7.74	2.39	3.81	7.11	9.51	9.56	2.49	3.91	7.21	9.61	9.66
8	16	1.94	3.19	5.44	7.30	7.55	2.16	3.56	6.91	9.28	9.33	2.26	3.66	7.01	9.38	9.43
	24	1.51	2.78	5.06	6.93	7.18	1.90	3.08	6.52	8.82	8.87	2.00	3.18	6.62	8.92	8.97
	12	1.98	3.16	5.48	7.32	7.56	2.18	3.56	6.83	9.17	9.22	2.28	3.66	6.93	9.27	9.32
9	16	1.70	2.10	5.21	7.07	7.32	1.89	3.25	6.58	8.88	8.93	1.99	3.35	6.68	8.98	9.03
	24	1.16	2.41	4.72	6.59	6.84	1.33	2.75	6.06	8.29	8.34	1.43	2.85	6.16	8.39	8.44
	12	1.76	3.01	5.26	7.11	7.36	1.94	3.28	6.51	8.77	8.82	2.04	3.38	6.61	8.87	8.92
10	16	1.43	2.29	4.94	6.80	7.05	1.59	2.91	6.20	8.40	8.45	1.69	3.01	6.30	8.50	8.55
	24	0.78	2.08	4.34	6.21	6.46	0.92	2.18	5.59	7.69	7.84	1.02	2.28	5.69	7.79	7.94
	12	1.27	2.41	4.70	6.59	6.84	1.41	2.76	5.73	7.78	7.83	1.51	2.86	5.83	7.88	7.93
12	16	0.93	2.08	4.27	6.14	6.39	0.96	2.14	5.29	7.27	7.32	1.06	2.24	5.39	7.37	7.42
	24	-	1.16	3.44	5.29	5.54	-	1.20	4.47	6.30	6.35	-	1.30	4.57	6.40	6.45
	12	-	1.84	3.94	5.71	5.96	0.86	1.96	4.81	6.61	6.66	0.96	2.06	4.91	6.71	6.76
14	16	-	1.31	3.40	5.15	5.40	0.31	1.35	4.28	5.47	6.52	0.41	1.45	4.38	5.57	6.62
	24	-	-	2.42	4.10	4.35	-	0.28	3.29	4.80	4.85	-	0.38	3.39	4.90	4.95
	12	-	-	2.54	4.72	4.97	0.33	1.28	3.86	5.39	5.44	0.43	1.38	3.96	5.49	5.54
16	16	-	-	1.48	4.17	4.42	-	0.90	3.26	4.97	5.02	-	1.00	3.36	5.07	5.12
	24	-	-	-	2.93	3.17	-	-	2.19	3.35	3.43	-	-	2.29	3.45	3.53

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30 PSF LATERAL LOAD

Wall Height Ft	Spacing in OC	600RS162 50 Ksi					600RS200 50 Ksi					600RS225 50 Ksi				
		30 Mil	33 Mil	43 Mil	54 Mil	60 Mil	30 Mil	33 Mil	43 Mil	54 Mil	60 Mil	30 Mil	33 Mil	43 Mil	54 Mil	60 Mil
8	12	2.20	2.98	5.52	7.38	7.63	2.25	3.27	6.81	9.37	9.42	2.56	3.76	6.91	9.47	9.52
	16	1.87	2.88	5.29	7.05	7.30	1.98	3.13	6.52	9.10	9.15	2.26	3.47	6.62	9.20	9.25
	24	1.20	1.89	4.83	6.65	6.96	1.44	2.55	5.94	8.56	8.61	1.63	2.89	6.04	8.66	8.71
9	12	1.90	2.67	5.31	7.17	7.42	2.00	3.06	6.46	8.99	9.04	2.25	3.47	6.56	9.09	9.14
	16	1.50	1.77	5.02	6.84	7.13	1.76	2.75	6.08	8.64	8.69	1.92	3.11	6.18	8.74	8.79
	24	0.79	1.28	4.44	6.14	6.56	1.00	2.16	5.36	7.45	7.50	1.20	2.40	5.46	7.55	7.60
10	12	1.60	1.75	5.07	6.93	7.18	1.73	2.82	6.04	8.56	8.61	1.99	3.16	6.14	8.66	8.71
	16	1.14	1.46	4.70	6.52	6.81	1.32	2.44	5.59	8.12	8.17	1.55	2.81	5.69	8.22	8.27
	24	0.28	1.22	4.00	5.86	6.11	0.54	1.72	4.72	7.28	7.33	0.68	1.87	4.82	7.38	7.43
12	12	0.88	0.92	4.44	6.32	6.57	1.13	2.26	5.08	7.47	7.52	1.23	2.44	5.18	7.57	7.62
	16	0.46	0.62	3.93	5.80	6.05	0.70	1.74	4.47	6.87	6.92	0.88	1.86	4.57	6.97	7.02
	24	-	-	2.97	4.63	4.33	-	0.81	3.34	5.75	5.80	-	1.07	3.44	5.85	5.90
14	12	-	0.42	3.61	5.25	5.62	0.52	1.62	4.02	6.23	6.28	-	1.68	4.12	6.33	6.38
	16	-	-	3.00	4.54	4.94	-	1.02	3.29	5.49	5.54	-	0.99	3.39	5.59	5.64
	24	-	-	1.88	3.40	3.50	-	-	1.98	4.16	4.21	-	-	2.08	4.26	4.31
16	12	-	-	2.78	4.03	4.47	-	1.01	2.98	4.96	5.01	-	0.97	3.08	5.06	5.11
	16	-	-	2.10	3.43	3.84	-	-	2.19	4.13	4.18	-	0.21	2.29	4.23	4.28
	24	-	-	0.80	2.17	2.55	-	-	0.90	2.79	2.84	-	-	0.99	2.89	2.94

