Rmax THERMABASEci™ **TER No. 1504-05**

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DIVISION: 06 00 00 – WOOD, PLASTICS AND COMPOSITES
Section: 06 16 00 – Sheathing
Section: 06 16 13 – Insulating Sheathing

DIVISION: 07 00 00 – THERMAL AND MOISTURE PROTECTION
Section: 07 20 00 – Thermal Protection
Section: 07 21 00 – Thermal Insulation
Section: 07 27 00 – Air Barriers

1. Product Evaluated:

1.1. Rmax THERMABASEci™

1.2. For the most recent version of this Technical Evaluation Report (TER), visit drjengineering.org. For more detailed state professional engineering and code compliance legal requirements and references, visit drjengineering.org/statelaw. DrJ is fully compliant with all state professional engineering and code compliance laws.

1.3. This TER can be used to obtain product approval in any country that is an IAF MLA Signatory (all countries found here) and covered by an IAF MLA Evaluation per the Purpose of the MLA (as an example, see letter to ANSI from the Standards Council of Canada). Manufacturers can go to jurisdictions in the U.S., Canada and other IAF MLA Signatory Countries and have their products readily approved by authorities having jurisdiction using DrJ's ANSI accreditation.

1.4. Building code regulations require that evaluation reports are provided by an approved agency meeting specific requirements, such as those found in *IBC* Section 1703. Any agency accredited in accordance with ANSI ISO/IEC 17065 meets this requirement within ANSI's scope of accreditation. For a list of accredited agencies, visit ANSI's website. For more information, see drjcertification.org.

1.5. Requiring an evaluation report from a specific private company (i.e. ICC-ES, IAPMO, CCMC, DrJ, etc.) can be viewed as discriminatory and is a violation of international, federal, state, provincial and local anti-trust and free trade regulations.

1.6. DrJ's code compliance work:

1.6.1. Conforms to code language adopted into law by individual states and any relevant consensus based standard such as an ANSI or ASTM standard.

1.6.2. Complies with accepted engineering practice, all professional engineering laws and by providing an engineer's seal DrJ takes professional responsibility for its specified scope of work.

2. Applicable Codes and Standards:[1]

2.1. *2012*, *2015* and *2018 International Building Code* (*IBC*)

2.2. *2012*, *2015* and *2018 International Residential Code (IRC)*

2.3. *ANSI/AWC NDS – National Design Specification®* (*NDS®*) *for Wood Construction*

2.4. *ASTM C1289 – Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board*

2.5. *ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials*

2.6. *ASTM E330 / E330M – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

2.7. *ASTM E564 – Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings*

2.8. *ASTM E2178 – Standard Test Method for Air Permeance of Building Materials*

2.9. *AWC SDPWS Wind & Seismic – Special Design Provisions for Wind and Seismic* (*SDPWS*)

2.10. *U.S. Department of Commerce Voluntary Product Standards PS 2, Performance Standard for Wood-Based Structural-Use Panels (DOC PS 2)*

3. Performance Evaluation:

3.1. Rmax THERMABASEci™ was evaluated to determine the following:

3.1.1. Thermal resistance for use as insulating sheathing in accordance with *IECC* Section R402.1 and *IRC* N1102.1.

3.1.2. Foam plastic insulation performance in accordance with *IRC* Section R316.

3.1.3. Connection to light-frame wood construction framing to support cladding weight in accordance with *IBC* Section 1604.2 and *IRC* Section R301.1.3.

3.1.3. Performance for use as an air barrier in accordance with *IECC* Section C402.

3.1.4. Structural performance under lateral load conditions for use as an alternative to *SDPWS* Section 4.3 Wood-Frame Shear Walls.

3.1.5. Resistance to transverse loads for wall assemblies used in light-frame wood construction in accordance with *IRC* Section R301.2.1 and *IBC* Section 1609.1.1.

3.2. Design of cladding fastening to THERMABASEci™ is outside the scope of this TER.

3.3. Seismic design is outside the scope of this TER.

[1] Unless otherwise noted, all references in this code compliant technical evaluation report (TER) are from the 2018 version of the codes and the standards referenced therein, including, but not limited to, *ASCE 7*, *SDPWS* and *WFCM*. This product also complies with the 2000-2015 versions of the *IBC* and *IRC* and the standards referenced therein. As required by law, where this TER is not approved, the building official shall respond in writing, stating the reasons this TER was not approved. For variations in state and local codes, if any see Section 8.

