Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

Report No: 2207-01

Issue Date: June 21, 2023

Revision Date: July 1, 2025

Subject to Renewal: July 1, 2026

Insul-Stud™ Structural Insulated Stud Wall System

Trade Secret Report Holder:

Moment Innovations, LLC

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CSI Designations:

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

Section: 06 10 00 - Rough Carpentry

Section: 06 11 00 - Wood Framing

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

Section: 07 21 00 - Thermal Insulation

Section: 07 21 13 - Foam Board Insulation

1 Innovative Product Evaluated[1]

1.1 Insul-Stud Structural Insulated Stud

2 Product Description and Materials

2.1 Insul-Stud Structural Insulated Studs consist of two Douglas Fir-Larch (DF-L) flanges, and a structural proprietary Polyurethane Foam (PF) core as shown in **Figure 1**.

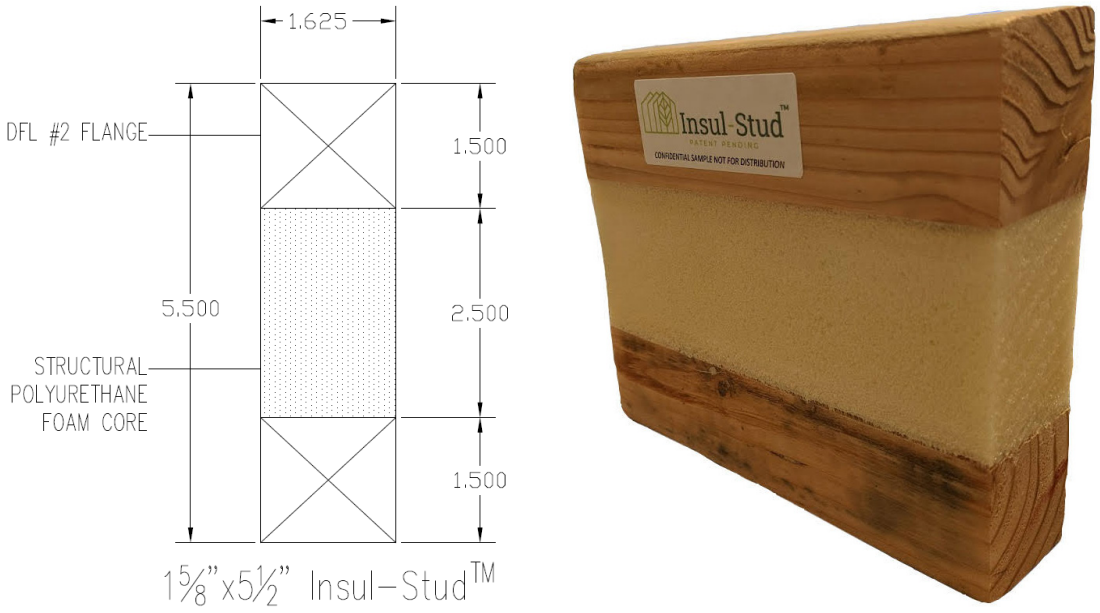

Figure 1. Insul-Stud Structural Insulated Stud

2.2 Insul-Stud Structural Insulated Studs are components of an assembly and are evaluated when used as the structural framing members in a wall assembly as shown in **Figure 2**.

2.2.1 Hold-downs, as shown in **Figure 2**, are not a part of the product and are only necessary where required by the design.

Figure 2. Insul-Stud Structural Insulated Stud Wall Assembly

2.3 Insul-Stud Structural Insulated Studs are available in 8', 9', and 10' lengths for use as wall studs. Vertical wall plate material is available in 12' lengths.

2.4 An Insul-Stud Structural Insulated Stud wall assembly is shown in **Figure 2**. The assembly details are provided in **Table 1**.

Table 1. Insul-Stud Structural Insulated Stud Wall Assembly Details

Product	Description	Fastening Schedule
Exterior Sheathing	7/16" Oriented Strand Board (OSB)	OSB installed vertically with 2 3/8" x 0.113" nails spaced 6" on center around the perimeter of each panel and 12" on center in the field.
Framing Members 2 x 6 Insul-Stud Structural Insulated Stud	Structural insulated studs are comprised of two 1 1/2" deep by 1 5/8" wide minimum No. 2 DF-L or MSR 2100f 1.8E flanges. The remaining portion of the web is filled in with 2 1/2" proprietary polyurethane foam insulation.	Installed at 24" on center with (2) Nails 3" x 0.131" per Stud at top/bottom plates
Interior Sheathing	None	-
SI: 1 in = 25.4 mm		

2.5 As needed, review material properties for design in **Section 6** and the regulatory evaluation in **Section 8**.

3 Definitions[2]

3.1 New Materials[3] are defined as building materials, equipment, appliances, systems, or methods of construction, not provided for by prescriptive and/or legislatively adopted regulations, known as alternative materials.[4] The design strength and permissible stresses shall be established by tests[5] and/or engineering analysis.[6]

3.2 Duly authenticated reports[7] and research reports[8] are test reports and related engineering evaluations that are written by an approved agency[9] and/or an approved source.[10]

3.2.1 These reports utilize intellectual property and/or trade secrets to create public domain material properties for commercial end-use.

3.2.1.1 This report protects confidential Intellectual Property and trade secretes under the regulation, 18.US.Code.90, also known as Defend Trade Secrets Act of 2016 (DTSA).[11]

3.3 An approved agency is *"approved"* when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is accredited and listed in the ANAB directory.

3.4 An approved source is *"approved"* when a professional engineer (i.e., Registered Design Professional, hereinafter RDP) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.[12]

3.5 Testing and/or inspections conducted for this duly authenticated report were performed by an ISO/IEC 17025 accredited testing laboratory, an ISO/IEC 17020 accredited inspection body, and/or a licensed RDP.

3.5.1 The Center for Building Innovation (CBI) is ANAB[13] ISO/IEC 17025 and ISO/IEC 17020 accredited.

3.6 The regulatory authority shall enforce[14] the specific provisions of each legislatively adopted regulation. If there is a non-conformance, the specific regulatory section and language of the non-conformance shall be provided in writing[15] stating the nonconformance and the path to its cure.

3.7 The regulatory authority shall accept duly authenticated reports from an approved agency and/or an approved source with respect to the quality and manner of use of new materials or assemblies as provided for in regulations regarding the use of alternative materials, designs, or methods of construction.[16]

3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory. Therefore, recognition of certificates and validation statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope shall be approved.[17] Thus, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent,[18] and can be used in any country that is an MLA signatory found at this link: https://iaf.nu/en/recognised-abs/

3.9 Approval equity is a fundamental commercial and legal principle.[19]

4 Applicable Local, State, and Federal Approvals; Standards; Regulations[20]

4.1 *Local, State, and Federal*

4.1.1 Approved in all local jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes the following featured local jurisdictions and is not limited to: Austin, Baltimore, Broward County, Chicago, Clark County, Dade County, Dallas, Detroit, Denver, DuPage County, Fort Worth, Houston, Kansas City, King County, Knoxville, Las Vegas, Los Angeles City, Los Angeles County, Miami, Nashville, New York City, Omaha, Philadelphia, Phoenix, Portland, San Antonio, San Diego, San Jose, San Francisco, Seattle, Sioux Falls, South Holland, Texas Department of Insurance, and Wichita.[21]

4.1.2 Approved in all state jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes the following featured states, and is not limited to: California, Florida, New Jersey, Oregon, New York, Texas, Washington, and Wisconsin.[22]

4.1.3 Approved by the Code of Federal Regulations Manufactured Home Construction: Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14[23] and Part 3280[24] pursuant to the use of ISO/IEC 17065 duly authenticated reports.