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35 PSF LATERAL LOAD

Wall Height Ft	Spacing in OC	600RS162 50 Ksi					600RS200 50 Ksi					600RS225 50 Ksi				
		30 Mil	33 Mil	43 Mil	54 Mil	60 Mil	30 Mil	33 Mil	43 Mil	54 Mil	60 Mil	30 Mil	33 Mil	43 Mil	54 Mil	60 Mil
8	12	2.00	3.16	5.40	7.26	7.51	2.11	3.51	6.76	9.23	9.28	2.21	3.61	6.86	9.33	9.38
	16	1.70	2.86	5.14	7.00	7.25	1.80	3.17	6.32	8.91	8.96	1.90	3.27	6.42	9.01	9.06
	24	0.80	2.31	4.61	6.49	6.74	0.85	2.51	5.96	8.20	8.33	0.90	2.61	6.06	8.30	8.43
9	12	1.74	2.85	5.16	7.32	7.27	1.83	3.19	6.27	8.82	8.87	1.93	3.29	6.37	8.92	8.97
	16	1.36	2.51	4.82	6.69	6.94	1.44	2.77	5.84	8.41	8.46	1.54	2.87	5.97	8.51	8.56
	24	0.64	1.81	4.16	6.13	6.28	0.78	1.95	5.00	7.92	7.77	0.78	2.05	5.10	8.02	7.87
10	12	1.46	2.53	4.88	6.74	6.99	1.52	2.83	5.81	8.33	8.38	1.62	2.93	5.91	8.43	8.48
	16	1.01	2.10	4.46	6.32	6.57	1.06	2.33	5.29	7.83	7.88	1.15	2.43	6.39	7.93	7.98
	24	-	1.28	3.66	5.52	5.76	0.17	1.36	4.30	6.87	6.92	0.65	1.46	4.40	6.97	7.02
12	12	0.84	1.89	4.18	6.36	6.30	0.86	2.04	4.77	7.17	7.22	0.96	2.14	4.87	7.27	7.32
	16	0.21	1.32	3.60	5.48	5.71	0.26	1.38	4.08	6.49	6.54	0.36	1.48	4.18	6.59	6.64
	24	-	-	2.53	4.34	4.59	-	0.16	2.80	6.22	6.27	-	0.26	2.90	6.32	6.37
14	12	0.16	1.16	3.30	5.34	5.29	0.20	1.23	3.96	6.85	6.91	0.30	1.33	4.06	6.95	7.01
	16	-	0.39	2.61	4.30	4.55	-	0.46	2.84	5.03	5.08	-	0.56	2.94	5.13	5.18
	24	-	-	1.37	2.98	3.23	-	-	1.38	3.54	3.59	-	-	1.48	3.64	3.69
16	12	-	0.42	2.43	3.96	4.20	-	0.48	2.58	4.53	4.58	-	0.58	2.68	4.63	4.68
	16	-	-	1.68	3.14	3.39	-	-	1.70	3.73	3.78	-	-	1.80	3.83	3.88
	24	-	-	-	1.72	1.97	-	-	0.18	2.04	2.09	-	-	0.28	2.14	2.19

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888-241-1985
www.rstud.com

COMBINED AXIAL AND FLEXURAL LOAD CHARTS

40 PSF LATERAL LOAD

Wall Height Ft	Spacing in OC	600RS162 50 Ksi					600RS200 50 Ksi					600RS225 50 Ksi				
		30 Mil	33 Mil	43 Mil	54 Mil	60 Mil	30 Mil	33 Mil	43 Mil	54 Mil	60 Mil	30 Mil	33 Mil	43 Mil	54 Mil	60 Mil
8.00	12	1.87	2.72	5.17	7.13	7.40	1.98	3.37	6.52	9.10	9.15	2.08	3.47	6.62	9.20	9.25
	16	1.20	2.36	4.80	6.84	7.10	1.72	2.98	6.13	8.73	8.78	1.82	3.08	6.23	8.83	8.88
	24	0.86	1.70	4.16	6.22	6.81	0.91	2.23	5.37	8.02	8.07	1.01	4.36	5.47	8.12	8.17
9.00	12	1.58	2.41	4.82	6.87	7.13	1.66	3.01	6.08	8.64	8.69	1.76	3.11	6.18	8.74	8.79
	16	1.16	1.98	4.41	6.42	6.75	1.22	2.53	5.59	8.18	8.23	1.32	2.63	5.69	8.28	8.33
	24	-	1.16	3.60	5.67	6.05	0.37	1.71	4.65	7.28	7.33	0.47	1.81	4.75	7.38	7.43
10.00	12	1.26	2.07	4.54	6.51	6.80	1.32	2.71	5.59	8.12	8.17	1.42	2.81	5.69	8.22	8.27
	16	0.76	1.56	4.04	6.01	6.34	0.84	2.04	5.00	7.55	7.60	1.09	2.14	5.10	7.65	7.70
	24	-	0.66	3.05	5.02	5.25	-	0.66	3.85	6.47	6.52	-	0.76	3.95	6.57	6.62
12.00	12	0.59	1.33	3.67	5.67	6.05	0.65	1.76	4.47	6.87	6.92	0.80	1.86	4.57	6.97	7.02
	16	-	0.83	3.01	4.96	5.38	-	1.02	3.70	6.11	6.16	-	1.12	3.80	6.21	6.26
	24	-	-	-	3.89	4.14	-	-	2.29	4.70	4.75	-	-	2.39	4.80	4.85
14.00	12	-	-	2.69	4.71	4.96	-	0.89	3.29	5.49	5.54	-	0.99	3.39	5.59	5.64
	16	-	-	2.01	3.91	4.16	-	-	2.40	4.58	4.63	-	-	2.50	4.68	4.73
	24	-	-	0.61	2.45	2.70	-	-	0.81	2.95	3.00	-	-	0.91	3.05	3.10
16.00	12	-	-	1.71	3.59	3.84	-	0.11	2.19	4.13	4.18	-	0.21	2.29	4.23	4.28
	16	-	-	0.83	2.71	2.96	-	-	1.24	3.15	3.20	-	-	1.34	3.25	3.30
	24	-	-	-	1.17	1.42	-	-	-	1.42	1.47	-	-	-	1.52	1.57

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COMBINED AXIAL AND FLEXURAL LOAD CHARTS

50 PSF LATERAL LOAD

Wall Height Ft	Spacing in OC	600RS162 50 Ksi					600RS200 50 Ksi					600RS225 50 Ksi				
		30 Mil	33 Mil	43 Mil	54 Mil	60 Mil	30 Mil	33 Mil	43 Mil	54 Mil	60 Mil	30 Mil	33 Mil	43 Mil	54 Mil	60 Mil
8	12	1.71	2.78	5.06	6.93	7.18	1.75	3.08	6.22	8.82	8.87	1.8	3.18	6.32	8.92	8.97
	16	1.28	2.39	4.68	6.56	6.81	1.31	2.7	5.74	8.37	8.42	1.36	2.8	5.84	8.47	8.52
	24	-	1.62	3.95	6.84	6.09	0.45	1.78	4.81	7.49	7.54	0.5	1.88	4.91	7.59	7.64
9	12	1.31	2.41	4.72	6.59	6.84	1.38	2.76	5.72	8.29	8.34	1.43	2.86	5.82	8.39	8.44
	16	0.79	1.91	4.26	6.12	6.37	0.84	2.07	5.12	7.73	7.78	0.89	2.17	5.22	7.83	7.88
	24	-	0.92	3.34	5.22	5.46	-	0.95	3.97	6.63	6.68	-	1.05	4.07	6.73	6.78
10	12	0.93	1.98	4.34	6.21	6.46	0.97	2.18	5.16	7.79	7.84	1.02	2.28	5.25	7.89	7.94
	16	-	1.29	3.77	5.63	5.88	0.34	1.49	4.43	7	7.05	0.39	1.59	4.53	7.1	7.15
	24	-	-	2.67	4.53	4.77	-	0.2	3.09	5.69	5.74	-	0.3	3.19	5.79	5.84
12	12	-	1.06	3.44	5.29	5.54	-	1.2	3.89	6.3	6.35	-	1.3	3.99	6.4	6.54
	16	-	0.31	2.67	4.5	4.75	-	0.33	2.96	5.39	5.44	-	0.43	3.06	5.49	5.54
	24	-	-	1.27	3.13	3.38	-	-	1.32	3.72	3.77	-	-	1.42	3.82	3.87
14	12	-	-	2.42	4.1	4.35	-	0.25	2.62	4.8	4.85	-	0.35	2.72	4.9	4.95
	16	-	-	1.53	3.16	3.41	-	-	1.58	3.74	3.79	-	-	1.68	3.84	3.89
	24	-	-	-	1.47	1.72	-	-	-	1.84	1.91	-	-	-	1.96	2.01
16	12	-	-	1.48	2.92	3.17	-	-	1.47	3.38	3.43	-	-	1.57	3.48	3.53
	16	-	-	0.54	1.91	2.16	-	-	0.38	2.21	2.31	-	-	-	2.36	2.41
	24	-	-		-	-	-	-	-	0.28	0.33	-	-	-	-	0.43

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Engineering Technology Consultants Corporation

POB 244, Marysville, WA 98270

425-210-5353

To Whom it may concern:

The attached Combined Loads Tables are based on testing data provided by ICC NTA, LLC, 305 N Oakland Ave., Nappanee, IN 46550. The calculations performed and checked by Dr. Dennis Edmondson, PhD, PhD, PE, and Dr. Dave Wood, PhD based in AISI and AISC codes.

