Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

Report No: 1510-04

Issue Date: January 4, 2016

Revision Date: January 26, 2026

Subject to Renewal: April 1, 2027

OX Engineered Products One and Two-Hour Fire Rated Wall Assemblies

Trade Secret Report Holder:

Amrize Building Envelope, LLC

Phone: 269-435-2425 Website: www.oxengineeredproducts.com

CSI Designations:

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

Section: 06 12 00 - Structural Panels

Section: 06 12 19 - Shear Wall Panels

Section: 06 16 00 - Sheathing

Section: 06 16 13 - Insulated Sheathing

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

Section: 07 21 00 - Thermal Insulation

1 Innovative Products Evaluated[1]

1.1 ThermoPLY® Structural Sheathing

1.2 OX-IS™ Structural Insulated Sheathing

1.3 SI-Strong Structural Insulation[2]

1.4 Strong-R® Structural Insulated Sheathing

1.5 IsoRED Ci® Polyiso Insulation

1.6 IsoRED Max® Polyiso Insulation

2 Product Description and Materials

2.1 *ThermoPLY Structural Sheathing*

2.1.1 ThermoPLY is a proprietary fibrous sheathing board, composed of pressure-laminated plies consisting of high-strength cellulosic fibers. These fibers are specially treated to be water resistant, and are bonded with a proprietary water-resistive adhesive.

2.1.1.1 Polymer facings are applied on both sides of the sheathing panels. Facings may be aluminum foil or Kraft/Polymer/Kraft facing on both sides.

2.2 *OX-IS and SI-Strong Structural Insulated Sheathing*

2.2.1 OX-IS and SI-Strong are structural sheathing products consisting of a proprietary fibrous sheathing board laminated to one side of a proprietary rigid, closed-cell polyisocyanurate (polyiso) foam plastic insulating sheathing.

2.2.1.1 The sheathing is made of specially treated plies that are pressure-laminated with a water-resistant adhesive. The surface finish consists of a non-reflective facer on one or both sides.

2.3 *Strong-R Structural Insulated Sheathing*

2.3.1 Strong-R Structural Insulated Sheathing is a structural sheathing product consisting of a proprietary fibrous sheathing board laminated to one side of a proprietary rigid, closed-cell polyiso foam plastic insulating sheathing.

2.3.1.1 The proprietary fibrous sheathing is made of specially treated plies that are pressure-laminated with a water-resistant adhesive. The surface finish consists of a foil facer on one or both sides using a fibrous sheathing board.

2.3.1.2 The rigid foam plastic insulation is a Class A proprietary polyisocyanurate, which can have facings on one or both sides. The facers are designed with a base foil layer.

2.4 *IsoRED Ci Polyiso Insulation*

2.4.1 IsoRED Ci Polyiso Insulation is an ASTM C1289 Type 1, Class 1, compliant rigid polyiso insulation.

2.4.1.1 The closed-cell polyiso foam core is bonded to facers on both sides. The facers are designed with a base foil layer, which is then combined with layers of other material(s).

2.5 *IsoRED Max Polyiso Insulation*

2.5.1 IsoRED Max Polyiso Insulation is an ASTM C1289 Type 1, Class 2 compliant rigid polyiso insulation.

2.5.1.1 The closed-cell polyiso foam core is bonded to facers on both sides. The facers are designed with a base foil layer.

2.6 *Material Availability*

2.6.1 *Thickness:*

2.6.1.1 *ThermoPLY Structural Sheathing:*

2.6.1.1.1 Standard Structural Grade (Red): 0.113" (2.9 mm)

2.6.1.1.2 High Structural Grade (Blue): 0.135" (3.4 mm)

2.6.1.2 *OX-IS and SI-Strong Structural Insulated Sheathing:*

2.6.1.2.1 Range from 0.5" (12.7 mm) up to 1.0" (25.4 mm)

2.6.1.3 *Strong-R Structural Insulated Sheathing:*

2.6.1.3.1 Thicknesses up to 2.0" (51 mm)

2.6.1.4 *IsoRED Ci Polyiso Insulation:*

2.6.1.4.1 Range from 0.5" (12.7 mm) up to 2.0" (51 mm)

2.6.1.5 *IsoRED Max Polyiso Insulation:*

2.6.1.5.1 Thicknesses up to 4.0" (102 mm)

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

3 Definitions[3]

3.1 New Materials[4] 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.[5] The design strength and permissible stresses shall be established by tests[6] and/or engineering analysis.[7]

3.2 Duly authenticated reports[8] and research reports[9] are test reports and related engineering evaluations that are written by an approved agency[10] and/or an approved source.[11]

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 secrets under the regulation, 18.US.Code.90, also known as Defend Trade Secrets Act of 2016 (DTSA).[12]

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.[13]

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[14] ISO/IEC 17025 and ISO/IEC 17020 accredited.

3.6 The regulatory authority shall enforce[15] 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[16] 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.[17]

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.[18] Thus, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent,[19] 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.[20]

4 Applicable Local, State, and Federal Approvals; Standards; Regulations[21]

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, but is not limited to, the following featured local jurisdictions: 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, St. Louis County, Texas Department of Insurance, and Wichita.[22]

4.1.2 Approved in all state jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes, but is not limited to, the following featured states: California, Florida, New Jersey, Oregon, New York, Texas, Washington, and Wisconsin.[23]

4.1.3 Approved by the Code of Federal Regulations Manufactured Home Construction: Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14[24] and Part 3280[25] 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 *Regulations*

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

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

4.2.3 *CBC – 22, 25: California Building Code[26] (Title 24, Part 2)*

4.2.4 *CRC – 22, 25: California Residential Code[26] (Title 24, Part 2.5)*

4.3 *Standards*

4.3.1 *ASTM E119: Standard Test Methods for Fire Tests of Building Construction and Materials*

4.3.2 *ASTM E2032: Standard Guide for Extension of Data from Fire Resistance Test Conducted in Accordance with ASTM E119*

5 Listed[27]

5.1 Equipment, materials, products, or services included in a List published by a nationally recognized testing laboratory (e.g., CBI), an approved agency (e.g., CBI and DrJ), and/or and approved source (e.g., DrJ), or other organization(s) concerned with product evaluation (e.g., DrJ), that maintains periodic inspection (e.g., 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 *General*

6.1.1 The following assemblies are modified UL designs allowing for the use of the listed insulation and sheathing products. The extension of the listings are based on ASTM E119 fire testing of the products, ASTM E2032, and generally accepted engineering.

6.1.1.1 Lateral shear design values, as stated in Report Number 0804-01, Report Number 1004-01, Report Number 1004-02, or Report Number 1004-03, apply where Exterior GWB is installed underneath or on top of OX Structural Sheathing as described in the fire rated assemblies in this report.

6.1.1.1.1 Additional screws in the GWB are not required to maintain the lateral shear design values provided that the OX ThermoPLY Structural Sheathing and the Exterior GWB layer is fastened with 0.120" x 1 3/4" roofing nails.

6.1.1.1.2 Alternately, the GWB layer shall be fastened with #6 x 1 5/8" Type W screws spaced 16" o.c. at panel edges and 16" o.c. in the field, and OX ThermoPLY Structural Sheathing shall be fastened with minimum 16-gauge, 7/16" crown, 2" leg staples spaced 3" o.c. at panel edges and 3" o.c. in the field.

6.1.1.2 For the assemblies listed in **Table 1** through **Table 14**, the location of the exterior gypsum and the OX Engineered product listed is permitted to be reversed so that the OX Engineered product is installed directly to the studs and the exterior gypsum is installed over the OX Engineered product. Additionally, a separate water-resistive barrier installed over the exterior gypsum is permitted. At a minimum, the length of the fasteners used for attaching the gypsum shall be increased by the thickness of the OX Engineered product. For assemblies constructed in this manner, the fire resistance rating is not reduced.