4.1.4 Approved means complying with the requirements of local, state, or federal legislation.

4.2 *Standards*

4.2.1 *ANSI/AWC NDS: National Design Specification (NDS) for Wood Construction*

4.2.2 *ANSI/AWC SDPWS: Special Design Provisions for Wind and Seismic*

4.2.3 *ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures*

4.2.4 *ASHRAE Handbook (Fundamentals)*

4.2.5 *ASTM D198: Standard Test Methods of Static Tests of Lumber in Structural Sizes*

4.2.6 *ASTM D7989: Standard Practice for Demonstrating Equivalent In-Plane Lateral Seismic Performance to Wood-Frame Shear Walls Sheathed with Wood Structural Panels*

4.2.7 *ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials*

4.2.8 *ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

4.2.9 *ASTM E2126: Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings*

4.3 Structural performance for shear wall assemblies used as lateral force resisting systems in Seismic Design Categories A through F have been tested and evaluated in accordance with the following standards:

4.3.1 *ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures*

4.3.2 *ASTM D7989: Standard Practice for Demonstrating Equivalent In-Plane Lateral Seismic Performance to Wood-Frame Shear Walls Sheathed with Wood Structural Panels*

4.3.2.1 ASTM D7989 is accepted engineering practice used to establish Seismic Design Coefficients (SDC).

4.3.2.2 Tested data generated by ISO/IEC 17025 approved agencies and/or professional engineers, which use ASTM D7989 as their basis, are defined as intellectual property and/or trade secrets.

4.3.2.3 All professional engineering evaluations are defined as an independent design review (i.e., listings, certified reports, duly authenticated reports from approved agencies, and/or research reports, are prepared independently by approved agencies and/or approved sources, when signed and sealed by licensed professional engineer pursuant to registration law.

4.3.3 *ASTM E564: Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings*

4.3.4 *ASTM E2126: Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings*

4.4 *Regulations*

4.4.1 *IBC – 15, 18, 21, 24: International Building Code®*

4.4.2 *IRC – 15, 18, 21, 24: International Residential Code®*

4.4.3 *IECC – 15, 18, 21, 24: International Energy Conservation Code®*

5 Listed[25]

5.1 Equipment, materials, products, or services included in a List published by a nationally recognized testing laboratory (i.e., CBI), an approved agency (i.e., CBI and DrJ), and/or and approved source (i.e., DrJ), or other organization(s) concerned with product evaluation (i.e., DrJ), that maintains periodic inspection (i.e., CBI) of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner.

6 Tabulated Properties Generated from Nationally Recognized Standards

6.1 *Prescriptive Provisions*

6.1.1 Insul-Stud Structural Insulated Stud wall assemblies are an alternative to solid sawn 2 x 6 lumber wall assemblies.

6.1.1.1 For use as a replacement for 2 x 6 sawn lumber, design shall be permitted in accordance with accepted engineering procedures, experience and technical judgment. In these cases, referenced design values as specified in **Table 2**, shall be used in accordance with IBC Section 2308 and IRC Section R602.

6.1.2 The foam plastic insulation forming the web of Insul-Stud Structural Insulated Studs is in compliance with IBC Section 2603.2, IBC Section 2603.3, and IBC Section 2603.4 for use in Type V construction, in accordance with the IBC, and IRC Section R303.2,[26] IRC Section R303.3[27] and IRC Section R303.4[28] for use in one and two-family dwellings and townhouses, up to three stories.

6.1.3 *Cutting, Notching, and Boring:*

6.1.3.1 Holes and notches in the flange material are not permitted.

6.1.4 Insul-Stud Structural Insulated Studs may be used as top and bottom plate framing material in wall assemblies. In all cases, at least one solid sawn lumber top plate must be used. The configurations shown in **Figure 3** are permitted.

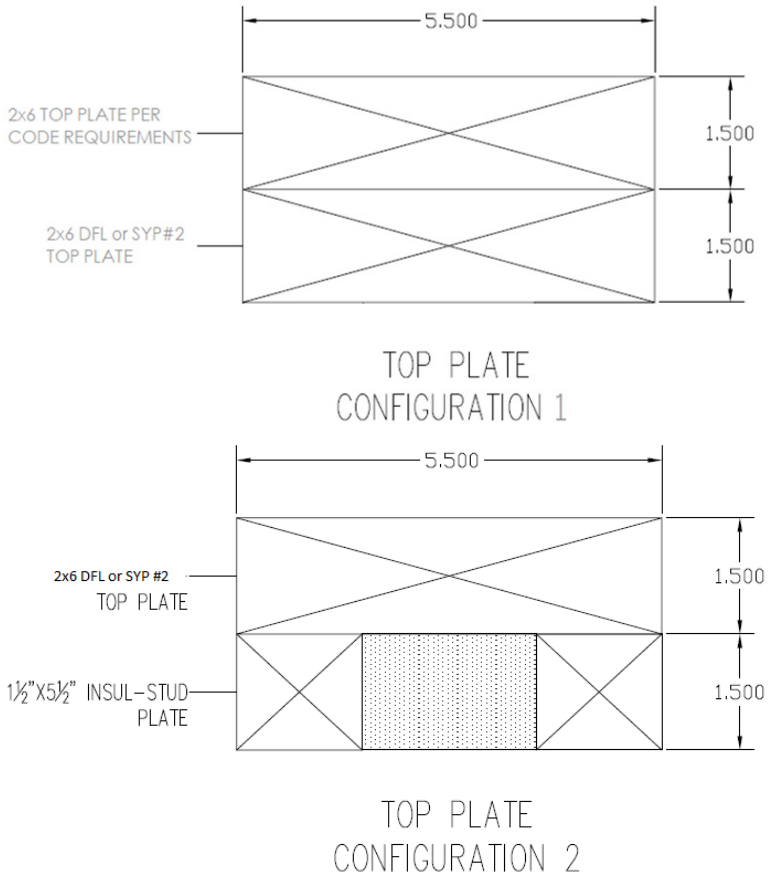

Figure 3. Allowable Top Plate Configurations

6.1.5 When Insul-Stud Structural Insulated Studs are used as a top plate, a second top plate using solid sawn lumber is also required and the framing above may be placed anywhere along the top plate.

6.1.6 Walls using nominal 2 x 6 sawn lumber single or double top plates shall be in accordance with IBC Section 2308.9.3.2[29] or IRC Section R602.3.2.

6.1.7 Structural framing attached to Insul-Stud walls and Insul-Stud Structural Insulated Studs used as structural members of a wall assembly shall be fastened as specified in **Table 2**.

6.1.8 Use as king studs, jack, trimmer, and cripple studs is permitted.

6.1.9 Structural sheathing shall be installed on one side of the wall and minimum ½" (12.7 mm) Gypsum Wallboard (GWB) or equivalent, on the other side of the wall, fastened in accordance with the applicable building code. Sheathing attached to only one side of the wall is not permitted.