It was found from testing results that Rstud's geometric shape contributed to its section modulus adding additional rigidity presenting a unique increase in efficiency of a steel stud. In addition, the cold working fabrication present in Rstud design per AISI Cold Working analysis increased the 50ksi yield strength steel material tested to over 60ksi yield strength providing significant strength increase allowing 36ksi working yield strength to be used opposed to 30ksi working yield strength for 50ksi steel.

Dr. Dennis Edmondson, PhD, PhD, PE

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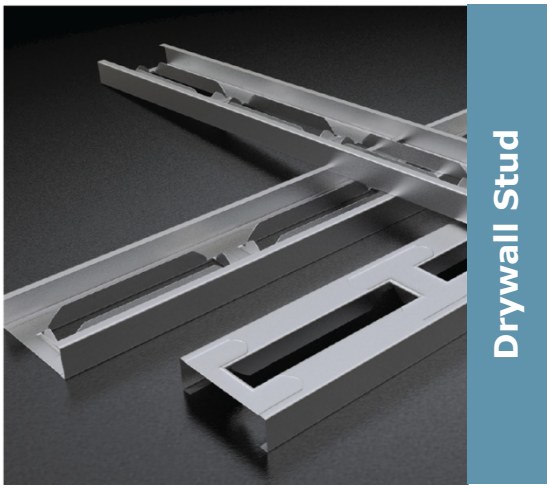
Product Data Sheet

U.S. Patent # US7866112
U.S. Patent # US7743578
U.S. Patent # US8424266

Product category: R-stud 30 mil Drywall Stud
Product name: 600RS162-30 50KSI G60
6" x 1-5/8" R-stud

Coating: G60
Color coding: White



Web openings (not punch-outs) formed from web every 12 in. with Stamping at bridge every 12 in.

Geometric Properties

Web depth	6.000 in	Weight	0.9984 lb/ft
Flange width	1.625 in	Web opening length	9-13/16 in
Stiffening lip	0.500 in	Web opening width	2-3/16 in
Design thickness	0.030 in	Minimum thickness	0.0296 in
Yield stress, Fy	50 Ksi		

Gross Section Properties of Full Section, Strong Axis*

Cross sectional area (A)	0.29365 in^2
Moment of inertia (Ix)	1.6016 in^4
Radius of gyration (Rx, r1)	2.3354 in
Moment of inertia (Iy)	0.0899 in^4
Radius of gyration (Ry, r2)	0.5534 in
Max bending moment Ix (Maxo)	13.867 k-in
Max bending moment Iy (Mayo)	2.345 k-in
Allowable shear force in web (Vax)	1.5696 k

Tension/Compression Properties*

Warping constant (Cw)	0.038983-in^6
Distance from shear center to neutral axis (Xo*)	-0.8892-in
Radii of gyration (Ro*)	2.5595-in
Torsional flexural constant (Beta)	FEA-in^4
Compression Pao (max)	6.3574-k
Tension Tao (Ta)	9.0823-k
Unbraced Length (Lu)	Full / Non-braced

Fully Braced Strength (CFS) *CFS result

ASTM & Code Standards:
- ✓ ATI/Intertek CCRR 1073
- ✓ IBC 2012 Compliant
- ✓ AISI S-100 & S220-11
- ✓ ASTM E119, E72, E90
- ✓ ASTM AC86, C645, & C745
- ✓ UL 263

Notes:
- Calculated properties are based on AISI S100-12, North American Specifications for Cold-Formed Steel Structure Members and ICC-ES AC46-2015, Acceptance Criteria for Cold-Formed Steel Framing Members.
- Effective properties herein incorporate the increased strength from cold working of the steel while forming. We only use 50Ksi coils.
- Tabulated gross properties, including torsional properties, are based on the added cross section properties of the web openings. R-studs do not have punch-outs.
- Allowable moment includes cold work of forming.
- Allowable moment is taken as the lowest value based on local or distortional buckling. Distortional buckling strength is based on K-phi=0
- For deflection calculations, use the effective moment of inertia.
- Web openings are every 12 inches and are 9-13/16 inches long with flanges being 0.94 inches tall and corners of the web openings enhanced.

Sustainability: R-stud sources its steel coils from USS-POSCO in Pittsburg, California for rolling in our manufacturing facility in Donald, Oregon. Our coils contain approximately 34.2% recycled steel. Approximately 19.8% is Post-consumer content, while Pre-consumer content is approximately 14.4%. R-studs are listed as "Red List Free" by the International Living Future Institute. Steel is one of the most sustainable building materials in the world. It is recycled content, recyclable, durable, safe, zinc-coated, dimensionally stable and strong, as well as not susceptible to rot, termites, or mold.

Supported Documentation

- 2016 AISI - ASD, LRFD, and LSD
- 2012 AISI - ASD, LRFD, and LSD
- 2010 AISI - ASD, LRFD, and LSD
- 2007 AISI - ASD, LRFD, and LSD
- 2004 AISI - ASD, LRFD, and LSD
- 2001 AISI - ASD, LRFD, and LSD
- 1999 AISI - ASD and LRFD & 2002 ASCE – ASD and LRFD (stainless steel)

Project Information	Contractor Information	Architect Information
Name:	Name:	Name:
Address:	Contact:	Contact:
	Phone:	Phone:
	Fax:	Fax:

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Product Data Sheet

U.S. Patent # US7866112
U.S. Patent # US7743578
U.S. Patent # US8424266

Product category: R-stud 30 mil Drywall Stud
Product name: 600RS162-30 50KSI G60
6" x 1-5/8" R-stud