6.1.2 *Wood – One-Hour Fire Rating – Bearing or Non-Load Bearing:*

6.1.2.1 **Table 1**. One-Hour Fire Rating from Interior or Exterior – UL Design No. U364, U397, V306

6.1.3 *Wood – One-Hour Fire Rating – Load Bearing:*

6.1.3.1 **Table 2**. One-Hour Fire Rating from Interior – UL Design No. U341

6.1.3.2 **Table 3**. One-Hour Fire Rating from Interior or Exterior – UL Design No. U354

6.1.3.3 **Table 4**. One-Hour Fire Rating from Interior – Limited Load Bearing – UL Design No. U356

6.1.3.4 **Table 5**. One-Hour Fire Rating from Interior – UL Design No. U356

6.1.3.5 **Table 6**. One-Hour Fire Rating from Interior or Exterior – UL Design No. U356

6.1.4 *Wood – Two-Hour Fire Rating – Load Bearing:*

6.1.4.1 **Table 7**. Two-Hour Fire Rating from Interior – UL Design No. U364, U397, V306

6.1.4.2 **Table 8**. Two-Hour Fire Rating from Interior or Exterior – UL Design No. U364, U397, V306

6.1.4.3 **Table 9**. Two-Hour Fire Rating from Interior – UL Design No. U356

6.1.4.4 **Table 10**. Two-Hour Fire Rating from Interior or Exterior – UL Design No. U356

6.1.4.5 **Table 11**. Two-Hour Fire Rating from Interior or Exterior – UL Design No. U301

6.1.5 *Steel – One-Hour Fire Rating – Load Bearing:*

6.1.5.1 **Table 12**. One-Hour Fire Rating from Interior or Exterior – UL Design No. U425

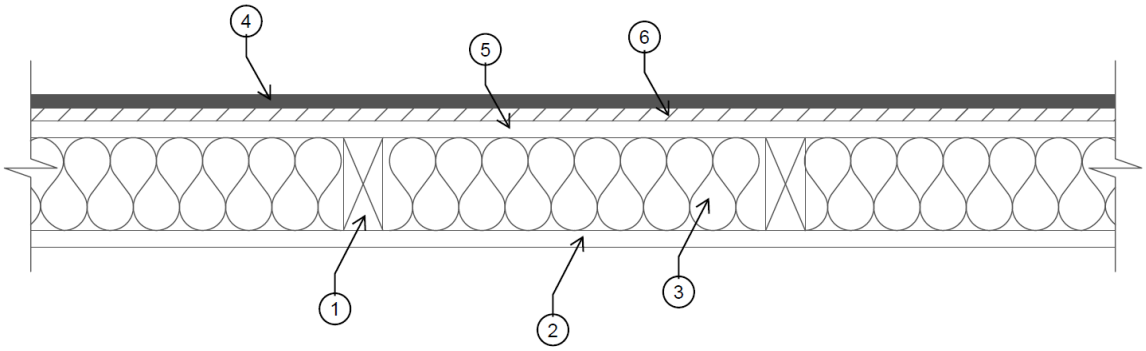
6.1.5.2 **Table 13**. One-Hour Fire Rating from Interior or Exterior – UL Design No. V454

6.1.6 *Steel – Two-Hour Fire Rating – Load Bearing:*

6.1.6.1 **Table 14**. Two-Hour Fire Rating from Interior – UL Design No. U425

6.2 *Wood – One-Hour Fire Rating – Bearing or Non-Load Bearing*

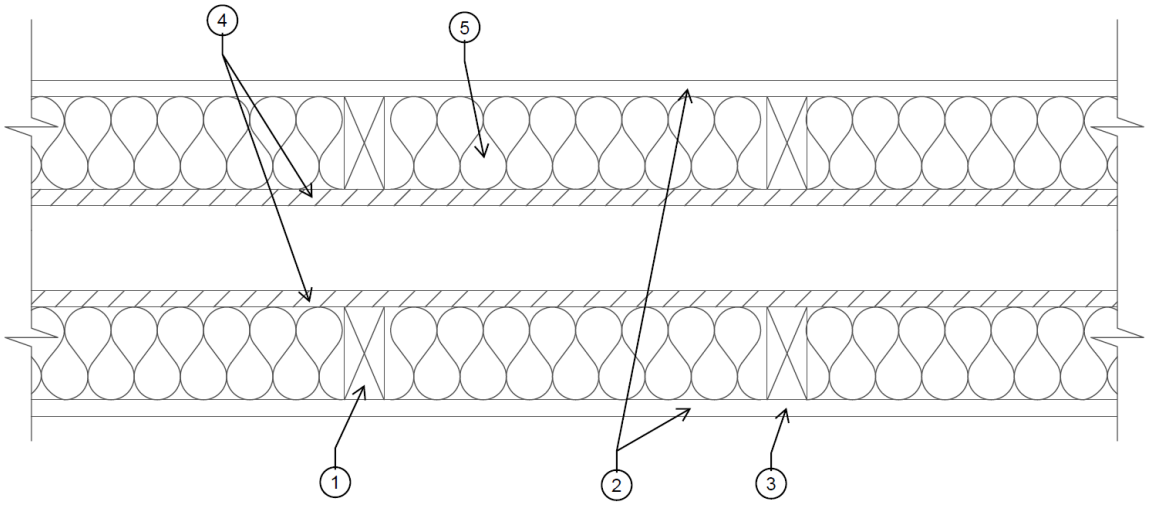
Table 1. One-Hour Fire Rating from Interior or Exterior – UL Design No. U364, U397, V306



1. Wood Studs:
   a. Nominal 2 x 4, minimum spacing 16" o.c. (406 mm), maximum spacing 24" o.c. (610 mm)
2. Gypsum Board:
   a. *Type:* X Gypsum Wall Board (GWB), 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically on interior side
   c. *Joints:* Centered over studs and staggered 1 stud cavity on opposite side of stud
   d. *Fastener:* GWB to studs using 1 7/8" (48 mm) 6d nails or #6 Type W screws
   e. *Fastener Spacing:* 7" (178 mm) o.c. at perimeter edges and field
3. Cavity Insulation:
   a. *Type:* Glass fiber or mineral wool
   b. *R-value:* R-13
   c. *Minimum Thickness:* 3 1/2" (89 mm)
4. Exterior Cladding – installed in accordance with the manufacturer installation instructions and U356:
   a. Siding including Vinyl, Fiber Cement Siding
   b. Molded Plastic – Particle Board Siding
   c. Wood Structural Panel or Lap Siding
   d. Cementitious Stucco
   e. Brick Veneer
   f. Exterior Insulation and Finish System (EIFS)
5. Exterior Gypsum Sheathing:
   a. *Type:* X GWB 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically on exterior side
   c. *Joints:* Centered over studs and staggered 1 stud cavity on opposite side of stud
   d. *Fastener:* GWB to studs using 1 7/8" (48 mm) 6d nails or #6 Type W screws
   e. *Fastener Spacing:* 8" (203 mm) o.c. on perimeter edges and field
6. Exterior Sheathing:
   a. ThermoPLY – installed per Report Number 1004-01
   b. OX-IS or SI-Strong up to 1" (25.4 mm) thick – installed per Report Number 0804-01
   c. Strong-R up to 2" (51 mm) thick – installed per Report Number 1808-02
   d. IsoRED Ci up to 2" (51 mm) thick or IsoRED Max up to 4" (102 mm) thick – installed per Report Number 1306-02

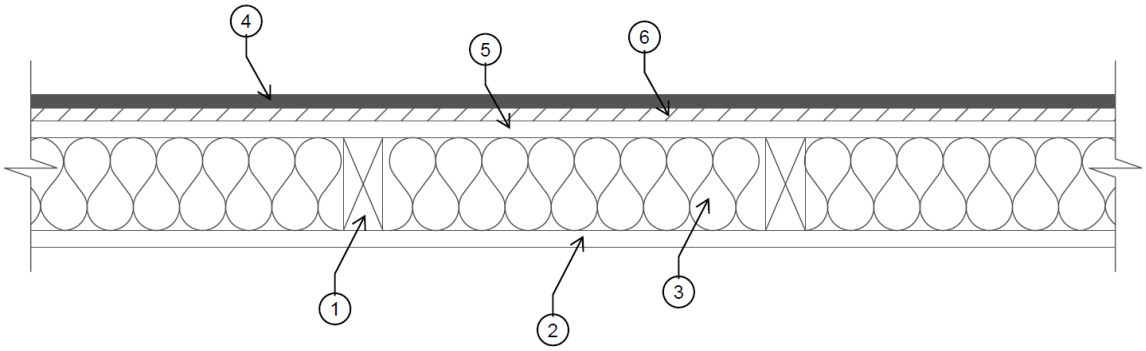
6.3 *Wood – One-Hour Fire Rating – Load Bearing*

Table 2. One-Hour Fire Rating from Interior – UL Design No. U341



1. Wood Studs
   a. Nominal 2 x 4, minimum spacing 24" o.c. (610 mm), two rows
2. Gypsum Board:
   a. *Type:* X GWB, 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically or horizontally on each side
   c. *Fastener:* GWB to studs using 1 7/8" (48 mm) 6d cement coated nails or #6 bugle head drywall screws
   d. *Fastener Spacing:* 7" (178 mm) o.c. at perimeter edges and field
3. Joints:
   a. Gypsum joints must be finished with joint compound and tape; fastener heads must be covered with joint compound
4. Sheathing (optional):
   a. Septum may be sheathed 1/2" (12.7 mm) OX-IS structural insulation panels, installed per Report Number 0804-01
5. Cavity Insulation:
   a. *Type:* Glass fiber or mineral fiber batt insulation
   b. *Thickness:* 3 1/2" (89 mm) maximum – used in each row of studs