6.1.10 A typical wall assembly is shown in **Figure 4**.

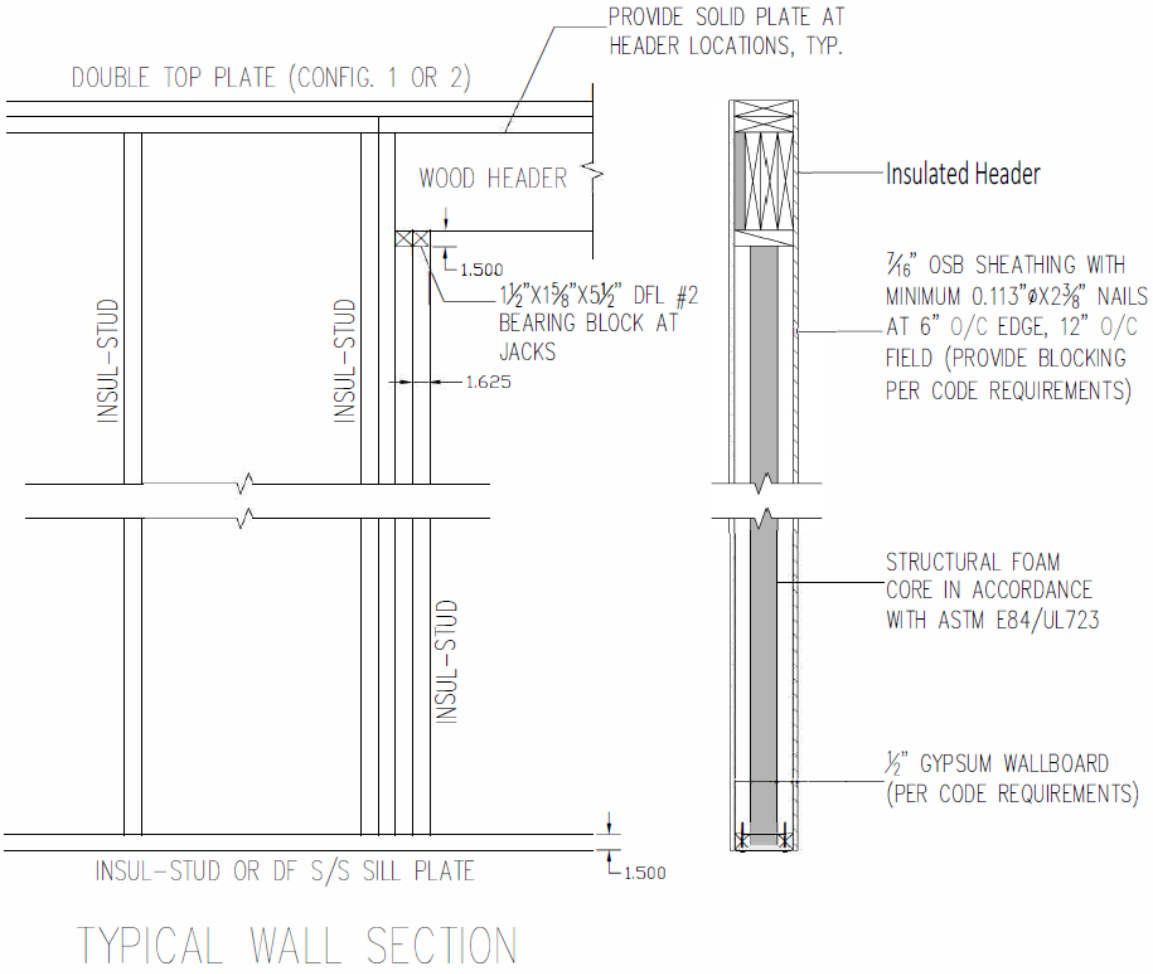

Figure 4. Typical Insul-Stud Wall Assembly

6.1.11 For Insul-Stud Structural Insulated Stud wall assemblies within the scope of the IRC, a maximum roof span of 56' is permitted where roof framing members are spaced no more than 24" on center. The roof framing members may be placed anywhere along the double top plate.

6.1.11.1 For cases where a longer span or a concentrated load that exceeds the limits of **Section 6.1.11** needs to be supported, an engineered design is required.

Table 2. Acceptable Fastening Schedule for Insul-Stud Structural Insulated Stud

Application[1]	Number and Type of Fastener	Fastener Spacing and Location
Blocking between ceiling joists or rafters to top plate	(4) - 8d box (2½" × 0.113"); or (3) - 8d common (2½" × 0.131"); or (3) - 10d box (3" × 0.128"); or (3) - 3" × 0.131" nails	Toenail into sold sawn top plate
Ceiling joists to top plate	(4) - 8d box (2½" × 0.113"); or (3) - 8d common (2½" × 0.131"); or (3) - 10d box (3" × 0.128"); or (3) - 3" × 0.131" nails	Per joist, toenail
Ceiling joist not attached to parallel rafter, laps over	(4) - 10d box (3" × 0.128"); or (4) - 3" × 0.131" nails	Per joist, toenail
Rafter or roof truss to plate	(3) - 10d common nails (3" × 0.148"); or (4) - 10d box (3" × 0.128"); or (4) - 3" × 0.131" nails	(2) toenails on one side and (1) toenail on opposite side of each rafter or truss where (3) nails are used. (2) toenails on each side of rafter or truss where (4) nails are used.
Stud to stud (not at braced wall panels)	10d box (3" × 0.128")	16" o.c. face nail; exterior flange and interior flange
Stud to stud and abutting studs at intersecting wall corners (at braced wall panels)	3" × 0.131" nails	12" o.c. face nail
Continuous header to stud	(4) - 8d common (2½" x 0.131")	Toenail
Solid sawn Top plate to Insul-Stud top plate	10d box (3" x 0.128")	12" o.c. face nail-staggered each flange
Double top plate splice	(12) - 10d box (3" x 0.128")	Face nail on each side of end joint (minimum 24" lap splice length each side of end joint) (6) at exterior flange; (6) at interior flange
Bottom plate to joist, rim joist, band joist or blocking (not at braced wall panels)	3" × 0.131" nails	12" o.c. face nail into joist, rim joist, band joist or blocking
Bottom plate to joist, rim joist, band joist or blocking (at braced wall panel)	3" × 0.131" nails	4" o.c. face nail into joist, rim joist, band joist or blocking
Top or bottom plate to stud	(2) - 3¼" × 0.131" nails	End nail (1) in exterior flange; (1) in interior flange
Top plates, laps at corners and intersections	(3) - 3" × 0.131" nails	Face nail (solid plates)
Joist to sill, top plate or girder	(3) - 3" × 0.131" nails	Toenail
Rim joist, band joist or blocking to sill or top plate (roof applications also)	8d box (2½" × 0.113")	4" o.c. toenail at exterior flange
	8d common (2½" × 0.131"); or 10d box (3" × 0.128"); or 3" × 0.131" nails	6" o.c. toenail at exterior flange

SI: 1 in = 25.4 mm

1. For all connections, care must be taken to avoid splitting.
2. Solid sawn top plate shall be used in single top plate applications and for the top plate in double plate applications.

6.2 *Engineered Design*

6.2.1 The design provisions for wood construction noted in IBC Section 2302.1[30] and IRC Section R301.1.3 apply to Insul-Stud Structural Insulated Stud wall Assemblies for ASD, unless otherwise noted in this report.

6.2.2 *Insul-Stud Structural Insulated Stud Composite Assembly Properties:*

6.2.2.1 When constructed at a minimum as defined in **Table 2**, wall assemblies, or portions thereof, may be designed on a per Insul-Stud Structural Insulated Stud basis using the design values that are shown in **Table 3**.