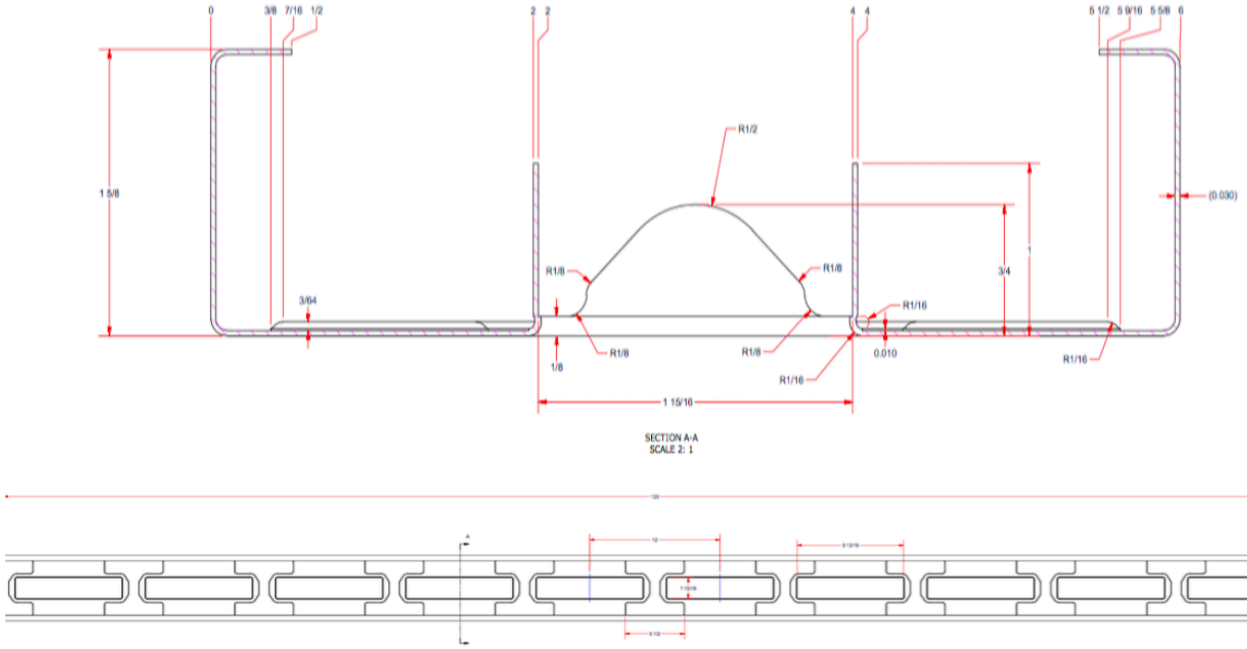
Limiting Wall Heights

Spacing (inches)	5 psf			7.5 psf			10 psf		
	L/120	L/240	L/360	L/120	L/240	L/360	L/120	L/240	L/360
16	36'2"	28'7"	25'1"	31'6"	25'1"	21'11"	28'7"	22'9"	19'9"
24	31'7"	24'5"	21'9"	27'6"	21'9"	19'2"	25'1"	19'10"	17'4"

Table Notes:

- Allowable composite limiting heights were determined from AC86-2012 testing by Intertek Testing / Architectural Testing, Inc.
- The composite limiting heights tables provided above are based on a single layer of Type X gypsum board from the following manufacturers, American, CertainTeed, Georgia Pacific, National, PABCO, and USG.
- The gypsum is to be applied full height in the vertical orientation to each stud flange and installed in accordance with ASTM C754-2004 using a minimum of No. 6 Type S Drywall spaced as listed below:
  - Screws spaced a minimum of 16 inches on-center to framing members spaced at 12 or 16 inches on-center.
  - Screws spaced a minimum of 12 inches on-center to framing members spaced at 24 inches on-center.
- No fasteners are required for attaching the stud to the track except as detailed in ASTM C754-2008.

Profile



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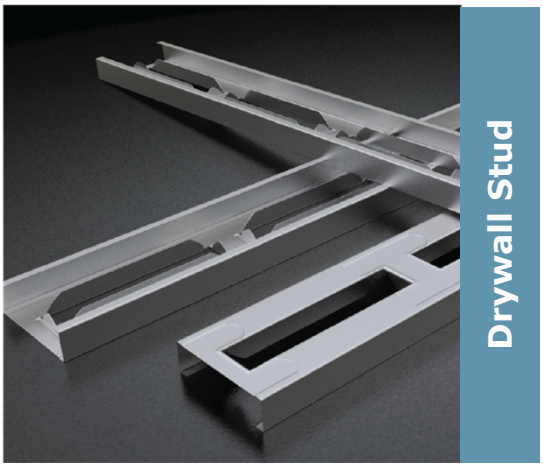
Product Data Sheet

U.S. Patent # US7866112
U.S. Patent # US7743578
U.S. Patent # US8424266

Product category: R-stud 19 mil Drywall Stud
Product name: 600RS162-19 50KSI G60
6" x 1-5/8" R-stud

Coating: G60
Color coding: None



Web openings (not punch-outs) formed from web every 12 in. with Stamping at bridge every 12 in.

Geometric Properties

Web depth	6.000 in	Weight	0.64851 lb/ft
Flange width	1.625 in	Web opening length	9-13/16 in
Stiffening lip	0.500 in	Web opening width	2-3/16 in
Design thickness	0.0202 in	Minimum thickness	0.0190 in
Yield stress, Fy	50 Ksi		

Gross Section Properties of Full Section, Strong Axis*

Cross sectional area (A)	0.20184 in^2
Moment of inertia (Ix)	1.0900 in^4
Radius of gyration (Rx, r1)	2.3239 in
Moment of inertia (Iy)	0.0626 in^4
Radius of gyration (Ry, r2)	0.5570 in
Max bending moment Ix (Maxo)	8.7389 k-in
Max bending moment Iy (Mayo)	2.0061 k-in
Allowable shear force in web (Vax)	0.9411 k

Tension/Compression Properties*

Warping constant (Cw)	0.028523 in^6
Distance from shear center to neutral axis (Xo)	-0.8849 in
Radii of gyration (Ro)	2.5483 in
Torsional flexural constant (Beta)	FEA-in^4
Compression Pao (max)	3.9183 k
Tension Tao (Ta)	7.0642 k
Unbraced Length (Lu)	Full / Non-braced

Fully Braced Strength (CFS) *CFS result

ASTM & Code Standards:
- ✓ ATI/Intertek CCRR 1073
- ✓ IBC 2012 Compliant
- ✓ AISI S-100 & S220-11
- ✓ ASTM E119, E72, E90
- ✓ ASTM AC86, C645, & C745
- ✓ UL 263

Notes:
- Calculated properties are based on AISI S100-12, North American Specifications for Cold-Formed Steel Structure Members and ICC-ES AC46-2015, Acceptance Criteria for Cold-Formed Steel Framing Members.
- Effective properties herein incorporate the increased strength from cold working of the steel while forming. We only use 50Ksi coils.
- Tabulated gross properties, including torsional properties, are based on the added cross section properties of the web openings. R-studs do not have punch-outs.
- Allowable moment includes cold work of forming.
- Allowable moment is taken as the lowest value based on local or distortional buckling. Distortional buckling strength is based on K-phi=0
- For deflection calculations, use the effective moment of inertia.
- Web openings are every 12 inches and are 9-13/16 inches long with flanges being 0.94 inches tall and corners of the web openings enhanced.

Sustainability: R-stud sources its steel coils from USS-POSCO in Pittsburg, California for rolling in our manufacturing facility in Donald, Oregon. Our coils contain approximately 34.2% recycled steel. Approximately 19.8% is Post-consumer content, while Pre-consumer content is approximately 14.4%. R-studs are listed as "Red List Free" by the International Living Future Institute. Steel is one of the most sustainable building materials in the world. It is recycled content, recyclable, durable, safe, zinc-coated, dimensionally stable and strong, as well as not susceptible to rot, termites, or mold.