3.4. Any code compliance issues not specifically addressed in this section are outside the scope of this TER.

4. Product Description and Materials:

Figure 1: THERMABASEci™

4.1. THERMABASEci™ is a composite product that consists of a Rmax rigid, closed-cell polyisocyanurate (Polyiso) foamed plastic insulation board bonded to oriented strand board (OSB) with liquid adhesive up to 5" in total thickness.

4.1.1. Rmax Polyiso foam insulation conforms to *ASTM C1289*.

4.1.2. The OSB is manufactured in accordance with *DOC PS 2* for compliance with *IRC* Section R604.1.

4.1.3. THERMABASEci™ is manufactured with Rmax Thermasheath-3 or Rmax Durasheath-3 as the rigid insulation portion of the product.

4.1.4. The rigid insulation portion is available in the following nominal thicknesses: 0.5" (12.7 mm) through 4.5" (114 mm).

4.1.5. The OSB portion is standard at 7/16" (11 mm) thickness. Other OSB or CDX Plywood thicknesses are available upon request.

4.1.6. Standard product width: 48" (1219 mm)

4.1.7. Standard product length: 96" (2438 mm)

5. Applications:

5.1. General

5.1.1. THERMABASEci™ is a composite insulation panel for use in the following applications:

5.1.1.1. Continuous insulation on buildings constructed in accordance with the *IBC* and *IRC* for light-frame wood construction.

5.1.1.2. Continuous insulation providing a nail base for cladding materials used in light-frame wood construction.

5.2. Thermal Insulation

5.2.1. THERMABASEci™ is intended to be used as exterior continuous insulation under any type of permitted cladding.

5.3. Air Barrier

5.3.1. THERMABASEci™ meets the requirements of *IECC* Section R402 for use as a component of the air barrier, when installed in accordance with the manufacturer's installation instructions and this TER with all seams, including the top and bottom edges, treated.

THERMABASEci™ Air Barrier Material Properties	
ASTM E2178	< 0.02 L/(s·m²)[1]
1. Liter per second per square meter	

Table 1: THERMABASEci™ Air Barrier Material Properties

5.3.2. The air permeance of an air barrier material is defined by the *IECC* and the Air Barrier Association of America (ABAA) as being no greater than 0.02 liter per second per square meter (L/(s·m²)) at 75 Pa (0.004 cfm/ft² @ 1.57 psf) pressure difference when tested in accordance with *ASTM E2178 – Standard Test Method for Air Permeance of Building Materials*.

5.4. Fire Safety

5.4.1. Surface Burn Characteristics

Fire Performance of THERMABASEci™[1]		
Product	**Flame Spread**	**Smoke Developed**
THERMABASEci™ Core[1]	< 75	< 450
1. Foam plastic portion of THERMABASEci™ tested in accordance with *ASTM E84*. Flame spread and smoke developed numbers are shown for comparison purposes only and are not intended to represent the performance of THERMABASEci™ and related components under actual fire conditions.		

Table 2: Fire Performance of THERMABASEci™

5.5. Thermal Barrier

5.5.1.1. Except as noted in Section 5.4.2.2, THERMABASEci™ panels with the rigid insulation layer at a maximum thickness of up to 4.5" (114 mm) may be installed within the building envelope (including, but not limited to, attics, crawlspaces and wall assemblies) of all building types when separated from the interior with a thermal barrier consisting of a minimum ½" gypsum wallboard or an approved equivalent in accordance with *IRC* Section R316.4[2] and *IBC* Section 2603.4.

5.5.1.2. The thermal barrier required by Section 5.4.2.1 is not required in the following applications:

5.5.1.2.1. THERMABASEci™ is covered by a minimum 1" thickness of concrete or masonry on each face of the sheathing in accordance with *IRC* Section 316.5.1 or *IBC* Section 2603.4.1.

5.5.1.2.2. Walk-in coolers in accordance with *IBC* Section 2603.4.1.3.

5.5.1.3. Where an ignition barrier is permitted in lieu of a thermal barrier, such as attic, crawlspace or other uninhabitable space applications, THERMABASEci™ panels with the rigid insulation layer at a maximum thickness of up to 2" may be installed on walls only, without a thermal barrier or ignition barrier in accordance with *IRC* Section R316.5.3 and Section R316.5.4, and *IBC* Section 2603.4.1.6.