Table 3. 2 x 6 Insul-Stud Structural Insulated Stud Composite Wall Assembly Allowable Design Values[1,2,3,4]

Product	Nom. Stud Height (ft)	F_b [5] (psi)	F_t [5] (psi)	F_v [5] (psi)	F_c [5] (psi)	$F_{c\perp}$ [5] (psi)	EI_{Comp}, Wall Assembly (lb-in^2)	EI, Single Member (lb-in^2)	Specific Gravity (SG)
2x6 Insul-Stud Structural Insulated Stud Assembly	10	900	575	180 (flange) 60 (foam)	1,350	625	14,400,000	9,500,000	0.50
	9						12,900,000	8,500,000	
	8						11,400,000	7,500,000	

SI: 1 ft = 0.305 m, 1 psi = 6.895 kPa, 1 lb-in^2 = 2.87 kN-mm^2, 1 in^4 = 416 x 10^3 mm^4, 1 in^3 = 16.4 x 10^3 mm^3

1. A single Insul-Stud Structural Insulated Stud has a bearing surface of 4.8 sq. in. when in the vertical orientation.
3. Values are based on full wall assembly (as described in **Table 1**) tests with Insul-Stud Structural Insulated Stud spaced a maximum of 24" on center, and are reported on a per stud basis.
4. Values include size factor adjustments as appropriate.
5. Reference design values for Insul-Stud Structural Insulated Studs shall be multiplied by the adjustment factors specified in NDS Section 4.3.
6. Reference design values are applicable to the lumber component of the composite product.

6.2.3 The allowable compression loads, deflection ratios and shear reactions of Insul-Stud Structural Insulated Studs for various wind speeds, studs spacings, and wall heights are as shown in **Table 4** through **Table 7**.

Table 4. Insul-Stud Structural Insulated Stud - Axial Capacity per Wind Speed (Zone 4, Exposure "B", h=35')[1,2,3,4]

Stud Spacing (in)	Wall Height (ft)	Allowable Compression Load (lb), Deflection Ratio and (Shear Reaction, lb)								
		Ultimate Design Wind Speed, V_{ult} (mph)								
		90	95	100	105	110	115	120	125	130
12	8	3750 L/2107 (35)	3750 L/1898 (39)	3750 L/1712 (43)	3750 L/1546 (48)	3750 L/1410 (52)	3750 L/1296 (57)	3750 L/1184 (62)	3750 L/1089 (68)	3750 L/1009 (73)
	9	3750 L/1652 (39)	3750 L/1488 (44)	3750 L/1342 (49)	3750 L/1212 (54)	3750 L/1105 (59)	3750 L/1015 (64)	3750 L/928 (70)	3750 L/854 (76)	3750 L/791 (82)
	10	3750 L/1329 (44)	3750 L/1198 (49)	3750 L/1080 (54)	3750 L/975 (60)	3750 L/889 (66)	3750 L/817 (72)	3750 L/747 (78)	3750 L/687 (85)	3750 L/637 (92)
16	8	3750 L/1584 (47)	3750 L/1427 (52)	3750 L/1287 (57)	3750 L/1163 (63)	3750 L/1060 (70)	3750 L/974 (76)	3750 L/890 (83)	3750 L/819 (90)	3750 L/759 (97)
	9	3750 L/1242 (53)	3750 L/1119 (58)	3750 L/1009 (65)	3750 L/911 (72)	3750 L/831 (79)	3750 L/764 (86)	3750 L/698 (94)	3750 L/642 (102)	3750 L/595 (110)
	10	3750 L/999 (59)	3750 L/900 (65)	3750 L/812 (72)	3750 L/733 (80)	3750 L/669 (88)	3750 L/615 (96)	3750 L/561 (105)	3692 L/517 (114)	3575 L/479 (123)
24	8	3750 L/1054 (70)	3750 L/949 (78)	3750 L/856 (86)	3750 L/773 (95)	3750 L/705 (104)	3750 L/648 (114)	3750 L/592 (124)	3750 L/545 (135)	3750 L/505 (146)
	9	3750 L/826 (79)	3750 L/744 (88)	3750 L/671 (97)	3750 L/606 (108)	3750 L/553 (118)	3750 L/508 (128)	3750 L/464 (141)	3750 L/427 (153)	3737 L/396 (165)
	10	3750 L/665 (88)	3750 L/599 (98)	3750 L/540 (108)	3604 L/488 (120)	3454 L/445 (132)	3304 L/409 (143)	3128 L/373 (157)	2952 L/344 (170)	2777 L/318 (184)

SI: 1 in = 25.4 mm, 1 ft = 0.305 m, 1 lb = 4.448 N, 1 mph = 1.61 km/hr

1. Wind speed assumes Exposure Category B, Wall Zone 4, Enclosed Building, Mean Roof Height 35', and an effective wind area of 20 ft^2
2. Reference material properties table for design value assumptions.
3. Shear reactions are the reactions at the ends of the Insul-Stud Structural Insulated Studs for use in designing connections to other framing members.
4. Maximum compression capacities are limited by compression perpendicular to grain for Douglas Fir-Larch lumber. Where SYP lumber is used for top or bottom plates, compression capacities shall be limited to 3,210 pounds.

Table 5. Insul-Stud Structural Insulated Stud - Axial Capacity per Wind Speed (Zone 5, Exposure "B", h=35')[1,2,3,4]

Stud Spacing (in)	Wall Height (ft)	Allowable Compression Load (lb), Deflection Ratio and (Shear Reaction, lb)								
		Ultimate Design Wind Speed, V_{ult} (mph)								
		90	95	100	105	110	115	120	125	130
12	8	3750 L/1759 (42)	3750 L/1572 (47)	3750 L/1420 (52)	3750 L/1287 (57)	3750 L/1176 (63)	3750 L/1077 (68)	3750 L/988 (74)	3750 L/909 (81)	3750 L/841 (88)
	9	3750 L/1218 (47)	3750 L/1232 (53)	3750 L/1113 (59)	3750 L/1009 (65)	3750 L/922 (71)	3750 L/844 (77)	3750 L/775 (84)	3750 L/712 (92)	3750 L/659 (99)
	10	3750 L/879 (53)	3750 L/991 (59)	3750 L/896 (65)	3750 L/812 (72)	3750 L/742 (79)	3750 L/680 (86)	3750 L/623 (94)	3750 L/573 (102)	3730 L/531 (110)
16	8	3750 L/1323 (56)	3750 L/1182 (62)	3750 L/1068 (69)	3750 L/968 (76)	3750 L/884 (83)	3750 L/810 (91)	3750 L/743 (99)	3750 L/683 (108)	3750 L/632 (117)
	9	3750 L/916 (63)	3750 L/926 (71)	3750 L/837 (78)	3750 L/758 (86)	3750 L/693 (94)	3750 L/635 (103)	3750 L/582 (112)	3750 L/536 (122)	3750 L/496 (132)
	10	3750 L/661 (70)	3750 L/745 (79)	3750 L/674 (87)	3750 L/610 (96)	3750 L/558 (105)	3675 L/511 (115)	3542 L/469 (125)	3400 L/431 (136)	3258 L/399 (147)
24	8	3750 L/880 (84)	3750 L/786 (94)	3750 L/710 (104)	3750 L/643 (114)	3750 L/588 (125)	3750 L/539 (137)	3750 L/494 (149)	3750 L/454 (162)	3750 L/420 (175)
	9	3750 L/609 (95)	3750 L/616 (106)	3750 L/557 (117)	3750 L/504 (129)	3750 L/461 (141)	3750 L/422 (155)	3696 L/387 (149)	3525 L/356 (162)	3353 L/330 (175)
	10	3750 L/439 (106)	3629 L/496 (118)	3466 L/448 (131)	3291 L/406 (144)	3115 L/371 (158)	2927 L/340 (172)	2727 L/312 (149)	2514 L/287 (162)	2301 L/265 (175)

SI: 1 in = 25.4 mm, 1 ft = 0.305 m, 1 lb = 4.448 N, 1 mph = 1.61 km/hr

1. Wind speed assumes Exposure Category B, Wall Zone 5, Enclosed Building, Mean Roof Height 35', and an effective wind area of 20 ft^2
2. Reference material properties table for design value assumptions
3. Shear reactions are the reactions at the ends of the Insul-Stud Structural Insulated Studs for use in designing connections to other framing members.
4. Maximum compression capacities are limited by compression perpendicular to grain for Douglas Fir-Larch lumber. Where SYP lumber is used for top or bottom plates, compression capacities shall be limited to 3,210 pounds.