Supported Documentation

- 2016 AISI - ASD, LRFD, and LSD
- 2012 AISI - ASD, LRFD, and LSD
- 2010 AISI - ASD, LRFD, and LSD
- 2007 AISI - ASD, LRFD, and LSD
- 2004 AISI - ASD, LRFD, and LSD
- 2001 AISI - ASD, LRFD, and LSD
- 1999 AISI - ASD and LRFD & 2002 ASCE – ASD and LRFD (stainless steel)

Project Information	Contractor Information	Architect Information
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	Phone:	Phone:
	Fax:	Fax:

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www.rstud.com

Product Data Sheet

U.S. Patent # US7866112
U.S. Patent # US7743578
U.S. Patent # US8424266

Product category: R-stud Drywall Stud
Product name: 600RS162-19 50KSI G60
6" x 1-5/8" R-stud

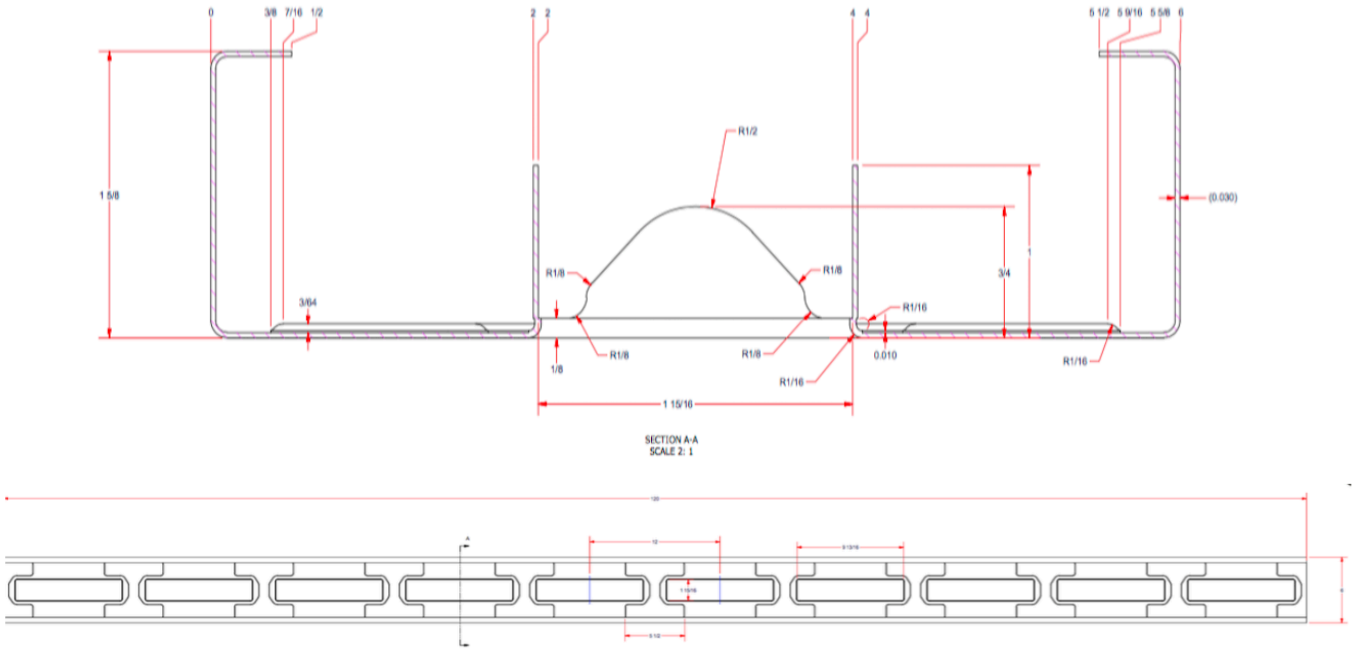
Limiting Wall Heights

Spacing (inches)	5 psf			7.5 psf			10 psf		
	L/120	L/240	L/360	L/120	L/240	L/360	L/120	L/240	L/360
16	28'-0"	25'-11"	23'-7"	22'-3"	20'-7"	18'-8"	19'-5"	18'-0"	16'-4"
24	24'-5"	22'-8"	20'-7"	19'-5"	18'-0"	16'-4"	17'-1"	15'-8"	14'-3"

Table Notes:

- Allowable composite limiting heights were determined from AC86-2012 testing by Intertek Testing / Architectural Testing, Inc.
- The composite limiting heights tables provided above are based on a single layer of Type X gypsum board from the following manufacturers, American, CertainTeed, Georgia Pacific, National, PABCO, and USG.
- The gypsum is to be applied full height in the vertical orientation to each stud flange and installed in accordance with ASTM C754-2004 using a minimum of No. 6 Type S Drywall spaced as listed below:
  - Screws spaced a minimum of 16 inches on-center to framing members spaced at 12 or 16 inches on-center.
  - Screws spaced a minimum of 12 inches on-center to framing members spaced at 24 inches on-center.
- No fasteners are required for attaching the stud to the track except as detailed in ASTM C754-2008.

Profile



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	Fax:	Fax:

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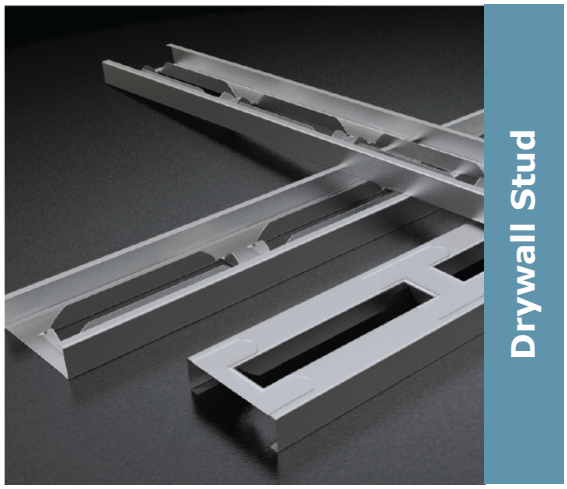
Product Data Sheet

U.S. Patent # US7866112
U.S. Patent # US7743578
U.S. Patent # US8424266

Product category: R-stud 30 mil Drywall Stud
Product name: 400RS162-30 50KSI G60
4" x 1-5/8" R-stud

Coating: G60
Color coding: White



Web openings (not punch-outs) formed from web every 12 in. with Stamping at bridge every 12 in.