Table 3. One-Hour Fire Rating from Interior or Exterior – UL Design No. U354

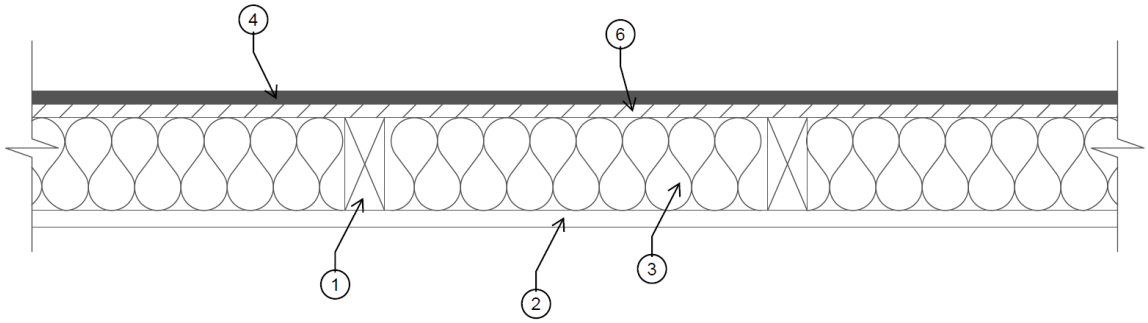


1. Wood Studs:
   a. Nominal 2 x 4, minimum spacing 16" o.c. (406 mm), nominal 2 x 6 maximum spacing 24" o.c. (610 mm)
2. Gypsum Board:
   a. *Type:* X GWB, 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically or horizontally on interior side
   c. *Joints:* Centered over studs. Joints must be finished with joint compound and tape. Fastener head must be covered with joint compound.
   d. *Fastener:* GWB to studs using 1 7/8" (48 mm) 6d cement coated nails or #6 bugle head drywall screws
   e. *Fastener Spacing:* 7" (178 mm) o.c. at perimeter edges and field
3. Cavity Insulation:
   a. *Type:* Any UL classified glass fiber batt, mineral wool, or sprayed cellulosic fiber. Cavity insulation is required.
4. Exterior Cladding - installed in accordance with the manufacturer installation instructions and U356:
   a. *Aluminum Siding:* 0.019" (0.48 mm) minimum thick painted aluminum that meets American Architectural Manufacturers Association (AAMA) 1402
   b. *Steel Siding:* 0.017" (0.43 mm) minimum thick (17 GSG-gauge) painted steel
   c. *Vinyl Siding:* 0.035" (0.90 mm) minimum thick UL Classified exterior plastic siding (Molded Plastic)
   d. *Wood Siding:* 0.313" (8.0 mm) minimum thick lumber, plywood, or OSB based siding
   e. *Hardboard Siding:* 1/4" (6.4 mm) minimum thick hardboard UL Classified exterior hardboard siding
   f. *Fiber Cement Siding:* 1/4" (6.4 mm) minimum thick fiber cement-based siding
   g. *Stone:* 2.0" (51 mm) minimum (natural stone) or 1 1/2" (38 mm) minimum (cast artificial) thick stone
   h. *Brick Veneer:* 2.0" (51 mm) minimum thick brick units, fastened over foam plastic sheathing to wood studs with metal ties
   i. *Concrete Masonry Veneer:* 2.0" (51 mm) minimum thick concrete masonry units, fastened over foam plastic sheathing to wood studs with metal ties
   j. *Stucco:* Portland Cement type, 3/4" (19.1 mm) minimum thickness. Metal lath or mesh base fastened over foam plastic sheathing to wood studs
   k. *One-Coat Stucco:* 3/8" (9.5 mm) minimum thickness; Wire fabric lath fastened over foam plastic sheathing to wood studs
   l. *Exterior Insulation and Finish System (EIFS):* Base coat with reinforcing mesh applied over foam plastic sheathing (Quik-R Wall Insulation) followed by finish coat. Type Quik-R Sheathing (Item 6) must be used for this exterior wall covering.
5. Exterior Gypsum Sheathing:
   a. *Type:* X GWB 5/8" (15.9 mm) thick (paper or glass matt facers, square to tapered edges)
   b. *Oriented:* Vertically or horizontally on exterior side
   c. *Joints:* Centered over studs staggered from back layer
   d. *Fastener:* GWB to studs using 1 7/8" (48 mm) 6d cement coated nails or #6 bugle head screws
   e. *Fastener Spacing:* 7" (178 mm) o.c. on perimeter edges and field

Table 3. One-Hour Fire Rating from Interior or Exterior – UL Design No. U354

6. Exterior Sheathing: a. ThermoPLY – installed per Report Number 1004-01 b. OX-IS or SI-Strong up to 1" (25.4 mm) thick – installed per Report Number 0804-01 c. Strong-R up to 2" (51 mm) thick – installed per Report Number 1808-02 d. IsoRED Ci up to 2" (51 mm) thick or IsoRED Max up to 4" (102 mm) thick – installed per Report Number 1306-02

Table 4. One-Hour Fire Rating from Interior – Limited Load Bearing – UL Design No. U356



This wall assembly is restricted to fifty-five percent (55%) of the allowable load. Alternatively, when wood structural panels are attached directly to studs on the exterior side of the wall, the load is not restricted. In this case, the thickness of the IsoRED Ci may also be increased to 2" (51 mm). The wood structural panels must be minimum $^{7}/_{16}$" (11.1 mm) thick, 4' (1,219 mm) wide wood structural panels, minimum grade *"C-D"* or *"Sheathing"*, installed with long dimension of sheet (strength axis) or face grain of plywood parallel with or perpendicular to studs. Vertical joints centered on studs. Horizontal joints backed with nominal 2 x 4 wood blocking. Attached to studs on exterior side of wall with 6d cement coated box nails spaced 6" (152 mm) o.c. at perimeter of panels and 12" (305 mm) o.c. along interior studs.

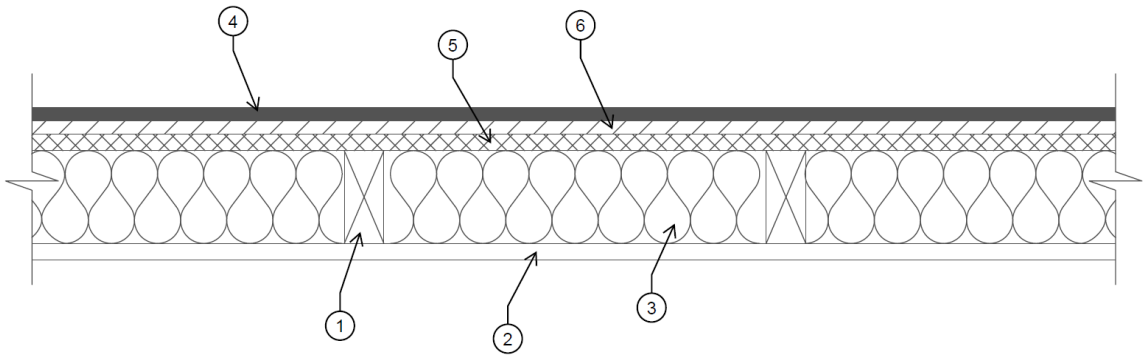
1. Wood Studs:
   a. Nominal 2 x 4, minimum spacing 16" o.c. (406 mm)
2. Gypsum Board:
   a. *Type:* X GWB, $^{5}/_{8}$" (15.9 mm) thick
   b. *Oriented:* Vertically on interior side
   c. *Joints:* Centered over studs and staggered 1 stud cavity on opposite side of stud
   d. *Fastener:* GWB to studs using $1^{7}/_{8}$" (48 mm) 6d nails or #6 Type W screws
   e. *Fastener Spacing:* 7" (178 mm) o.c. at perimeter edges and field
3. Cavity Insulation:
   a. *Type:* Glass fiber or mineral wool
   b. *R-value:* R-13
   c. *Minimum Thickness:* $3^{1}/_{2}$" (89 mm)
4. Exterior Cladding – installed in accordance with the manufacturer installation instructions and U356:
   a. Vinyl Siding with a flame spread of 20 or less
   b. Particle Board Siding
   c. Wood Structural Panel or Lap Siding complying with PS1 or APA PRP-108
   d. Cementitious Stucco – Portland Cement or synthetic stucco with self-furring lath or base coat. Minimum thickness $^{3}/_{8}$" (9.5 mm) to $^{3}/_{4}$" (19.1 mm) depending on the system.
   e. Brick Veneer – Nominal 4" (102 mm) thick. Brick veneer fastened with corrugated metal wall ties attached over sheathing to wood studs with 8d nail per tie. Ties spaced not more than each sixth course of brick and maximum 32" (813 mm) o.c. horizontally. 1" (25.4 mm) airspace provided between brick veneer and sheathing.
   f. Exterior Insulation and Finish System (EIFS) – Nominal 1" (25.4 mm) foamed plastic insulation attached over sheathing and finished with coating system, Portland Cement, or synthetic stucco systems, in accordance with manufacturer instructions.
   g. Aluminum or steel siding attached over sheathing to studs
   h. Fiber cement siding
   i. Stone veneer with mortar bonded to a lath, scratch coat, and water-resistant barrier applied to sheathing, installed in accordance with the manufacturer installation instructions.