Table 6. Insul-Stud Structural Insulated Stud - Axial Capacity per Wind Speed (Zone 4, Exposure "C", h=35')[1,2,3,4]

Stud Spacing (in)	Wall Height (ft)	Allowable Compression Load (lb), Deflection Ratio and (Shear Reaction, lb)								
		Ultimate Design Wind Speed, V_{ult} (mph)								
		90	95	100	105	110	115	120	125	130
12	8	3750 L/1453 (51)	3750 L/1309 (56)	3750 L/1181 (62)	3750 L/1066 (69)	3750 L/972 (76)	3750 L/893 (82)	3750 L/816 (90)	3750 L/751 (98)	3750 L/696 (106)
	9	3750 L/1139 (57)	3750 L/1026 (64)	3750 L/925 (70)	3750 L/836 (78)	3750 L/762 (86)	3750 L/700 (93)	3750 L/640 (102)	3750 L/589 (111)	3750 L/546 (120)
	10	3750 L/917 (64)	3750 L/826 (71)	3750 L/745 (79)	3750 L/673 (87)	3750 L/613 (95)	3750 L/564 (104)	3687 L/515 (114)	3559 L/474 (124)	3432 L/439 (133)
16	8	3750 L/1093 (68)	3750 L/984 (75)	3750 L/888 (83)	3750 L/802 (92)	3750 L/731 (101)	3750 L/672 (110)	3750 L/614 (120)	3750 L/565 (131)	3750 L/523 (141)
	9	3750 L/856 (76)	3750 L/772 (85)	3750 L/696 (94)	3750 L/628 (104)	3750 L/573 (114)	3750 L/527 (124)	3750 L/481 (136)	3750 L/443 (148)	3750 L/410 (159)
	10	3750 L/689 (85)	3750 L/621 (95)	3750 L/560 (105)	3660 L/506 (116)	3515 L/461 (127)	3370 L/424 (138)	3201 L/387 (152)	3031 L/356 (165)	2862 L/330 (178)
24	8	3750 L/727 (101)	3750 L/655 (112)	3750 L/590 (125)	3750 L/533 (138)	3750 L/486 (151)	3750 L/447 (165)	3750 L/408 (180)	3750 L/376 (196)	3750 L/348 (212)
	9	3750 L/569 (115)	3750 L/513 (127)	3750 L/463 (141)	3750 L/418 (156)	3664 L/381 (171)	3489 L/350 (186)	3284 L/320 (204)	3079 L/294 (222)	2875 L/273 (239)
	10	3505 L/458 (128)	3323 L/413 (142)	3123 L/372 (157)	2905 L/336 (174)	2687 L/307 (191)	2469 L/282 (208)	2214 L/257 (227)	1960 L/237 (247)	1705 L/220 (267)

SI: 1 in = 25.4 mm, 1 ft = 0.305 m, 1 lb = 4.448 N, 1 mph = 1.61 km/hr

1. Wind speed assumes Exposure Category C, Wall Zone 4, Enclosed Building, Mean Roof Height 35', and an effective wind area of 20 ft^2
2. Reference material properties table for design value assumptions
3. Shear reactions are the reactions at the ends of the Insul-Stud Structural Insulated Studs for use in designing connections to other framing members.
4. Maximum compression capacities are limited by compression perpendicular to grain for Douglas Fir -Larch lumber. Where SYP lumber is used for top or bottom plates, compression capacities shall be limited to 3,210 pounds.

Table 7. Insul-Stud Structural Insulated Stud - Axial Capacity per Wind Speed (Zone 5, Exposure "C", h=35')[1,2,3,4]

Stud Spacing (in)	Wall Height (ft)	Allowable Compression Load (lb), Deflection Ratio and (Shear Reaction, lb)								
		Ultimate Design Wind Speed, V_{ult} (mph)								
		90	95	100	105	110	115	120	125	130
12	8	3750 L/1213 (61)	3750 L/1084 (68)	3750 L/980 (75)	3750 L/887 (83)	3750 L/811 (91)	3750 L/743 (99)	3750 L/682 (108)	3750 L/627 (117)	3750 L/580 (127)
	9	3750 L/951 (69)	3750 L/850 (77)	3750 L/768 (85)	3750 L/696 (94)	3750 L/636 (103)	3750 L/582 (112)	3750 L/534 (122)	3750 L/491 (133)	3750 L/455 (143)
	10	3750 L/765 (76)	3750 L/684 (86)	3750 L/618 (95)	3750 L/560 (105)	3750 L/512 (114)	3750 L/469 (125)	3750 L/430 (136)	3734 L/395 (148)	3579 L/366 (160)
16	8	3750 L/912 (81)	3750 L/815 (91)	3750 L/736 (100)	3750 L/667 (111)	3750 L/610 (121)	3750 L/559 (132)	3750 L/513 (144)	3750 L/471 (157)	3750 L/436 (169)
	9	3750 L/715 (91)	3750 L/639 (102)	3750 L/577 (113)	3750 L/523 (125)	3750 L/478 (137)	3750 L/438 (149)	3750 L/402 (163)	3601 L/369 (177)	3436 L/342 (191)
	10	3750 L/575 (102)	3684 L/514 (114)	3527 L/465 (126)	3358 L/421 (139)	3189 L/385 (153)	3007 L/352 (167)	2814 L/323 (182)	2608 L/297 (197)	2403 L/275 (213)
24	8	3750 L/607 (121)	3750 L/542 (136)	3750 L/490 (150)	3750 L/444 (166)	3750 L/406 (182)	3750 L/371 (198)	3750 L/341 (216)	3747 L/313 (235)	3552 L/290 (254)
	9	3750 L/475 (137)	3750 L/425 (154)	3679 L/384 (170)	3474 L/348 (188)	3269 L/318 (205)	3050 L/291 (224)	2816 L/267 (244)	2568 L/246 (266)	2319 L/227 (287)
	10	3178 L/383 (153)	2941 L/342 (171)	2705 L/309 (189)	2450 L/280 (209)	2196 L/256 (229)	1923 L/234 (250)	1632 L/215 (272)	1323 L/198 (296)	1014 L/183 (320)

SI: 1 in = 25.4 mm, 1 ft = 0.305 m, 1 lb = 4.448 N, 1 mph = 1.61 km/hr

1. Wind speed assumes Exposure Category C, Wall Zone 5, Enclosed Building, Mean Roof Height 35', and an effective wind area of 20 ft^2
2. Reference material properties table for design value assumptions
3. Shear reactions are the reactions at the ends of the Insul-Stud Structural Insulated Studs for use in designing connections to other framing members.
4. Maximum compression capacities are limited by compression perpendicular to grain for Douglas Fir-Larch lumber. Where SYP lumber is used for top or bottom plates, compression capacities shall be limited to 3,210 pounds.

6.2.4 *Design for Compression Loads:*

6.2.4.1 The maximum allowable compression load for Insul-Stud Structural Insulated Studs is specified in **Table 4** through **Table 7** for Insul-Stud assemblies utilizing Insul-Stud Structural Insulated Studs for wall studs and bottom plates, and Insul-Stud Structural Insulated Studs and/or DFL solid sawn top plates.

6.2.4.2 The maximum allowable compression load is controlled by perpendicular-to-grain compression of Insul-Stud Structural Insulated Studs and/or DF-L top and bottom plates.

6.2.4.3 The allowable axial compression for Insul-Stud Structural Insulated Studs can be calculated using the provisions of NDS Section 3.6 and NDS Section 3.7.