Geometric Properties

Web depth	4.000 in	Weight	0.79436 lb/ft
Flange width	1.625 in	Web opening width	9-13/16 in
Stiffening lip	0.310 in	Web opening length	2-3/16 in
Design thickness	0.030 in	Minimum thickness	0.0296 in
Yield stress, Fy	50 Ksi		

Gross Section Properties of Full Section, Strong Axis*

Cross sectional area (A)	0.23363 in^2
Moment of inertia (Ix)	0.62994 in^4
Radius of gyration (Rx, r1)	1.6557 in
Moment of inertia (Iy)	0.07426 in^4
Radius of gyration (Ry, r2)	0.5638 in
Max bending moment Ix (Maxo)	8.0026 k-in
Max bending moment Iy (Mayo)	2.1250 k-in
Allowable shear force in web (Vax)	1.6004 k

Tension/Compression Properties*

Warping constant (Cw)	0.013131 in^6
Distance from shear center to neutral axis (Xo)	-0.9618-in
Radii of gyration (Ro)	1.9961 in
Torsional flexural constant (Beta)	FEA-in^4
Compression Pao (max)	5.0199 k
Tension Tao (Ta)	7.2776 k
Unbraced Length (Lu)	Full / Non-braced

Fully Braced Strength (CFS) *CFS result

ASTM & Code Standards:
- ✓ ATI/Intertek CCRR 1073
- ✓ IBC 2012 Compliant
- ✓ AISI S-100 & S220-11
- ✓ ASTM E119, E72, E90
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- ✓ UL 263

Notes:
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- Effective properties herein incorporate the increased strength from cold working of the steel while forming. We only use 50Ksi coils.
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Sustainability: **R-stud** sources its steel coils from USS-POSCO in Pittsburg, California for rolling in our manufacturing facility in Donald, Oregon. Our coils contain approximately 34.2% recycled steel. Approximately 19.8% is Post-consumer content, while Pre-consumer content is approximately 14.4%. R-studs are listed as "Red List Free" by the International Living Future Institute. Steel is one of the most sustainable building materials in the world. It is recycled content, recyclable, durable, safe, zinc-coated, dimensionally stable and strong, as well as not susceptible to rot, termites, or mold.

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- 2010 AISI - ASD, LRFD, and LSD
- 2007 AISI - ASD, LRFD, and LSD
- 2004 AISI - ASD, LRFD, and LSD
- 2001 AISI - ASD, LRFD, and LSD
- 1999 AISI - ASD and LRFD & 2002 ASCE – ASD and LRFD (stainless steel)

Project Information	Contractor Information	Architect Information
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Product Data Sheet

U.S. Patent # US7866112
U.S. Patent # US7743578
U.S. Patent # US8424266

Product category: R-stud 30 mil Drywall Stud
Product name: 400RS162-30 50KSI G60
4" x 1-5/8" R-Stud

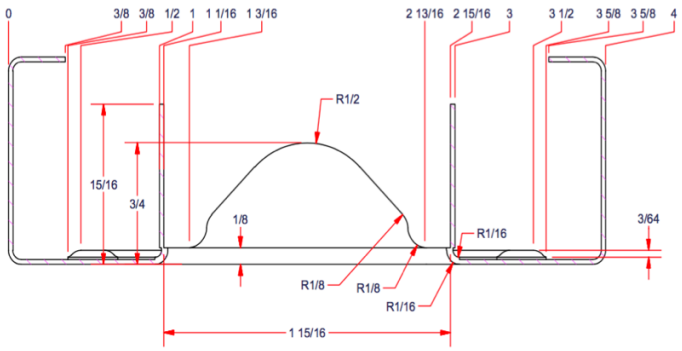
Limiting Wall Heights

Spacing (inches)	5 psf			7.5 psf			10 psf		
	L/120	L/240	L/360	L/120	L/240	L/360	L/120	L/240	L/360
16	26'4"	20'11"	18'3"	23'1"	18'3"	15'11"	20'11"	16'6"	14'6"
24	23'8"	18'9"	15'11"	20'9"	15'11"	13'10"	18'3"	13'11"	12'8"

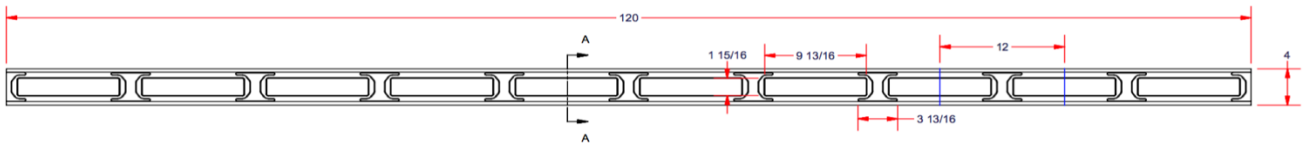
Table Notes:

- Allowable composite limiting heights were determined from AC86-2012 testing by Intertek Testing / Architectural Testing, Inc.
- The composite limiting heights tables provided above are based on a single layer of Type X gypsum board from the following manufacturers, American, CertainTeed, Georgia Pacific, National, PABCO, and USG.
- The gypsum is to be applied full height in the vertical orientation to each stud flange and installed in accordance with ASTM C754-2004 using a minimum of No. 6 Type S Drywall spaced as listed below:
  - Screws spaced a minimum of 16 inches on-center to framing members spaced at 12 or 16 inches on-center.
  - Screws spaced a minimum of 12 inches on-center to framing members spaced at 24 inches on-center.
- No fasteners are required for attaching the stud to the track except as detailed in ASTM C754-2008.

Profile



SECTION A-A
SCALE 1.5:1



Project Information	Contractor Information	Architect Information
Name:	Name:	Name:
Address:	Contact:	Contact:
	Phone:	Phone:
	Fax:	Fax:

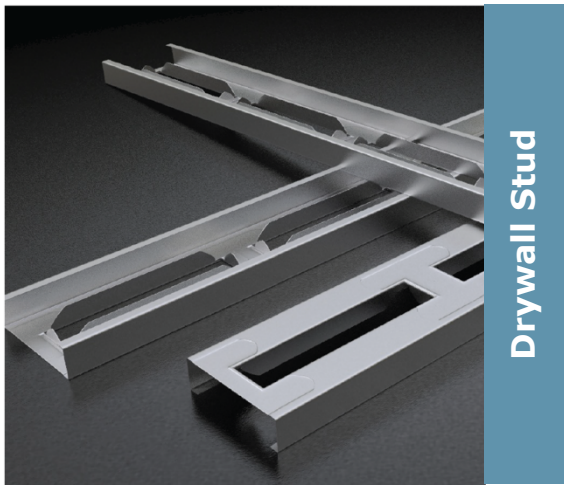
R-stud
STEEL FRAMING STUDS
P.O. Box 692
10580 Donald Rd. NE
Donald, OR 97020
888-241-1985
www.rstud.com

Product Data Sheet

U.S. Patent # US7866112
U.S. Patent # US7743578
U.S. Patent # US8424266

Product category: R-stud 19 mil Drywall Stud
Product name: 400RS162-19 50KSI G60
4" x 1-5/8" R-stud

Coating: G60
Color coding: None



Web openings (not punch-outs) formed from web every 12 in. with Stamping at bridge every 12 in.