5.5.1.3.1. For panels with the rigid insulation layer at a thickness greater than 2", an ignition barrier is required.

5.6. Wind Pressure Resistance

5.6.1.1. THERMABASEci™ is permitted to be used where the Maximum Nominal Design Wind Speed, V_{asd}, is as set forth in Table 3.

[2] *2015 IRC* also allows for $^{23}/_{32}$" wood structural panel.

Maximum Nominal Design Wind Speed Permitted for THERMABASEci™ to Resist Wind Pressures							
Minimum Nail		Max. Wall Stud Spacing (in.)	Max. Panel Nail Spacing		Maximum Nominal Design Wind Speed, V_{ult}/V_{asd} (MPH)		
Size	Penetration (in.)		Edge (in. o.c.)	Field (in. o.c.)	Wind Exposure Category		
					B	C	D
8d common (0.131 diameter)	1.25"	24"	4"	12"	220/170	220/170	220/170
			6"	12"	220/170	200/155	190/147
			8"	12"	200/155	180/139	170/132
			12"	12"	180/139	150/116	140/108
			16"	16"	160/124	130/101	120/93
			24	24"	120/93	-	-
12d common (0.148 diameter)	1.25"	24"	4"	12"	220/170	220/170	220/170
			6"	12"	220/170	200/155	200/155
			8"	12"	220/170	190/147	170/132
			12"	12"	190/147	160/124	150/116
			16"	16"	160/124	140/108	130/101
			24"	24"	130/101	110/85	-
Rmax Nail Board Fastener, FastenMaster HeadLOK, TruFast SIPTP	1.25"	24"	24	24"	220/170	220/170	220/170
Simpson Strong-Drive SDWS22	1.25"	24"	16"	16"	220/170	220/170	220/170
			24"	24"	220/170	220/170	200/155

Table 3: Transverse Load Performance of THERMABASEci™ Structural Sheathing

5.7. Resistance to Lateral Loads

5.7.1. THERMABASEci™ has been tested in accordance with *ASTM E564* for lateral resistance and has the shear capacity as shown in Table 4a and 4b.

THERMABASEci™ Nominal Unit Shear Capacity (NUSC) & Allowable Strength Design (ASD) Capacity (Wind)[1, 2, 4, 5, 6] (Foam Against Studs)					
Product	**Fastener Type & Size (Spaced 4":12")**	**Maximum Stud Spacing (in.)**	**Max. Distance from Face of Framing to Underside of Fastener Head**	**Nominal Unit Shear Capacity (plf)[2]**	**Allowable Unit Shear Capacity (plf)[2]**
THERMABASEci™ - ½" Polyiso + 7/16" OSB	**8d (0.131 x 2½")**	24" o.c.	0.938 in	945	470
		16" o.c.		990	495
THERMABASEci™ - 1" Polyiso + 7/16" OSB	**8d (0.131 x 3¼")**	24" o.c	1.438 in	775	385
		16" o.c		850	425
THERMABASEci™ - 1½" Polyiso + 7/16" OSB	**0.131" x 3¼" Smooth Shank Nail**	24" o.c	1.938 in	660	330
		16" o.c		750	375
THERMABASEci™ - 2" Polyiso + 7/16" OSB	**0.131" x 3¼" Smooth Shank Nail[3]**	24" o.c	2.438 in	610	310
		16" o.c		715	360
THERMABASEci™ - 2" Polyiso + 7/16" OSB	**Rmax Nail Board Fastener, FastenMaster HeadLOK, TruFast SIPTP, Simpson Strong-Drive SDWS22**	24" o.c	2.438 in	610	310
		16" o.c		715	360

For SI: 1" = 25.4 mm 1 lb./ft. = 0.0146 kN/m
1. THERMABASEci™ attached with a minimum 0.131" diameter smooth shank nail, lengths as listed above. Fasteners are to be spaced a maximum of 4" o.c. at the edges and 12" o.c. in the field with a minimum edge distance of 3/8". Minimum fastener penetration of 1-¼" required, excepted as noted below.
2. No additional capacity may be added for GWB installed on the interior side of the wall.
3. Fastener penetration of only 13/16" (0.813").
4. For thicker continuous insulation applications, design is required in accordance with accepted engineering practice.
5. Fasteners of equal or greater diameter, length and head size and material properties may be substituted for the fasteners above including all fasteners shown in Tables 5 and 6
6. Fastener head shall be flush with the OSB. The total distance from the face of the stud, to the underside of the fastener head shall not be more than that listed above.