6.2.4.4 For computing the column stability factor, the critical bucking design value, F_{cE}, shall be computed using the formula in **Equation 1**.

Equation 1. Critical Bucking Design Value

$$F_{cE} = \frac{\pi^2 EI_{min}}{A(l_e)^2}$$

Where: EI_{min} = bending stiffness for beam and column stability (lb-in^2)

A = minimum net section area of Insul-Stud (in^2)
= (1.5" x 1.625") + (1.5" x 1.625") = 4.875 in^2

l_e = effective column length (in) = K_e x h

6.2.5 *Design for Bending:*

6.2.5.1 The maximum bending moment and shear forces shall not exceed the reference design values for the Insul-Stud Structural Insulated Studs specified in **Table 3**.

6.2.6 *Design for Combined Bending and Axial Compression Loads:*

6.2.6.1 Insul-Stud Structural Insulated Studs resists bending using tension and compression stresses in the wood members.

6.2.6.2 The axial compressive stress due to combined bending and axial load can be computed using **Equation 2**.

Equation 2. Axial Compressive Stress

$$f_a = \frac{P}{A} + \frac{M}{A_m \cdot d_{eff}}$$

Where: P = axial load applied to Insul-Stud (lb)

A = minimum net section area of Insul-Stud (in^2)
= (1.625" x 1.5") + (1.625" x 1.5") = 4.875 in^2

M = bending moment applied to Insul-Stud (lb-in)

A_m = Minimum net section area of single Insul-Stud member (in^2) = (1.625" x 1.5") = 2.44 in^2

d_{eff} = Distance from center-to-center of Insul-Stud member (in) = 4.00 in

6.2.6.3 The axial stresses in Insul-Stud Structural Insulated Stud members shall be checked in accordance with NDS Section 3.6 and NDS Section 3.7.

6.2.6.4 Insul-Stud Structural Insulated Studs shall also be checked in bending only to insure the allowable bending moment in **Table 3** is not exceeded.

6.2.6.5 For wall assemblies up to 10 feet in height and for wind speeds up to 130 mph, the allowable axial compression load is as shown in **Table 4** through **Table 7**.

6.2.6.6 For cases where a higher reaction needs to be supported, use of built-up studs fastened in accordance with **Table 2** is permitted with a compression limit per-ply as specified in **Table 4** through **Table 7**.

6.2.6.6.1 For example, for Insul-Stud Structural Insulated Studs with a DF-L top plate on an 8' wall, the maximum compression load is 3,750 lbs. per ply. Therefore, for a 2-ply built-up stud, the maximum reaction is 6,500 lbs.

6.2.6.6.2 In this case, the built-up stud shall be located directly under the applied load.

6.3 *Lateral Load Diaphragm Resistance for Wall Applications*

6.3.1 Insul-Stud Structural Insulated Studs used in wall assemblies designed as shear walls are permitted to be designed in accordance with the methodology used in SDPWS for wood structural panels. Fasteners for the attachment of sheathing materials to Insul-Stud Structural Insulated Studs shall not be closer than 3" on center.

6.3.1.1 The response modification coefficient, R, system overstrength factor, Ω_0, and deflection amplification factor, C_d, as indicated in **Table 8**, shall be used to determine the base shear, element design forces, and design story drift in accordance with ASCE 7 Chapter 12 and Section 14.5.

Table 8. Insul-Stud Structural Insulated Stud Composite Assembly
Allowable Unit Shear Capacity for Seismic Loading

Seismic Force Resisting System	Response Modification Factor, R[1]	Overstrength Factor, Ω_0[2]	Deflection Amplification Coefficient, C_d[3]	Structural System Limitations and Building Height Limit (ft)				
				Seismic Design Category (SDC)				
				B	C	D	E	F
Insul-Stud Framed Walls[4] Sheathed with Wood Structural Panels for Shear Resistance	6.5	3	4	NL	NL	65	65	65

1. Response modification coefficient, R, for use with ASCE 7.
2. The tabulated value of the overstrength factor, Ω_0 is permitted to be reduced by subtracting one-half (0.5) for structures with flexible diaphragms.
3. Deflection amplification factor C_d, for use with ASCE 7 Section 12.8.6, 12.8.7 and 12.9.2.
4. NL = Not Limited. Heights are measured from the base of the structure as defined in ASCE 7 Section 11.2.

6.3.2 *Hold-Downs:*

6.3.2.1 Hold-downs shall not be attached directly to Insul-Stud Structural Insulated Stud members. Solid sawn nominal 2 x 6 blocking shall be used where hold-downs are required and shall be designed to transfer loads from the Insul-Stud Structural Insulated Stud through the blocking and into the hold down device.

6.4 *Thermal Resistance*

6.4.1 An example calculation for the effective R-Value and U-factor for the Insul-Stud Structural Insulated Stud wall assembly are as shown in **Table 9**.

Table 9. 1.625" x 5.5" Insul-Stud Structural Insulated Stud Wall Assembly U Factor Analysis

Wall Assembly Layer or Component	Component R-Value		
	Cavity	Insulated Framing	Framing
Exterior Air Film	0.17	0.17	0.17
Wood Siding	0.81	0.81	0.81
7/16" OSB Sheathing	0.55	0.55	0.55
Cavity Insulation (Fiberglass Batt)	21.0	-	-
Insul-Stud Cavity Insulation (2.5")	-	15.75	-
Insul-Stud Flanges	-	3.75	6.875
1/2" Gypsum Wall Board	0.45	0.45	0.45
Interior Air Film	0.68	0.68	0.68
Total R-Value	**23.7**	**22.2**	**9.5**
U-Factor	**0.042**	**0.045**	**0.105**
Percent of Wall Assembly	**88**	**9**	**3**
Average U-Factor	**0.044**		
Average Effective R-Value	**22.5**		

1. Calculated on opaque wall sections only without fenestrations.
2. Assumes 8' 1 1/8" tall x 8' 0" wall section with studs 24" o.c.
3. Assumes top and bottom plates are Insul-Stud Structural Insulated Studs and top plate is solid sawn 2 x 6.
4. If all plates are solid sawn 2x lumber, U-factor is 0.045.
5. If a single solid sawn top plate is used, U-factor is 0.044.

6.4.2 The effective R-Value and U-factors for various assemblies are shown in **Table 10**.

Table 10. Effective R-Value and U-factors for Various Insul-Stud Structural Insulated Stud Wall Assemblies

Wall Framing	Cavity Insulation	Exterior Insulation	Sheathing	U-Factor	R-Value
1.625" x 5.5" Insul-Stud @ 24" o.c.	R-19 Batt	-	7/16" OSB	0.048	21.0
1.625" x 5.5" Insul-Stud @ 24" o.c.	R-21 Batt	-	7/16" OSB	0.044	22.6
1.625" x 5.5" Insul-Stud @ 24" o.c.	R-21 Batt	R3 Insulated Zip	7/16" OSB	0.039	25.7
1.625" x 5.5" Insul-Stud @ 24" o.c.	R-21 Batt	R6 Polyiso	7/16" OSB	0.035	28.8
1.625" x 5.5" Insul-Stud @ 24" o.c.	2"Closed Cell + R15 Batt	-	7/16" OSB	0.037	27.9
1.625" x 5.5" Insul-Stud @ 24" o.c.	2"Closed Cell + R15 Batt	R3 Insulated Zip	7/16" OSB	0.032	31.2
1.625" x 5.5" Insul-Stud @ 24" o.c.	2"Closed Cell + R15 Batt	R6 Polyiso	7/16" OSB	0.029	34.4
1. If a single top plate is used, the U-Factor is 0.043 and if all plates are solid (top and bottom) the U-Factor is 0.045.					