Table 4. One-Hour Fire Rating from Interior – Limited Load Bearing – UL Design No. U356

j. Cementitious Backer Units – 1/2" (12.7 mm) or 5/8" (15.9 mm) minimum 32" (813 mm) wide – applied vertically or horizontally with vertical joints centered over studs. Fasten to studs and runners with cement board screws of adequate length to penetrate stud by a minimum 3/4" (19.1 mm), spaced a maximum of 8" (203 mm) o.c. Horizontal joints need not be backed by framing. When Cementitious Backer Units are used, the rating is applicable with exposure on either face. Cementitious Backer Units are used as substrate for exterior finishes such as ceramic tile, slate, marble, natural stone, manufactured stone, thin brick, Portland Cement, or synthetic stucco.

5. Exterior Gypsum Sheathing: Not used.
6. Sheathing: When the following are considered as bracing for the studs, the load is restricted to fifty-five percent (55%) of the allowable load:
   a. ThermoPLY – installed per Report Number 1004-01
   b. OX-IS or SI-Strong up to 1" (25.4 mm) thick – installed per Report Number 0804-01
   c. Strong-R up to 2" (51 mm) thick – installed per Report Number 1808-02
   d. IsoRED Ci up to 1" (25.4 mm) thick or IsoRED Max up to 4" (102 mm) thick – installed per Report Number 1306-02

Table 5. One-Hour Fire Rating from Interior – UL Design No. U356

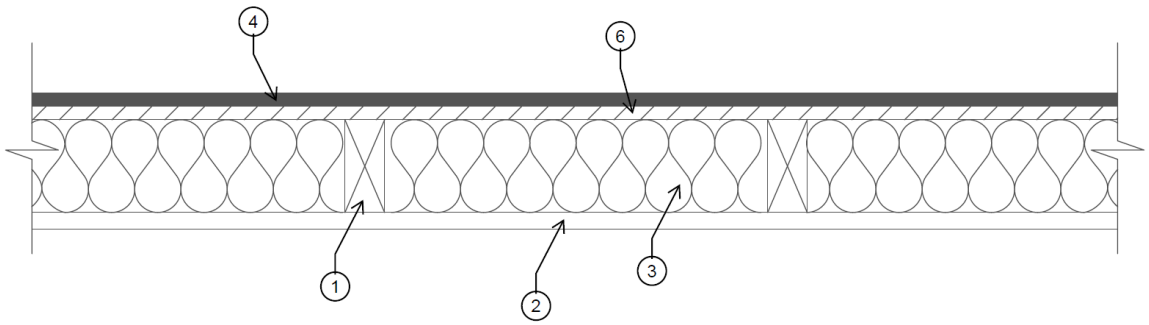


1. Wood Studs:
   a. Nominal 2 x 4, minimum spacing 16" o.c. (406 mm)
2. Gypsum Board:
   a. *Type:* X GWB, 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically on interior side
   c. *Joints:* Centered over studs and staggered 1 stud cavity on opposite side of stud
   d. *Fastener:* GWB to studs using 1 7/8" (48 mm) 6d nails or #6 Type W screws
   e. *Fastener Spacing:* 7" (178 mm) o.c. at perimeter edges and field
3. Cavity Insulation:
   a. *Type:* Glass fiber or mineral wool
   b. *R-value:* R-13
   c. *Minimum Thickness:* 3 1/2" (89 mm)
4. Exterior Cladding – installed in accordance with the manufacturer installation instructions and U356:
   a. Vinyl Siding with a flame spread of 20 or less
   b. Particle Board Siding
   c. Wood Structural Panel or Lap Siding complying with PS1 or APA PRP-108
   d. Cementitious Stucco – Portland Cement or synthetic stucco with self-furring lath or base coat. Minimum thickness 3/8" (9.5 mm) to 3/4" (19.1 mm) depending on the system.
   e. Brick Veneer – Nominal 4" (102 mm) thick. Brick veneer fastened with corrugated metal wall ties attached over sheathing to wood studs with 8d nail per tie. Ties spaced not more than each sixth course of brick and maximum 32" (813 mm) o.c. horizontally. 1" (25.4 mm) airspace provided between brick veneer and sheathing.
   f. Exterior Insulation and Finish System (EIFS) – Nominal 1" (25.4 mm) foamed plastic insulation attached over sheathing and finished with coating system, Portland Cement, or synthetic stucco systems, in accordance with manufacturer instructions.
   g. Aluminum or steel siding attached over sheathing to studs
   h. Fiber cement siding
   i. Stone veneer with mortar bonded to a lath, scratch coat, and water-resistant barrier applied to sheathing, installed in accordance with the manufacturer installation instructions.
   j. Cementitious Backer Units – 1/2" (12.7 mm) or 5/8" (15.9 mm) minimum 32" (813 mm) wide – applied vertically or horizontally with vertical joints centered over studs. Fasten to studs and runners with cement board screws of adequate length to penetrate stud by a minimum 3/4" (19.1 mm), spaced a maximum of 8" (203 mm) o.c. Horizontal joints need not be backed by framing. When Cementitious Backer Units are used, the rating is applicable with exposure on either face. Cementitious Backer Units are used as substrate for exterior finishes such as ceramic tile, slate, marble, natural stone, manufactured stone, thin brick, Portland Cement, or synthetic stucco.

Table 5. One-Hour Fire Rating from Interior – UL Design No. U356

5. Wood Structural Panel: $^{7}/_{16}$" (11.1 mm) nominal thickness – Install with vertical joints over studs. Horizontal joints must be backed by nominal 2 x 4 wood blocking attached with 6d cement coated box nails spaced 6" (152 mm) o.c. along the perimeter of the panels and 12" (305 mm) o.c. along the interior studs.
6. Sheathing:
   a. ThermoPLY – installed per Report Number 1004-01
   b. OX-IS or SI-Strong up to 1" (25.4 mm) thick – installed per Report Number 0804-01
   c. Strong-R up to 2" (51 mm) thick – installed per Report Number 1808-02
   d. IsoRED Ci up to 2" (51 mm) thick or IsoRED Max up to 4" (102 mm) thick – installed per Report Number 1306-02

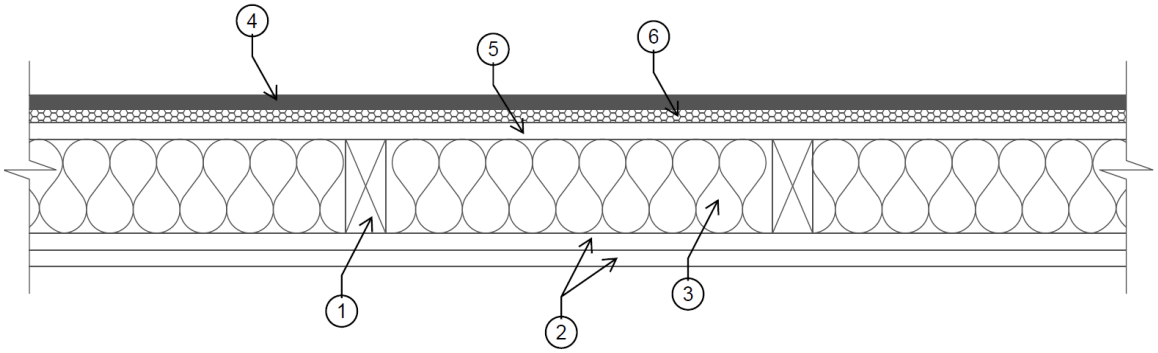
Table 6. One-Hour Fire Rating from Interior or Exterior – UL Design No. U356



1. Wood Studs:
   a. Nominal 2 x 4, minimum spacing 16" o.c. (406 mm)
2. Gypsum Board:
   a. *Type:* X GWB, 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically on interior side
   c. *Joints:* Centered over studs and staggered 1 stud cavity on opposite side of stud
   d. *Fastener:* GWB to studs using 1 7/8" (48 mm) 6d nails or #6 Type W screws
   e. *Fastener Spacing:* 7" (178 mm) o.c. at perimeter edges and field
3. Cavity Insulation:
   a. *Type:* Glass fiber or mineral wool
   b. *R-value:* R-13
   c. *Minimum Thickness:* 3 1/2" (89 mm)
4. Exterior Cladding – installed in accordance with the manufacturer installation instructions and U356:
   a. Brick Veneer
5. Exterior Sheathing:
   a. Wood Structural Panel – 7/16" (11.1 mm) nominal thickness. Install with vertical joints over studs. Horizontal joints must be backed by nominal 2 x 4 wood blocking attached with 6d cement coated box nails spaced 6" (152 mm) o.c. along the perimeter of the panels and 12" (305 mm) on center along the interior studs.
6. Sheathing:
   a. ThermoPLY – installed per Report Number 1004-01
   b. OX-IS or SI-Strong up to 1" (25.4 mm) thick – installed per Report Number 0804-01
   c. Strong-R up to 2" (51 mm) thick – installed per Report Number 1808-02
   d. IsoRED Ci up to 2" (51 mm) thick or IsoRED Max up to 4" (102 mm) thick – installed per Report Number 1306-02