Table 4a: Ultimate Unit Shear & Allowable Unit Shear Design Values for THERMABASEci™ – Wind

THERMABASEci™ Nominal Unit Shear Capacity (NUSC) & Allowable Strength Design (ASD) Capacity (Wind)[1, 3, 4, 5] (OSB Against Studs)					
Product	**Fastener Type & Size (Spaced 4":12")**	**Maximum Stud Spacing (in.)**	**Max. Distance from Face of Framing to Underside of Fastener Head**	**Nominal Unit Shear Capacity (plf)[2,6]**	**Allowable Unit Shear Capacity (plf)[2,6]**
THERMABASEci™ - 1 3/16" Polyiso + 7/16" OSB (OSB installed against the studs)[5]	**0.113" x 2 3/8" Smooth Shank Nail**	24" o.c	0.438	980	490
		16" o.c	0.438	1065	535

For SI: 1" = 25.4 mm 1 lb./ft. = 0.0146 kN/m
1. THERMABASEci™ attached with a minimum 0.131" diameter smooth shank nail, lengths as listed above. Fasteners are to be spaced a maximum of 4" o.c. at the edges and 12" o.c. in the field with a minimum edge distance of 3/8". Minimum fastener penetration of 1-¼" required, excepted as noted below.
2. Where GWB is installed on the interior side of the wall, capacity of the gypsum may be added to the nominal Unit shear capacity in accordance with SDPWS, Table 4.3C.
3. For thicker continuous insulation applications, design is required in accordance with accepted engineering practice.
4. Fastener head shall be flush with the OSB. The total distance from the face of the stud, to the underside of the fastener head shall not be more than that listed above.
5. Requires installation using Senco SCN63LDXP Structural Foam Insulation Nailer. 1-3/16" Maximum THERMABASEci™ foam thickness.
6. For framing species other than Douglas-Fir-Larch or Southern Pine, reduced capacities shall be determined by multiplying the unit shear capacity by a framing lumber specific gravity adjustment factor= [1-(0.5-G)] where G = the specific gravity of the framing lumber per NDS Table 11.3.2A. The adjustment factor shall not be greater than 1.

Table 4b: Ultimate Unit Shear & Allowable Unit Shear Design Values for THERMABASEci™ – Wind

5.8. Fastener Attachments for THERMABASEci™ to Support Cladding Weight

5.8.1. To develop the loads listed in Table 4a and 4b the fasteners attaching the THERMABASEci™ sheathing to the wall framing shall have a minimum size and maximum spacing as shown in Table 4a and 4b and all panel edges shall be supported by framing or blocking.

5.8.2. Fasteners are required to attach the THERMABASEci™ sheathing to the wall framing to carry the cladding weight. See Table 5 and Table 6 for allowable cladding loads for various fasteners.

5.8.3. Minimum penetration into wall framing is 1-¼" unless specifically noted in this TER.

5.8.4. Fasteners with equal or greater design properties shall be permitted:

5.8.4.1. 8d nail (0.131" x 2.5"): 0.281" head diameter

5.8.4.2. 12d nail (0.148" x 3.25"): 0.312" head diameter

5.8.4.3. Rmax Nail Board Fastener: 0.190" shank diameter, 0.625" head diameter

5.8.4.4. Simpson Strong-Drive SDWS22: 0.156" shank diameter, 0.435" head diameter

5.8.4.5. FastenMaster HeadLOK: 0.172" shank diameter, 0.625" head diameter

5.8.4.6. TruFast SIPTP: 0.190" shank diameter, 0.625" head diameter

5.9. Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience and technical judgment.