6.5 *Fire Performance*

6.5.1 The foam plastic portion of the Insul-Stud Structural Insulated Stud has the flame spread and smoke developed index shown in **Table 11**.

Table 11. Insul-Stud Structural Insulated Stud Foam Plastic Flame Spread and Smoke Developed Indexes

Product Description	Flame Spread	Smoke Developed Index
Insul-Stud Structural Insulated Stud	≤ 25	≤ 450
1. Foam plastic portion of Insul-Stud Structural Insulated Stud tested in accordance with ASTM E84/ UL723		

6.6 Wall assemblies utilizing Insul-Stud Structural Insulated Studs shall be provided with a thermal barrier on the interior side of the wall in accordance with the IRC Section R303.4,[31] consisting of minimum 1/2" gypsum wallboard or equivalent.

6.7 Where the application falls outside of the performance evaluation, conditions of use, and/or installation requirements set forth herein, alternative techniques shall be permitted in accordance with accepted engineering practice and experience. This includes but is not limited to the following areas of engineering: mechanics or materials, structural, building science, and fire science.

7 Certified Performance[32]

7.1 All construction methods shall conform to accepted engineering practices to ensure durable, livable, and safe construction and shall demonstrate acceptable workmanship reflecting journeyman quality of work of the various trades.[33]

7.2 The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur.[34]

8 Regulatory Evaluation and Accepted Engineering Practice

8.1 Insul-Stud Structural Insulated Stud complies with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:

8.1.1 Compliance with the thermal resistance provisions of the IECC and IRC Chapter 11.

8.1.2 Compliance of the foam plastic portion of Insul-Stud Structural Insulated Studs with the provisions of the IRC, IRC Section R303,[35] for flame spread and smoke developed indices.

8.1.3 Use as a direct replacement for 2 x 4 studs, top plates, and sill plates in IRC braced wall applications subject to the limits herein.

8.1.4 Use as an alternative material to that described in IBC Chapter 23, in particular, compliance with requirements for the design and construction of wood-based products as described in IBC Section 2302.1 for Allowable Stress Design (ASD).

8.1.5 Structural performance for shear wall assemblies used as lateral force resisting systems in Seismic Design Categories A through F.

8.1.6 Lateral force resisting systems for use in both wind and seismic applications follow the performance-based provisions of IBC Section 2306.1, IBC Section 2306.3, and/or SDPWS Section 4.3 for light-frame wood wall assemblies.

8.1.7 **Table 8** provides SDC that conform to the requirements in ASCE 7 Section 12.2.1, 12.2.1.1, and Table 12.2-1 for design of wall assemblies in buildings that require seismic design.

8.2 Any building code, regulation and/or accepted engineering evaluations (i.e., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ, which is an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP or approved sources. DrJ is qualified[36] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise,[37] respectively.

8.3 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope of expertise, which is also its areas of professional engineering competence.

8.4 Any regulation specific issues not addressed in this section are outside the scope of this report.

9 Installation

9.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this report, and the applicable building code.

9.2 In the event of a conflict between the manufacturer installation instructions and this report, contact the manufacturer for counsel on the proper installation method.

9.3 *Installation Procedure*

9.3.1 Insul-Stud Structural Insulated Studs are designed to be used as a direct replacement of nominal 2 x 4 (38 mm x 89 mm) solid sawn lumber, as wall studs and top and bottom plates.

9.3.1.1 For use as a 2 x 6, design shall be permitted in accordance with accepted engineering procedures, experience and technical judgment. In these cases, referenced design values as specified in **Table 3**. Insul-Stud Structural Insulated Stud Reference Design Values shall be used in accordance with IBC Section 2308 and IRC Section R602.

9.3.2 Install Insul-Stud Structural Insulated Studs in the same manner as solid sawn lumber, except as noted herein.

9.3.2.1 For IBC Section 2308 and the IRC, install in accordance with the provisions therein, except as noted in this report. See **Table 2** for framing connection information.

9.3.2.2 For engineered design, walls shall be designed in accordance with the IBC and the referenced standards therein using the material properties and design limitations as noted in **Section 6**.

9.3.2.3 Design of connections not listed herein, using Insul-Stud Structural Insulated Studs shall be in accordance with NDS.

10 Substantiating Data

10.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:

10.1.1 Compressive load testing of Insul-Stud Structural Insulated Studs in accordance with ASTM D4761

10.1.2 Bending tests in accordance with ASTM D198 and ASTM D4761

10.1.3 Lateral load resistance in accordance with ASTM E2126

10.1.4 Transverse load test in accordance with ASTM E330

10.1.5 Flame Spread and Smoke Developed indices in accordance with ASTM E84

10.1.6 Effective R-value and U-Factors in accordance with ASHRAE Handbook (Fundamentals)

10.2 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies, approved sources, and/or an RDP. Accuracy of external test data and resulting analysis is relied upon.

10.3 Where applicable, testing and/or engineering analysis are based upon provisions that have been codified into law through state or local adoption of regulations and standards. The developers of these regulations and standards are responsible for the reliability of published content. DrJ's engineering practice may use a regulation-adopted provision as the control. A regulation-endorsed control versus a simulation of the conditions of application to occur establishes a new material as being equivalent to the regulatory provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.

10.4 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate, or duly authenticated reports from approved agencies and/or approved sources provided by the supplier. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this duly authenticated report, may be dependent upon published design properties by others.

10.5 *Testing and Engineering Analysis:*

10.5.1 The strength, rigidity, and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.[38]

10.6 Where additional condition of use and/or regulatory compliance information is required, please search for Insul-Stud Structural Insulated Stud on the DrJ Certification website.

11 Findings

11.1 As outlined in **Section 6**, Insul-Stud Structural Insulated Stud has performance characteristics that were tested and/or meet applicable regulations. In addition, they are suitable for use pursuant to its specified purpose.

11.2 When used and installed in accordance with this duly authenticated report and the manufacturer installation instructions, Insul-Stud Structural Insulated Stud shall be approved for the following applications:

11.2.1 The structural performance as described in **Table 3** through **Table 8**.

11.2.2 The effective R-value/U-Factor shown in **Table 9** and **Table 10**.

11.2.3 The fire performance of the foam plastic shown in **Table 11**.

11.2.4 Use as replacement for 2 x 4 solid sawn lumber in wall assemblies.

11.3 Unless exempt by state statute, when Insul-Stud Structural Insulated Studs are to be used as a structural and/or building envelope component in the design of a specific building, the design shall be performed by an RDP.

11.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Moment Innovations, LLC.

11.5 IBC Section 104.2.3 (IRC Section R104.2.2 and IFC Section 104.2.3[39] are similar) in pertinent part state:

> **104.2.3 Alternative Materials, Design and Methods of Construction and Equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.

11.6 **Approved:**[40] Building regulations require that the building official shall accept duly authenticated reports.[41]

11.6.1 An approved agency is *"approved"* when it is ANAB ISO/IEC 17065 accredited.

11.6.2 An approved source is *"approved"* when an RDP is properly licensed to transact engineering commerce.

11.6.3 Federal law, Title 18 US Code Section 242, requires that, where the alternative product, material, service, design, assembly, and/or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved. Denial without written reason deprives a protected right to free and fair competition in the marketplace.

11.7 DrJ is a licensed engineering company, employs licensed RDPs and is an ANAB Accredited Product Certification Body – Accreditation #1131.