Geometric Properties

Web depth	4.000 in	Weight	0.4891 lb/ft
Flange width	1.625 in	Web opening length	9-13/16 in
Stiffening lip	0.500 in	Web opening width	2-3/16 in
Design thickness	0.0202 in	Minimum thickness	0.0190 in
Yield stress, Fy	50 Ksi		

Gross Section Properties of Full Section, Strong Axis*

Cross sectional area (A)	0.14385 in^2
Moment of inertia (Ix)	0.3899 in^4
Radius of gyration (Rx, r1)	1.6464 in
Moment of inertia (Iy)	0.0459 in^4
Radius of gyration (Ry, r2)	0.5649 in
Max bending moment Ix (Maxo)	4.5304 k-in
Max bending moment Iy (Mayo)	1.3379 k-in
Allowable shear force in web (Vax)	0.7307 k

Tension/Compression Properties*

Warping constant (Cw)	0.0093277 in^6
Distance from shear center to neutral axis (Xo)	-1.0186 in
Radii of gyration (Ro)	2.0168 in
Torsional flexural constant (Beta)	FEA-in^4
Compression Pao(max)	2.8309 k
Tension Tao (Ta)	6.0347 k
Unbraced Length (Lu)	Full / Non-braced

Fully Braced Strength (CFS) *CFS result

ASTM & Code Standards:

- ✓ ATI/Intertek CCRR 1073
- ✓ IBC 2012 Compliant
- ✓ AISI S-100 & S220-11
- ✓ ASTM E119, E72, E90
- ✓ ASTM AC86, C645, & C745
- ✓ UL 263

Notes:

- Calculated properties are based on AISI S100-12, North American Specifications for Cold-Formed Steel Structure Members and ICC-ES AC46-2015, Acceptance Criteria for Cold-Formed Steel Framing Members.
- Effective properties herein incorporate the increased strength from cold working of the steel while forming. We only use 50Ksi coils.
- Tabulated gross properties, including torsional properties, are based on the added cross section properties of the web openings. R-studs do not have punch-outs.
- Allowable moment includes cold work of forming.
- Allowable moment is taken as the lowest value based on local or distortional buckling. Distortional buckling strength is based on K-phi=0
- For deflection calculations, use the effective moment of inertia.
- Web openings are every 12 inches and are 9-13/16 inches long with flanges being 0.94 inches tall and corners of the web openings enhanced.

Sustainability: R-stud sources its steel coils from USS-POSCO in Pittsburg, California for rolling in our manufacturing facility in Donald, Oregon. Our coils contain approximately 34.2% recycled steel. Approximately 19.8% is Post-consumer content, while Pre-consumer content is approximately 14.4%. R-studs are listed as "Red List Free" by the International Living Future Institute. Steel is one of the most sustainable building materials in the world. It is recycled content, recyclable, durable, safe, zinc-coated, dimensionally stable and strong, as well as not susceptible to rot, termites, or mold.

Supporting Documentation

- 2016 AISI - ASD, LRFD, and LSD
- 2012 AISI - ASD, LRFD, and LSD
- 2010 AISI - ASD, LRFD, and LSD
- 2007 AISI - ASD, LRFD, and LSD
- 2004 AISI - ASD, LRFD, and LSD
- 2001 AISI - ASD, LRFD, and LSD
- 1999 AISI - ASD and LRFD & 2002 ASCE – ASD and LRFD (stainless steel)

Project Information	Contractor Information	Architect Information
Name:	Name:	Name:
Address:	Contact:	Contact:
	Phone:	Phone:
	Fax:	Fax:

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Product Data Sheet

U.S. Patent # US7866112
U.S. Patent # US7743578
U.S. Patent # US8424266

Product category: R-stud 19 mil Drywall Stud
Product name: 400RS162-19 50KSI G60
4" x 1-5/8" R-stud

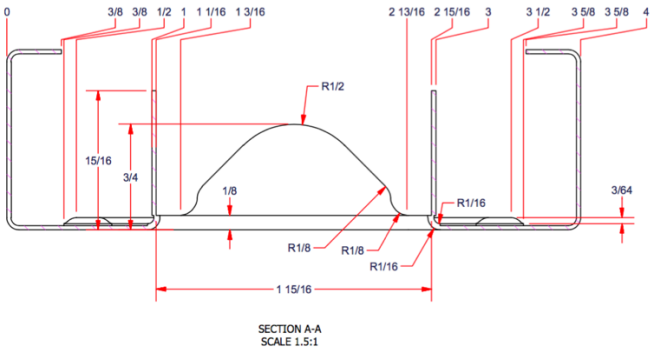
Limiting Wall Heights

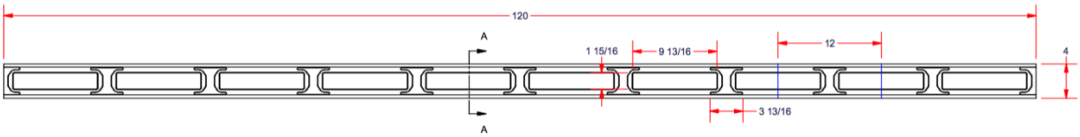
Spacing (inches)	5 psf			7.5 psf			10 psf		
	L/120	L/240	L/360	L/120	L/240	L/360	L/120	L/240	L/360
12									
16	24'1"	19'1"	16'8"	21'10"	16'8"	14'7"	19'10"	15'2"	13'3"
24	21'0"	17'8"	14'7"	19'1"	14'7"	13'3"	16'8"	13'3"	11'7"

Table Notes:

- Allowable composite limiting heights were determined from AC86-2012 testing by Intertek Testing / Architectural Testing, Inc.
- The composite limiting heights tables provided above are based on a single layer of Type X gypsum board from the following manufacturers, American, CertainTeed, Georgia Pacific, National, PABCO, and USG.
- The gypsum is to be applied full height in the vertical orientation to each stud flange and installed in accordance with ASTM C754-2004 using a minimum of No. 6 Type S Drywall spaced as listed below:
  - Screws spaced a minimum of 16 inches on-center to framing members spaced at 12 or 16 inches on-center.
  - Screws spaced a minimum of 12 inches on-center to framing members spaced at 24 inches on-center.
- No fasteners are required for attaching the stud to the track except as detailed in ASTM C754-2008.

Profile





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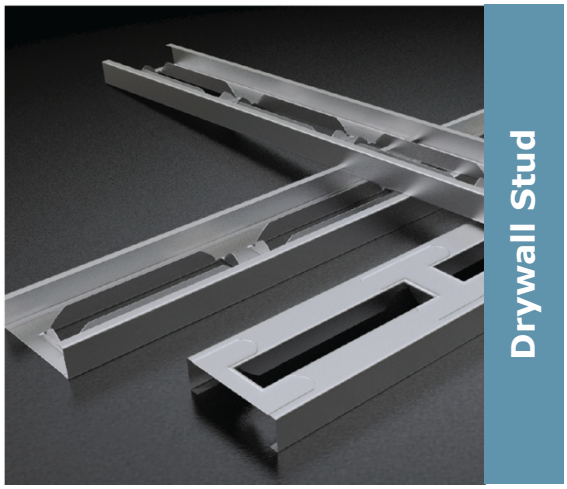
Product Data Sheet

U.S. Patent # US7866112
U.S. Patent # US7743578
U.S. Patent # US8424266

Product category: R-stud 30 mil Drywall Stud
Product name: 362RS125-30 50KSI G60
3-5/8" x 1-1/4" R-stud

Coating: G60
Color coding: White



Web openings (not punch-outs) formed from web every 12 in. with Stamping at bridge every 12 in.