THERMABASEci™ w/ 7/16" OSB – Vertical Studs 16" o.c.[1,2,3,4,5,6]								
Framing Member	Fastener Type & Minimum Size	Max. Nominal Thickness of THERMABASEci™ (in.)	Max. Vertical Spacing (in.) of fasteners along each stud to support the specified Cladding weight (psf).					
			5	10	15	20	25	30
Minimum 2x4 SPF	8d (0.131" x 2.5")	1/2" Polyiso + 7/16" OSB	24	16	12	8	8	6
		3/4" Polyiso + 7/16" OSB	24	12	8	8	6	4
	12d (0.148" x 3.25")	1/2" Polyiso + 7/16" OSB	24	20	16	12	8	8
		3/4" Polyiso + 7/16" OSB	24	16	12	8	8	6
		1" Polyiso + 7/16" OSB	24	12	8	8	6	4
		1 1/2" Polyiso + 7/16" OSB	16	8	6	6	4	4
	Rmax Nail Board Fastener	1/2" " Polyiso + 7/16" OSB	24	24	24	20	16	16
		3/4" Polyiso + 7/16" " OSB	24	24	24	16	12	12
		1" Polyiso + 7/16" OSB	24	24	20	16	12	8
		1 1/2" Polyiso + 7/16" OSB	24	20	12	8	8	8
		2" Polyiso + 7/16" OSB	24	16	12	8	6	6
		2 1/2" " Polyiso + 7/16" OSB	20	12	8	6	6	4
		3" Polyiso + 7/16" OSB	16	8	8	6	4	4
		3 1/2" Polyiso + 7/16" OSB	16	8	6	4	4	4
		4" Polyiso + 7/16" OSB	12	8	6	4	4	-
		4 1/2" Polyiso + 7/16" OSB	12	6	4	4	-	-
	Simpson Strong-Drive SDWS22	1/2" Polyiso + 7/16" OSB	24	24	24	24	24	20
		3/4" Polyiso + 7/16" OSB	24	24	24	24	20	16
		1" Polyiso + 7/16" OSB	24	24	24	20	16	16
		1 1/2" Polyiso + 7/16" OSB	24	24	20	16	12	12
		2" Polyiso + 7/16" OSB	24	24	16	12	8	8
		2 1/2" Polyiso + 7/16" OSB	24	20	12	8	8	8
		3" Polyiso + 7/16" OSB	24	16	12	8	8	6
		3 1/2" Polyiso + 7/16" OSB	24	16	8	8	6	6
		4" Polyiso + 7/16" OSB	20	12	8	8	6	4
		4 1/2" Polyiso + 7/16" OSB	20	12	8	6	4	4
	FastenMaster HeadLOK	1/2" Polyiso + 7/16" OSB	24	24	24	24	20	16
		3/4" Polyiso + 7/16" OSB	24	24	24	20	16	12
		1" Polyiso + 7/16" OSB	24	24	20	16	12	12
		1 1/2" Polyiso + 7/16" OSB	24	24	16	12	8	8
		2" Polyiso + 7/16" OSB	24	16	12	8	8	6
		2 1/2" Polyiso + 7/16" OSB	24	16	8	8	6	6
		3" Polyiso + 7/16" OSB	20	12	8	6	6	4
		3 1/2" Polyiso + 7/16" OSB	16	8	8	6	4	4
		4" Polyiso + 7/16" OSB	16	8	6	4	4	4
		4 1/2" Polyiso + 7/16" OSB	12	8	6	4	4	-

THERMABASEci™ w/ 7/16" OSB – Vertical Studs 16" o.c.[1,2,3,4,5,6]								
Framing Member	**Fastener Type & Minimum Size**	**Max. Nominal Thickness of THERMABASEci™ (in.)**	**Max. Vertical Spacing (in.) of fasteners along each stud to support the specified Cladding weight (psf).**					
			5	**10**	**15**	**20**	**25**	**30**
	TruFast SIPTP	**1/2" Polyiso + 7/16" OSB**	24	24	24	20	16	16
		3/4" Polyiso + 7/16" OSB	24	24	24	16	12	12
		1" Polyiso + 7/16" OSB	24	24	20	16	12	8
		1 1/2" Polyiso + 7/16" OSB	24	20	12	8	8	8
		2" Polyiso + 7/16" OSB	24	16	12	8	6	6
		2 1/2" Polyiso + 7/16" OSB	20	12	8	6	6	4
		3" Polyiso + 7/16" OSB	16	8	8	6	4	4
		3 1/2" Polyiso + 7/16" OSB	16	8	6	4	4	4
		4" Polyiso + 7/16" OSB	12	8	6	4	4	-
		4 1/2" Polyiso + 7/16" OSB	12	6	4	4	-	-