11.8 Through the IAF Multilateral Arrangement (MLA), this duly authenticated report can be used to obtain product approval in any jurisdiction or country because all ANAB ISO/IEC 17065 duly authenticated reports are equivalent.[42]

12 Conditions of Use

12.1 Material properties shall not fall outside the boundaries defined in **Section 6**.

12.2 As defined in **Section 6**, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.

12.3 As listed herein, Insul-Stud Structural Insulated Stud shall not be used:

12.3.1 In single top plate applications, when used as the lower member of double top plate application, the top member shall consist of DFL solid sawn lumber. Alternately, a single top plate of DFL solid sawn lumber is permitted in accordance with IRC Section R602.3.2.

12.4 When required by adopted legislation and enforced by the building official, also known as the Authority Having Jurisdiction (AHJ) in which the project is to be constructed:

12.4.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice and, when prepared by an approved source, shall be approved when signed and sealed.

12.4.2 This report and the installation instructions shall be submitted at the time of permit application.

12.4.3 This innovative product has an internal quality control program and a third-party quality assurance program.

12.4.4 At a minimum, this innovative product shall be installed per **Section 9**.

12.4.5 The review of this report by the AHJ shall comply with IBC Section 104.2.3.2 and IBC Section 105.3.1.

12.4.6 This innovative product has an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.7.2, IBC Section 110.4, IBC Section 1703, IRC Section R104.7.2, and IRC Section R109.2.

12.4.7 The application of this innovative product in the context of this report is dependent upon the accuracy of the construction documents, implementation of installation instructions, inspection as required by IBC Section 110.3, IRC Section R109.2, and any other regulatory requirements that may apply.

12.5 The approval of this report by the AHJ shall comply with IBC Section 1707.1, where legislation states in part, *"the building official shall make, or cause to be made, the necessary tests and investigations; or the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in Section 104.2.3"*, all of IBC Section 104, and IBC Section 105.3.

12.6 Design loads shall be determined in accordance with the regulations adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (i.e., owner or RDP).

12.7 The actual design, suitability, and use of this report for any particular building, is the responsibility of the owner or the authorized agent of the owner.

13 Identification

13.1 The innovative product listed in **Section 1.1** is identified by a label on the board or packaging material bearing the manufacturer name, product name, this report number, and other information to confirm code compliance.

13.2 Additional technical information can be found at www.insulstud.com.

14 Review Schedule

14.1 This report is subject to periodic review and revision. For the latest version, visit www.drjcertification.org.

14.2 For information on the status of this report, please contact DrJ Certification.

Notes

1 For more information, visit drjcertification.org or call us at 608-310-6748.

2 Capitalized terms and responsibilities are defined pursuant to the applicable building code, applicable reference standards, the latest edition of TPI 1, the NDS, AISI S202, US professional engineering law, Canadian building code, Canada professional engineering law, Qualtim External Appendix A: Definitions/Commentary, Qualtim External Appendix B: Project/Deliverables, Qualtim External Appendix C: Intellectual Property and Trade Secrets, definitions created within Design Drawings and/or definitions within Reference Sheets. Beyond this, terms not defined shall have ordinarily accepted meanings as the context implies. Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

3 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1702

4 Alternative Materials, Design and Methods of Construction and Equipment: The provisions of any regulation code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by a regulation. Please review https://www.justice.gov/atr/mission and https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.2.3

5 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1706.2:~:text=the%20design%20strengths%20and%20permissible%20stresses%20shall%20be%20established%20by%20tests

6 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design of accepted engineering practice. https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1706.1:~:text=Conformance%20to%20Standards-,The%20design%20strengths%20and%20permissible%20stresses,-of%20any%20structural

7 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1:~:text=the%20building%20official%20shall%20make%2C%20or%20cause%20to%20be%20made%2C%20the%20necessary%20tests%20and%20investigations%3B%20or%20the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies%20in%20respect%20to%20the%20quality%20and%20manner%20of%20use%20of%20new%20materials%20or%20assemblies%20as%20provided%20for%20in%20Section%20104.2.3.

8 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1703.4.2

9 https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#approved_agency

10 https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#approved_source

11 https://www.law.cornell.edu/uscode/text/18/1832 (b) Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of $5,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided. The federal government and each state have a public records act. To follow DTSA and comply state public records and trade secret legislation requires approval through ANAB ISO/IEC 17065 accredited certification bodies or approved sources. For more information, please review this website: Intellectual Property and Trade Secrets.

12 https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional AND https://apassociation.org/list-of-engineering-boards-in-each-state-archive/

13 https://www.cbitest.com/accreditation/

14 https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.1:~:text=directed%20to%20enforce%20the%20provisions%20of%20this%20code

15 https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.2.3 AND https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#105.3.1

16 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1

17 https://iaf.nu/en/about-iaf-mla/#:~:text=Once%20an%20accreditation%20body%20is%20a%20signatory%20of%20the%20IAF%20MLA%2C%20it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%2C%20with%20the%20appropriate%20scope

18 True for all ANAB accredited product evaluation agencies and all International Trade Agreements.

19 https://www.justice.gov/crt/deprivation-rights-under-color-law AND https://www.justice.gov/atr/mission

20 Unless otherwise noted, the links referenced herein use un-amended versions of the 2024 International Code Council (ICC) 2024 International Code Council (ICC) model codes as foundation references. Mississippi versions of the IBC 2024 and the IRC 2024 are un-amended. This material, product, design, service and/or method of construction also complies with the 2000-2012 versions of the referenced codes and the standards referenced therein. As pertinent to this technical and code compliance evaluation, CBI and/or DrJ staff have reviewed any state or local regulatory amendments to assure this report is in compliance.

21 See Adoptions by Publisher for the latest adoption of a non-amended or amended model code by the local jurisdiction. https://up.codes/codes/general

22 See Adoptions by Publisher for the latest adoption of a non-amended or amended model code by state. https://up.codes/codes/general

23 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14

24 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280

25 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#p-3280.2(Listed%20or%20certified); https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#listed AND https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#labeled

26 2021 IRC Section R316.2

27 2021 IRC Section R316.3

28 2021 IRC Section R316.4

29 2021 IBC Section 2308.5.3.2

30 2015 IBC Section 2301.2

31 2021 IRC Section R316.4

32 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1703.4

[33] https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=All%20construction%20methods%20shall%20be%20in%20conformance%20with%20accepted%20engineering%20practices%20to%20insure%20durable%2C%20livable%2C%20and%20safe%20housing%20and%20shall%20demonstrate%20acceptable%20workmanship%20reflecting%20journeyman%20quality%20of%20work%20of%20the%20various%20trades

[34] https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=The%20strength%20and%20rigidity%20of%20the%20component%20parts%20and/or%20the%20integrated%20structure%20shall%20be%20determined%20by%20engineering%20analysis%20or%20by%20suitable%20load%20tests%20to%20simulate%20the%20actual%20loads%20and%20conditions%20of%20application%20that%20occur

[35] 2021 IRC Section R316

[36] Qualification is performed by a legislatively defined Accreditation Body. ANSI National Accreditation Board (ANAB) is the largest independent accreditation body in North America and provides services in more than 75 countries. DrJ is an ANAB accredited product certification body.

[37] https://anabpd.ansi.org/Accreditation/product-certification/AllDirectoryDetails?prgID=1&orgID=2125&statusID=4#:~:text=Bill%20Payment%20Date-,Accredited%20Scopes,-13%20ENVIRONMENT.%20HEALTH

[38] See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition: https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280

[39] 2018: https://up.codes/viewer/wyoming/ifc-2018/chapter/1/scope-and-administration#104.9 AND 2021: https://up.codes/viewer/wyoming/ibc-2021/chapter/1/scope-and-administration#104.11

[40] Approved is an adjective that modifies the noun after it. For example, Approved Agency means that the Agency is accepted officially as being suitable in a particular situation. This example conforms to IBC/IRC/IFC Section 201.4 (https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#201.4) where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.

[41] https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1

[42] Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.