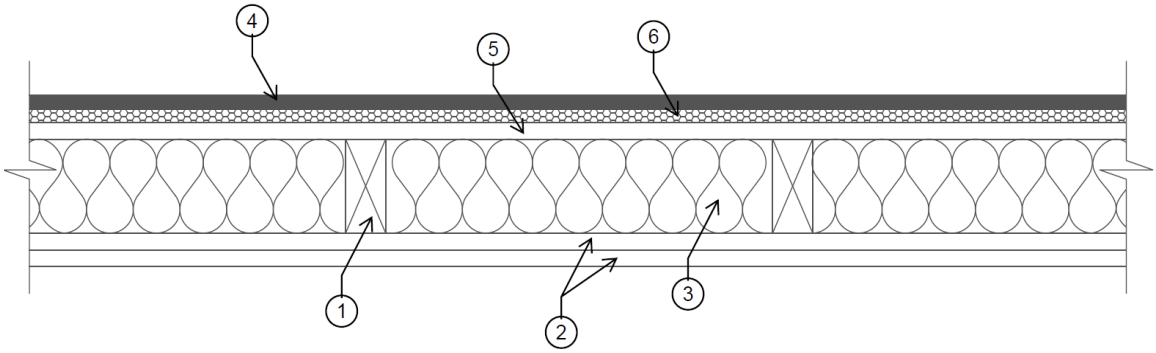
6.4 *Wood – Two-Hour Fire Rating – Load Bearing*

Table 7. Two-Hour Fire Rating from Interior – UL Design No. U364, U397, V306



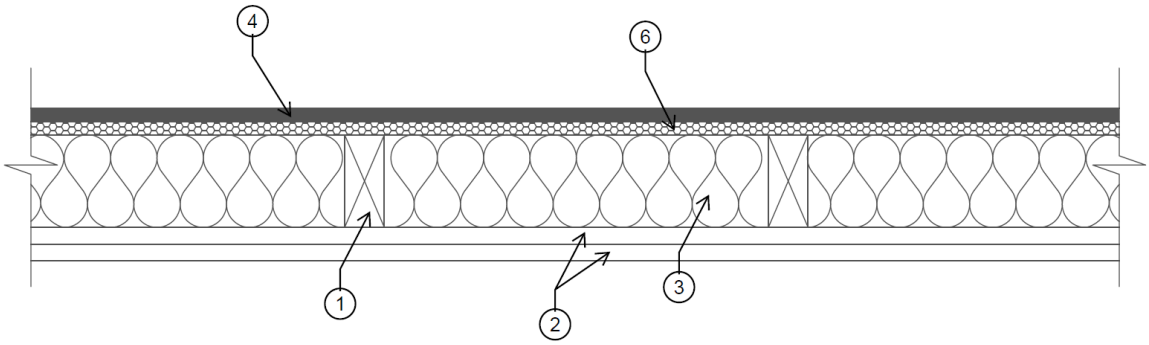
1. Wood Studs:
   a. Nominal 2 x 4, minimum spacing 16" o.c. (406 mm), maximum spacing 24" o.c. (610 mm)
2. Gypsum Board – requires two GWB layers:
   a. *Type:* X GWB, 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically on interior side
   c. *Joints:* Centered over studs and staggered 1 stud cavity on opposite side of stud
   d. *Fastener - Interior Layer:* GWB to studs using 1 7/8" (48 mm) 6d nails or #6 Type W screws
   e. *Fastener Spacing – Interior Layer:* 7" (178 mm) o.c. at perimeter edges and field
   f. *Fastener Secondary Layer:* Use 2 3/8" (61 mm) 8d nails or screws
   g. *Fastener Spacing – Secondary Layer:* 8" (203 mm) o.c.
3. Cavity Insulation:
   a. *Type:* Glass fiber or mineral wool
   b. *R-value:* R-13
   c. *Minimum Thickness:* 3 1/2" (89 mm)
   d. *Option:* BASF Spray Polyurethane Foam Insulation is allowed per U397
4. Exterior Cladding – installed in accordance with the manufacturer installation instructions and U356:
   a. Siding including Vinyl, Fiber Cement Siding
   b. Molded Plastic – Particle Board Siding
   c. Wood Structural Panel or Lap Siding
   d. Cementitious Stucco
   e. Brick Veneer
   f. Exterior Insulation and Finish System (EIFS)
5. Exterior Gypsum Sheathing:
   a. *Type:* X GWB 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically on exterior side
   c. *Joints:* Centered over studs and staggered 1 stud cavity on opposite side of stud
   d. *Fastener:* GWB to studs using 1 7/8" (48 mm) 6d nails or #6 Type W screws
   e. *Fastener Spacing:* 8" (203 mm) o.c. on perimeter edges and field
6. Exterior Sheathing:
   a. ThermoPLY – installed per Report Number 1004-01
   b. OX-IS or SI-Strong up to 1" (25.4 mm) thick – installed per Report Number 0804-01
   c. Strong-R up to 2" (51 mm) thick – installed per Report Number 1808-02
   d. IsoRED Ci up to 2" (51 mm) thick or IsoRED Max up to 4" (102 mm) thick – installed per Report Number 1306-02

Table 8. Two-Hour Fire Rating from Interior or Exterior – UL Design No. U364, U397, V306



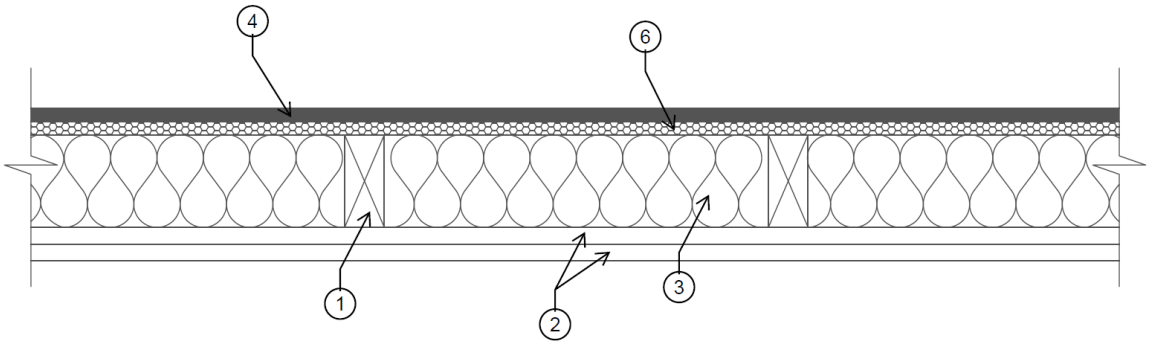
1. Wood Studs:
   a. Nominal 2 x 4, minimum spacing 16" o.c. (406 mm), maximum spacing 24" o.c. (610 mm)
2. Gypsum Board – requires two GWB layers:
   a. *Type:* X GWB, 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically on interior side
   c. *Joints:* Centered over studs and staggered 1 stud cavity on opposite side of stud
   d. *Fastener - Interior Layer:* GWB to studs using 1 7/8" (48 mm) 6d nails or #6 Type W screws
   e. *Fastener Spacing – Interior Layer:* 7" (178 mm) o.c. at perimeter edges and field
   f. *Fastener - Secondary Layer:* Use 2 3/8" (60 mm) 8d nails or screws
   g. *Fastener Spacing – Secondary Layer:* 8" (203 mm) o.c.
3. Cavity Insulation:
   a. *Type:* Glass fiber or mineral wool
   b. *R-value:* R-13
   c. *Minimum Thickness:* 3 1/2" (89 mm)
   d. *Option:* BASF Spray Polyurethane Foam Insulation is allowed per U397
4. Exterior Cladding
   a. Brick veneer installed in accordance with the manufacturer installation instructions and U356
5. Exterior Gypsum Sheathing:
   a. *Type:* X GWB 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically on exterior side
   c. *Joints:* Centered over studs and staggered 1 stud cavity on opposite side of stud
   d. *Fastener:* GWB to studs using 1 7/8" (48 mm) 6d nails or #6 Type W screws
   e. *Fastener Spacing:* 8" (203 mm) o.c. on perimeter edges and field
6. Exterior Insulation:
   a. ThermoPLY – installed per Report Number 1004-01
   b. OX-IS or SI-Strong up to 1" (25.4 mm) thick – installed per Report Number 0804-01
   c. Strong-R up to 2" (51 mm) thick – installed per Report Number 1808-02
   d. IsoRED Ci up to 2" (51 mm) thick or IsoRED Max up to 4" (102 mm) thick – installed per Report Number 1306-02