Geometric Properties

Web depth	3.625 in	Weight	0.7251 lb/ft
Flange width	1.250 in	Web opening width	1-15/16 in
Stiffening lip	0.375 in	Web opening length	9-13/16 in
Design thickness	0.0312 in	Minimum thickness	0.0296 in
Yield stress, Fy	50 Ksi		

Gross Section Properties of Full Section, Strong Axis*

Cross sectional area (A)	0.23363 in^2
Moment of inertia (Ix)	0.62994 in^4
Radius of gyration (Rx, r1)	1.6557 in
Moment of inertia (Iy)	0.07426 in^4
Radius of gyration (Ry, r2)	0.5638 in
Max bending moment Ix (Maxo)	8.0026 k-in
Max bending moment Iy (Mayo)	2.1250 k-in
Allowable shear force in web (Vax)	1.6004 k

Tension/Compression Properties*

Warping constant (Cw)	0.009792 in^6
Distance from shear center to neutral axis (Xo)	-0.8888 in
Radii of gyration (ro)	1.7657 in
Torsional flexural constant (Beta)	6.9200e-5 in^4
Compression Pao (max)	4.4569 k
Tension Tao (Ta)	7.4642 k
Unbraced Length (Lu)	Full / Non-braced

Fully Braced Strength (CFS) *CFS result

ASTM & Code Standards:
- ✓ ATI/Intertek CCRR 1073
- ✓ IBC 2012 Compliant
- ✓ AISI S-100 & S220-11
- ✓ ASTM E119, E72, E90
- ✓ ASTM AC86, C645, & C745
- ✓ UL 263

Notes:
- Calculated properties are based on AISI S100-12, North American Specifications for Cold-Formed Steel Structure Members and ICC-ES AC46-2015, Acceptance Criteria for Cold-Formed Steel Framing Members.
- Effective properties herein incorporate the increased strength from cold working of the steel while forming. We only use 50Ksi coils.
- Tabulated gross properties, including torsional properties, are based on the added cross section properties of the web openings. R-studs do not have punch-outs.
- Allowable moment includes cold work of forming.
- Allowable moment is taken as the lowest value based on local or distortional buckling. Distortional buckling strength is based on K-phi=0
- For deflection calculations, use the effective moment of inertia.
- Web openings are every 12 inches and are 9-13/16 inches long with flanges being 0.94 inches tall and corners of the web openings enhanced.

Sustainability: **R-stud** sources its steel coils from USS-POSCO in Pittsburg, California for rolling in our manufacturing facility in Donald, Oregon. Our coils contain approximately 34.2% recycled steel. Approximately 19.8% is Post-consumer content, while Pre-consumer content is approximately 14.4%. R-studs are listed as "Red List Free" by the International Living Future Institute. Steel is one of the most sustainable building materials in the world. It is recycled content, recyclable, durable, safe, zinc-coated, dimensionally stable and strong, as well as not susceptible to rot, termites, or mold.

Supporting Documentation

- 2016 AISI - ASD, LRFD, and LSD
- 2012 AISI - ASD, LRFD, and LSD
- 2010 AISI - ASD, LRFD, and LSD
- 2007 AISI - ASD, LRFD, and LSD
- 2004 AISI - ASD, LRFD, and LSD
- 2001 AISI - ASD, LRFD, and LSD
- 1999 AISI - ASD and LRFD & 2002 ASCE – ASD and LRFD (stainless steel)

Project Information	Contractor Information	Architect Information
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Product Data Sheet

U.S. Patent # US7866112
U.S. Patent # US7743578
U.S. Patent # US8424266

Product category: R-stud 30 mil Drywall Stud
Product name: 362RS125-30 50KSI G60
3-5/8" x 1-1/4 R-Stud

Limiting Wall Heights

Spacing (inches)	5 psf			7.5 psf			10 psf		
	L/120	L/240	L/360	L/120	L/240	L/360	L/120	L/240	L/360
16	22'-10"	17'-10"	15'-10"	19'-0"	15'-7"	13'-10"	18'-1"	14'-2"	12'-7"
24	19'-11"	15'-10"	13'-10"	17'-5"	13'-10"	12'-1"	15'-10"	12'-7"	11'-0"

Table Notes:

- Allowable composite limiting heights were determined from AC86-2012 testing by Intertek Testing / Architectural Testing, Inc.
- The composite limiting heights tables provided above are based on a single layer of Type X gypsum board from the following manufacturers, American, CertainTeed, Georgia Pacific, National, PABCO, and USG.
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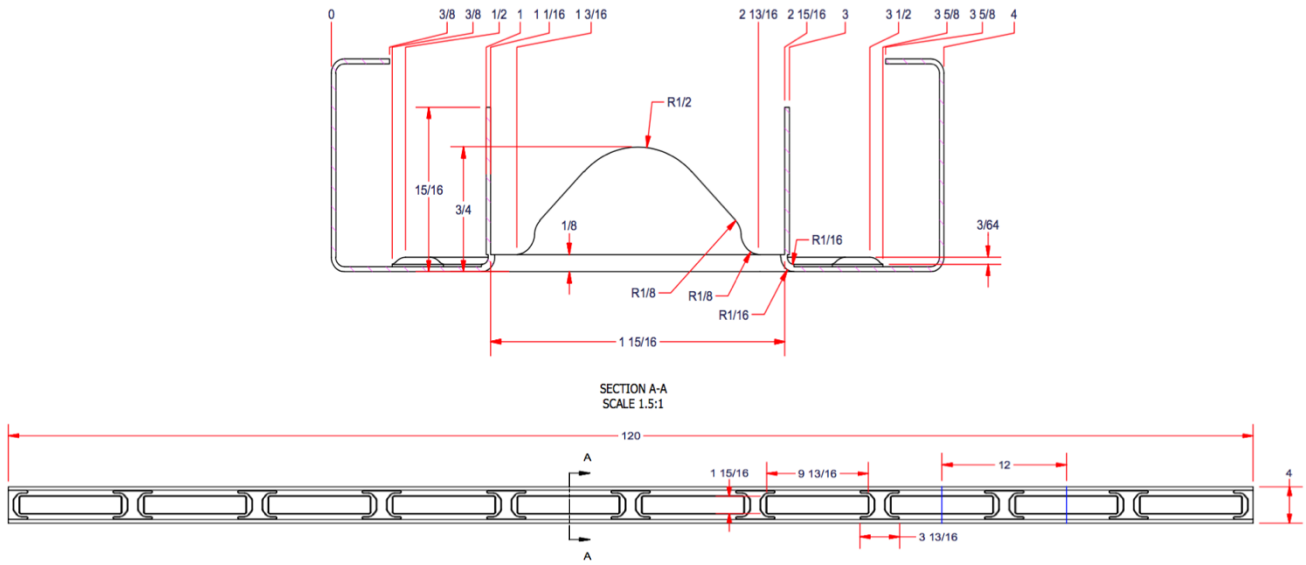
  - Screws spaced a minimum of 16 inches on-center to framing members spaced at 12 or 16 inches on-center.
  - Screws spaced a minimum of 12 inches on-center to framing members spaced at 24 inches on-center.
- No fasteners are required for attaching the stud to the track except as detailed in ASTM C754-2008.

Profile



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