Table 9. Two-Hour Fire Rating from Interior – UL Design No. U356



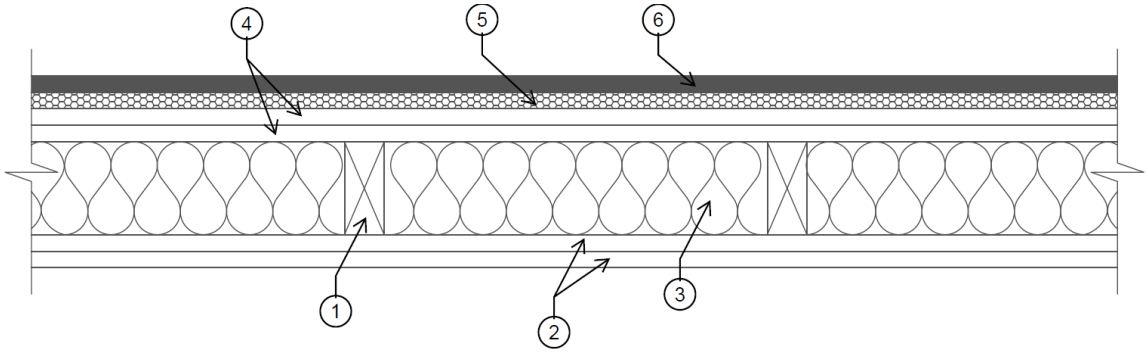
1. Wood Studs:
   a. Nominal 2 x 4, maximum spacing 16" o.c. (406 mm)
2. Gypsum Board – requires two GWB layers:
   a. *Type:* X GWB, 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically on interior side
   c. *Joints:* Centered over studs and staggered 1 stud cavity on opposite side of stud
   d. *Fastener - Interior Layer:* GWB to studs using 1 7/8" (48 mm) 6d nails or #6 Type W screws
   e. *Fastener Spacing – Interior Layer:* 7" (178 mm) o.c. at perimeter edges and field
   f. *Fastener - Secondary Layer:* Use 2 3/8" (61 mm) 8d nails or screws
   g. *Fastener Spacing – Secondary Layer:* 8" (203 mm) o.c.
3. Cavity Insulation:
   a. *Type:* Glass fiber or mineral wool
   b. *R-value:* R-13
   c. *Minimum Thickness:* 3 1/2" (89 mm)
4. Exterior Cladding – installed in accordance with the manufacturer installation instructions and U356
   a. Siding including vinyl, fiber cement siding
   b. Molded Plastic – particle board siding
   c. Wood Structural Panel or Lap Siding
   d. Cementitious Stucco
   e. Brick Veneer
   f. Exterior Insulation and Finish System (EIFS)
5. Exterior Gypsum Sheathing – not used
6. Exterior Insulation – when the following are considered as bracing for the studs, the load is restricted to fifty-five percent (55%) of the allowable load:
   a. ThermoPLY – installed per Report Number 1004-01
   b. OX-IS or SI-Strong up to 1" (25.4 mm) thick – installed per Report Number 0804-01
   c. Strong-R up to 2" (51 mm) thick – installed per Report Number 1808-02
   d. IsoRED Ci up to 2" (51 mm) thick or IsoRED Max up to 4" (102 mm) thick – installed per Report Number 1306-02

Table 10. Two-Hour Fire Rating from Interior or Exterior – UL Design No. U356



1. Wood Studs:
   a. Nominal 2 x 4, maximum spacing 16" o.c. (406 mm)
2. Gypsum Board – requires two GWB layers:
   a. *Type:* X GWB, 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically on interior side
   c. *Joints:* Centered over studs and staggered 1 stud cavity on opposite side of stud
   d. *Fastener - Interior Layer:* GWB to studs using 1 7/8" (48 mm) 6d nails or #6 Type W screws
   e. *Fastener Spacing – Interior Layer:* 7" (178 mm) o.c. at perimeter edges and field
   f. *Fastener - Secondary Layer:* Use 2 3/8" (61 mm) 8d nails or screws, 8" (203 mm) o.c.
   g. *Fastener Spacing – Secondary Layer:* 8" (203 mm) o.c.
3. Cavity Insulation:
   a. *Type:* Glass fiber or mineral wool
   b. *R-value:* R-13
   c. *Minimum Thickness:* 3 1/2" (89 mm)
4. Exterior Cladding: Brick veneer installed in accordance with the manufacturer installation instructions and U356
5. Exterior Gypsum Sheathing – not used
6. Exterior Insulation – when the following are considered as bracing for the studs, the load is restricted to fifty-five percent (55%) of the allowable load:
   a. ThermoPLY – installed per Report Number 1004-01
   b. OX-IS or SI-Strong up to 1" (25.4 mm) thick – installed per Report Number 0804-01
   c. Strong-R up to 2" (51 mm) thick – installed per Report Number 1808-02
   d. IsoRED Ci up to 2" (51 mm) thick or IsoRED Max up to 4" (102 mm) thick – installed per Report Number 1306-02

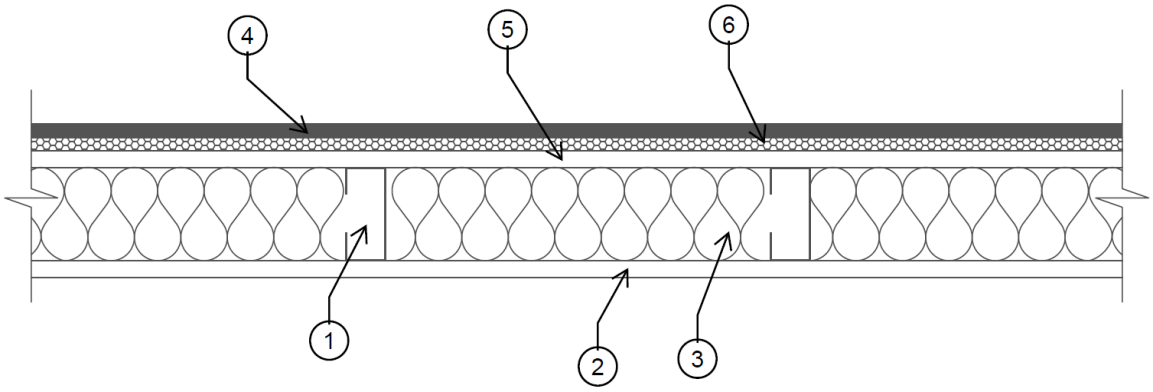
Table 11. Two-Hour Fire Rating from Interior or Exterior – UL Design No. U301



1. Wood Studs:
   a. Nominal2 x 4, maximum spacing 16" o.c. (406 mm)
2. Gypsum Board – requires two GWB layers:
   a. *Type:* X GWB, 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically or horizontally on interior side
   c. *Joints:* Centered over studs and staggered 1 stud cavity on opposite side of stud
   d. *Fastener - Interior Layer:* GWB to studs using 1 7/8" (48 mm) 6d nails or #6 Type W screws
   e. *Fastener Spacing – Interior Layer:* 6" (152 mm) o.c. on GWB edges and at intermediate studs
   f. *Fastener - Face Layer:* Use 2 3/8" (61 mm) 8d nails or screws
   g. *Fastener Spacing – Face Layer:* 8" (203 mm) o.c. on perimeter and field
3. Cavity Insulation:
   a. *Type:* Glass fiber or mineral wool
   b. *R-value:* R-13
   c. *Minimum Thickness:* 3 1/2" (89 mm)
   d. *Options:* Various Spray Polyurethane Foams (SPF) are allowed; SES or equivalent spray foam is allowed per U301
4. Exterior Cladding – Any code-approved exterior cladding may be used
5. Exterior Gypsum Sheathing – 2 layers:
   a. *Type:* X GWB 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically or horizontally on exterior side
   c. *Joints:* Centered over studs and staggered 1 stud cavity on opposite side of stud and interior GWB joints
   d. *Fastener - Interior Layer:* GWB to studs using 1 7/8" (48 mm) 6d nails or #6 Type W screws
   e. *Fastener Spacing – Interior Layer:* 6" (152 mm) o.c. on GWB edges and at intermediate studs
   f. *Fastener - Face Layer:* Use 2 3/8" (60 mm) 8d nails or screws
   g. *Fastener Spacing – Face Layer:* 8" (203 mm) o.c. on perimeter and field
6. Exterior Insulation:
   a. ThermoPLY – installed per Report Number 1004-01
   b. OX-IS or SI-Strong up to 1" (25.4 mm) thick – installed per Report Number 0804-01
   c. Strong-R up to 2" (51 mm) thick – installed per Report Number 1808-02
   d. IsoRED Ci up to 2" (51 mm) thick or IsoRED Max up to 4" (102 mm) thick – installed per Report Number 1306-02

6.5 *Steel – One-Hour Fire Rating – Load Bearing*

Table 12. One-Hour Fire Rating from Interior or Exterior – UL Design No. U425

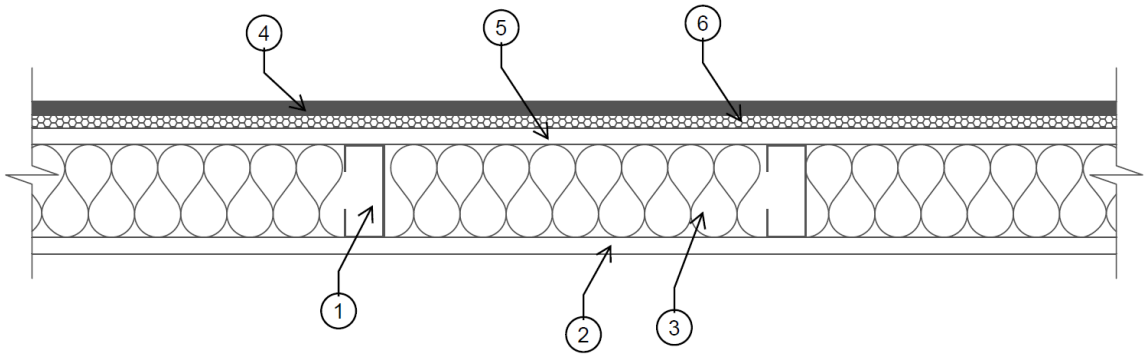


1. Steel Studs:
   a. Minimum 20-gauge, maximum spaced 24" (610 mm) o.c.
2. Gypsum Board – 1 Layer; 1 hour (100% of design load):
   a. *Type:* X GWB, 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically on interior side
   c. *Joints:* Centered over studs
   d. *Fastener:* GWB to studs using Type S-12 1" (25.4 mm) self-tapping bugle head sheet steel screws
   e. *Fastener Spacing:* 12" (305 mm) o.c. on perimeter edges and field
3. Cavity Insulation:
   a. *Type:* Any UL-classified glass fiber batt, mineral wool, or sprayed cellulosic fiber
   b. *Exterior Cladding:* installed in accordance with the manufacturer installation instructions and U425
   c. *Siding:* including aluminum, steel, brick or stucco
   d. Cementitious Backer Units
   e. Fiber-Cement Siding
   f. Molded Plastic
   g. Wood Structural Panel or Lap Siding
   h. Building Units (Cellular Glass Blocks)
4. Exterior Cladding – installed in accordance with the manufacturer installation instructions and U425
   a. Siding including aluminum, steel, brick, or stucco
   b. Cementitious Backer Units
   c. Fiber-Cement Siding
   d. Molded Plastic
   e. Wood Structural Panel or Lap Siding
   f. Building Units (Cellular Glass Blocks)
5. Exterior Gypsum Sheathing:
   a. *Type:* X GWB 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically on exterior side
   c. *Joints:* Centered over studs and staggered from back layer
   d. *Fastener:* GWB to studs using Type S-12 1" (25.4 mm) self-tapping bugle head sheet steel screws
   e. *Fastener Spacing:* 12" (305 mm) o.c. along studs and tracks

Table 12. One-Hour Fire Rating from Interior or Exterior – UL Design No. U425

6. Exterior Insulation: a. ThermoPLY – installed per Report Number 1004-01 b. OX-IS or SI-Strong up to 1" (25.4 mm) thick – installed per Report Number 0804-01 c. Strong-R up to 2" (51 mm) thick – installed per Report Number 1808-02 d. IsoRED Ci up to 2" (51 mm) thick or IsoRED Max up to 4" (102 mm) thick – installed per Report Number 1306-02

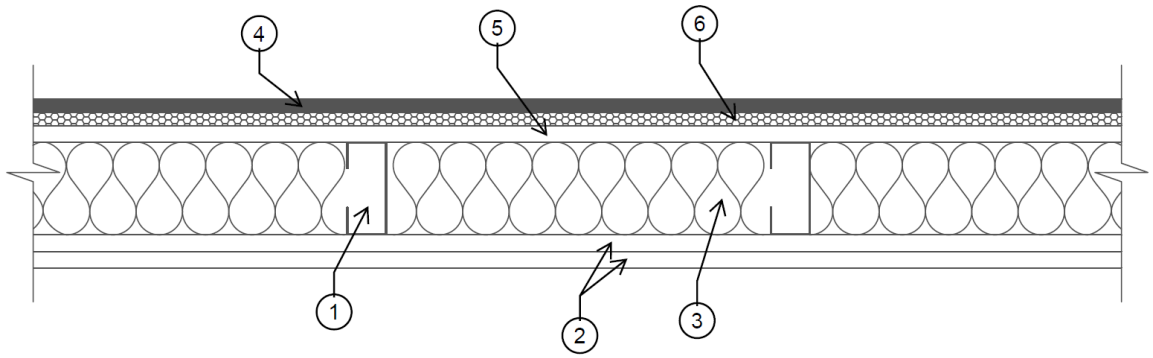
Table 13. One-Hour Fire Rating from Interior or Exterior – UL Design No. V454



1. Steel Studs:
   a. Minimum 20-gauge, maximum spaced 24" (610 mm) o.c.
2. Interior Gypsum Board:
   a. *Type:* X GWB, 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically on interior side
   c. *Joints:* Centered over studs staggered from exterior gypsum sheathing joints
   d. *Fastener:* GWB to studs using Type S 1" (25.4 mm) self-drilling, self-tapping steel screws
   e. *Fastener Spacing:* 8" (203 mm) o.c. on perimeter edges and 12" (305 mm) o.c. in the field
3. Cavity Insulation:
   a. *Type:* any UL-classified glass fiber batt, mineral wool or sprayed cellulosic fiber or proprietary SPF allowed in V454. See listing for full details.
4. Exterior Cladding – installed in accordance with the manufacturer installation instructions and V454
   a. Siding including aluminum, steel, vinyl, wood, hard board, fiber-cement, stone, brick veneer, concrete, or masonry veneer, stucco, one-coat stucco, Exterior Insulation and Finish System (EIFS), metal panel, or wall and partition facing and accessories.
5. Exterior Gypsum Sheathing:
   a. *Type:* X GWB 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically on exterior side
   c. *Joints:* Centered over studs staggered from interior GWB
   d. *Fastener:* GWB to studs using Type S 1" (25.4 mm) self-drilling, self-tapping steel screws
   e. *Fastener Spacing:* 8" (203 mm) o.c. on perimeter edges and 12" (305 mm) o.c. in the field
6. Exterior Insulation:
   a. ThermoPLY – installed per Report Number 1004-01
   b. OX-IS or SI-Strong up to 1" (25.4 mm) thick – installed per Report Number 0804-01
   c. Strong-R up to 2" (51 mm) thick – installed per Report Number 1808-02
   d. IsoRED Ci up to 2" (51 mm) thick or IsoRED Max up to 4" (102 mm) thick – installed per Report Number 1306-02

6.6 *Steel – Two-Hour Fire Rating – Load Bearing*

Table 14. Two-Hour Fire Rating from Interior – UL Design No. U425



1. Steel Studs:
   a. Minimum 20-gauge spaced maximum 24" (610 mm) o.c.
2. Interior Gypsum Board:
   a. *2 Layers:* 2 hours (80% of design load)
   b. *Type:* X GWB, 5/8" (15.9 mm) thick
   c. *Oriented:* Vertically on interior side
   d. *Joints:* Centered over studs and staggered 1 stud cavity between layers
   e. *Fastener:* GWB to studs using Type S-12 x 1" (25.4 mm) self-tapping bugle head sheet steel screws in first layer, Type S-12 x 1 5/8" (41 mm) self-tapping bugle head sheet steel screws in second layer
   f. *Fastener Spacing:* 12" (305 mm) o.c. on perimeter edges and field
3. Cavity Insulation:
   a. *Type:* Any UL-classified glass fiber batt, mineral wool, or sprayed cellulosic fiber
4. Exterior Cladding – installed in accordance with the manufacturer installation instructions and U425:
   a. Siding including aluminum, steel, brick, or stucco
   b. Cementitious Backer Units
   c. Fiber-Cement Siding
   d. Molded Plastic
   e. Wood Structural Panel or Lap Siding
   f. Building Units (Cellular Glass Blocks)
5. Exterior Gypsum Sheathing:
   a. *Type:* X GWB 5/8" (15.9 mm) thick
   b. *Oriented:* Vertically on exterior side
   c. *Joints:* Centered over studs staggered from back layer
   d. *Fastener:* GWB to studs using Type S-12 1" (25.4 mm) self-tapping bugle head sheet steel screws
   e. *Fastener Spacing:* 12" (305 mm) o.c. along studs and tracks
6. Exterior Insulation:
   a. ThermoPLY – installed per Report Number 1004-01
   b. OX-IS or SI-Strong up to 1" (25.4 mm) thick – installed per Report Number 0804-01
   c. Strong-R up to 2" (51 mm) thick – installed per Report Number 1808-02
   d. IsoRED Ci up to 2" (51 mm) thick or IsoRED Max up to 4" (102 mm) thick – installed per Report Number 1306-02

6.7 Alternative techniques shall be permitted in accordance with accepted engineering practice and experience. These provisions for the use of alternative materials, designs, and methods of construction are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed herein. This includes, but is not limited to, the following areas of engineering: mechanics of materials, structures, building science, and fire science.

7 Certified Performance[28]

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.[29]

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.[30]

8 Regulatory Evaluation and Accepted Engineering Practice

8.1 ThermoPLY Structural Sheathing, OX-IS Structural Insulated Sheathing, SI-Strong Structural Insulation, Strong-R Structural Insulated Sheathing, IsoRED Ci Polyiso Insulation, and IsoRED Max Polyiso Insulation comply with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:

8.1.1 ThermoPLY Structural Sheathing, OX-IS Structural Insulated Sheathing, SI-Strong Structural Insulation, Strong-R Structural Insulated Sheathing, IsoRED Ci Polyiso Insulation, and IsoRED Max Polyiso Insulation were evaluated in accordance with ASTM E119 for the following designs:

8.1.2 Performance of one-hour and two-hour fire-rated wall assemblies using:

8.1.2.1 UL-U364, UL-U397, and UL-V306

8.1.2.2 UL-U341

8.1.2.3 UL-U354

8.1.2.4 UL-U356

8.1.2.5 UL-U425 and UL-V454

8.1.2.6 UL-U301

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[31] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise,[32] 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.

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 Insulation boards shall be installed horizontally with sheathing edges bearing directly on framing members and edges of abutting panels in moderate contact with each other.

9.3.2 Install cladding materials in accordance with the cladding manufacturer installation instructions.

9.3.3 *One and Two-Hour Fire Rated Wall Assemblies:*

9.3.3.1 The one-hour rated wall assembly shall be constructed as described in **Section 6.2**, **Section 6.3**, and **Section 6.5**.

9.3.3.2 The two-hour rated wall assembly shall be constructed as described in **Section 6.4** and **Section 6.6**.

9.3.3.3 Specifications as defined in the UL Directory (e.g., UL assembly U356 or U364).

9.3.3.4 ThermoPLY shall be installed per Report Number 1004-01.

9.3.3.5 OX-IS and SI-Strong shall be installed per Report Number 0804-01.

9.3.3.5.1 Up to 1" (25.4 mm) thickness

9.3.3.6 Strong-R shall be installed per Report Number 1808-02.

9.3.3.6.1 Up to 2" (51 mm) thickness

9.3.3.7 IsoRED Ci or IsoRED Max shall be installed per Report Number 1306-02.

9.3.3.7.1 IsoRED Ci up to 2" (51 mm) thickness

9.3.3.7.2 IsoRED Max up to 4" (102 mm) thickness

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 Fire rating performance testing in accordance with ASTM E119

10.1.2 Engineering evaluation of equivalent design for one or two-hour fire rated wall assemblies in accordance with ASTM E2032

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.[33]

10.6 Where additional condition of use and/or regulatory compliance information is required, please search for ThermoPLY Structural Sheathing, OX-IS Structural Insulated Sheathing, SI-Strong Structural Insulation, Strong-R Structural Insulated Sheathing, IsoRED Ci Polyiso Insulation, and IsoRED Max Polyiso Insulation on the DrJ Certification website.

11 Findings

11.1 As outlined in **Section 6**, ThermoPLY Structural Sheathing, OX-IS Structural Insulated Sheathing, SI-Strong Structural Insulation, Strong-R Structural Insulated Sheathing, IsoRED Ci Polyiso Insulation, and IsoRED Max Polyiso Insulation have 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, ThermoPLY Structural Sheathing, OX-IS Structural Insulated Sheathing, SI-Strong Structural Insulation, Strong-R Structural Insulated Sheathing, IsoRED Ci Polyiso Insulation, and IsoRED Max Polyiso Insulation shall be approved for the following applications:

11.2.1 As a component element of one and two-hour fire rated wall assemblies as described in **Section 6**.

11.3 Unless exempt by state statute, when ThermoPLY Structural Sheathing, OX-IS Structural Insulated Sheathing, SI-Strong Structural Insulation, Strong-R Structural Insulated Sheathing, IsoRED Ci Polyiso Insulation, and IsoRED Max Polyiso Insulation 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 Amrize Building Envelope, LLC.

11.5 IBC Section 104.2.3[34] (IRC Section R104.2.2[35] and IFC Section 104.2.3[36] 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:**[37] Building regulations require that the building official shall accept duly authenticated reports.[38]

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.[39]

12 Conditions of Use

12.1 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.

12.2 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:

12.2.1 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.

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

12.2.3 These innovative products have an internal quality control program and a third-party quality assurance program.

12.2.4 At a minimum, these innovative products shall be installed per **Section 9**.

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

12.2.6 These innovative products have 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.

12.2.7 The application of these innovative products 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.

12.3 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.

12.4 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).

12.5 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 ThermoPLY Structural Sheathing, OX-IS Structural Insulated Sheathing, SI-Strong Structural Insulation, Strong-R Structural Insulated Sheathing, IsoRED Ci Polyiso Insulation, and IsoRED Max Polyiso Insulation, as listed in **Section 1**, are 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.oxengineeredproducts.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.

Issue Date: January 26, 2026
Subject to Renewal: April 1, 2027

CBC and CRC Supplement to Report Number 1510-04

REPORT HOLDER: Amrize Building Envelope, LLC

1 Evaluation Subject

1.1 ThermoPLY Structural Sheathing, OX-IS Structural Insulated Sheathing, SI-Strong Structural Insulation, Strong-R Structural Insulated Sheathing, IsoRED Ci Polyiso Insulation, and IsoRED Max Polyiso Insulation

2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Report Supplement is to show ThermoPLY Structural Sheathing, OX-IS Structural Insulated Sheathing, SI-Strong Structural Insulation, Strong-R Structural Insulated Sheathing, IsoRED Ci Polyiso Insulation, and IsoRED Max Polyiso Insulation, recognized in Report Number 1510-04 have also been evaluated for compliance with the codes listed below.

2.2 *Applicable Code Editions*

2.2.1 *CBC — 22, 25: California Building Code (Title 24, Part 2)*

2.2.2 *CRC — 22, 25: California Residential Code (Title 24, Part 2.5)*

3 Conclusions

3.1 ThermoPLY Structural Sheathing, OX-IS Structural Insulated Sheathing, SI-Strong Structural Insulation, Strong-R Structural Insulated Sheathing, IsoRED Ci Polyiso Insulation, and IsoRED Max Polyiso Insulation, described in Report Number 1510-04, comply with the CBC and CRC and are subject to the conditions of use described in this supplement.

3.2 Where there are variations between the IBC and IRC and the CBC and CRC applicable to this report, they are listed here:

3.2.1 CBC Section 104.11 replaces IBC Section 104.2.3 and IBC Section 104.2.3.2.

3.2.2 CBC Section 104.7 replaces IBC Section 104.7.2.

3.2.3 CBC Section 1707.1 replaces IBC Section 1707.1.

3.2.4 CRC Section R104.4 replaces IRC Section R104.7.2.

3.2.5 CRC Section R104.11 replaces IRC Section R104.2.2.

4 Conditions of Use

4.1 ThermoPLY Structural Sheathing, OX-IS Structural Insulated Sheathing, SI-Strong Structural Insulation, Strong-R Structural Insulated Sheathing, IsoRED Ci Polyiso Insulation, and IsoRED Max Polyiso Insulation, described in Report Number 1510-04, must comply with all of the following conditions:

4.1.1 All applicable sections in Report Number 1510-04.

4.1.2 The design, installation, and inspections are in accordance with additional requirements of CBC and CRC, as applicable.

Notes

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

2 OX-IS is formerly known as SI-Strong.

3 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.

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

5 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

6 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

7 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

8 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.

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

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

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

12 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.

13 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/

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

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

16 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

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

18 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

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

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

21 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.

22 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

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

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

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

26 All references to the CBC and CRC are the same as the 2024 IBC and 2024 IRC unless otherwise noted in the CBC and CRC Supplement at the end of this report.

27 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

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

29 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

[30] 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

[31] 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.

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

[33] 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

[34] 2021 IBC Section 104.11

[35] 2021 IRC Section R104.11

[36] 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

[37] 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.

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

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