1. Minimum fastener penetration into stud is 1¼".
2. N/A = Not allowed.
3. THERMABASEci is installed directly to the studs with the OSB to the exterior of the structure.
4. Wood studs shall have a minimum specific gravity of 0.42.
5. Nail and screw values determined using NDS® Yield Limit Equations and TR-12 for evaluating the foam as a gap.
6. Nail fasteners shall comply with *ASTM F1667*, except nail length shall be permitted to exceed *ASTM F1667* standard lengths. Minimum bending yield strength for nails with a diameter up to 0.148", 0.162" and 0.225" shall be 90,000; 90,000 and 80,000 psi respectively. Proprietary fastener properties are per published data or testing.

Table 5: Allowable Cladding Fastener Load with THERMABASEci™– Vertical Studs 16" o.c.

THERMABASEci™ w/ 7/16" OSB - Vertical Studs 24" o.c.[1,2,3,4,5,6]								
Framing Member	Fastener Type & Minimum Size	Max. Nominal Thickness of THERMABASEci™ (in.)	Maximum Vertical Spacing (in.) of fasteners along each stud to support the specified Cladding weight (psf).					
			5	10	15	20	25	30
Minimum 2x4 SPF	8d (0.131 x 2.5)	1/2" Polyiso + 7/16" OSB	20	12	8	6	4	4
		3/4" Polyiso + 7/16" OSB	16	8	6	4	4	-
	12d (0.148 x 3.25)	1/2" Polyiso + 7/16" OSB	24	12	8	8	6	4
		3/4" Polyiso + 7/16" OSB	16	8	8	6	4	4
		1" Polyiso + 7/16" OSB	16	8	6	4	4	-
		1 1/2" Polyiso + 7/16" OSB	8	6	4	4	-	-
	Rmax Nail Board Fastener	1/2" " Polyiso + 7/16" OSB	24	24	20	12	12	8
		3/4" Polyiso + 7/16" OSB	24	20	16	12	8	8
		1" Polyiso + 7/16" OSB	24	16	12	8	8	6
		1 1/2" Polyiso + 7/16" OSB	20	12	8	6	6	4
		2" Polyiso + 7/16" OSB	16	8	8	6	4	4
		2 1/2" Polyiso + 7/16" OSB	12	8	6	4	4	-
		3" Polyiso + 7/16" OSB	12	6	4	4	-	-
		3 1/2" Polyiso + 7/16" OSB	8	6	4	-	-	-
		4" Polyiso + 7/16" OSB	8	4	4	-	-	-
		4 1/2" Polyiso + 7/16" OSB	8	4	-	-	-	-
	Simpson Strong-Drive SDWS22	1/2" Polyiso + 7/16" OSB	24	24	24	20	16	12
		3/4" Polyiso + 7/16" OSB	24	24	20	16	12	12
		1" Polyiso + 7/16" OSB	24	24	20	12	12	8
		1 1/2" Polyiso + 7/16" OSB	24	20	12	8	8	8
		2" Polyiso + 7/16" OSB	24	16	12	8	6	6
		2 1/2" Polyiso + 7/16" OSB	20	12	8	6	6	4
		3" Polyiso + 7/16" OSB	16	8	8	6	4	4
		3 1/2" Polyiso + 7/16" OSB	16	8	6	6	4	4
		4" Polyiso + 7/16" OSB	12	8	6	4	4	-
		4 1/2" Polyiso + 7/16" OSB	12	8	6	4	-	-
	FastenMaster HeadLOK	1/2" Polyiso + 7/16" OSB	24	24	20	16	12	12
		3/4" Polyiso + 7/16" OSB	24	24	16	12	12	8
		1" Polyiso + 7/16" OSB	24	20	12	12	8	8
		1 1/2" Polyiso + 7/16" OSB	24	16	8	8	6	6
		2" Polyiso + 7/16" OSB	20	12	8	6	6	4
		2 1/2" Polyiso + 7/16" OSB	16	8	6	6	4	4
		3" Polyiso + 7/16" OSB	12	8	6	4	4	-
		3 1/2" Polyiso + 7/16" OSB	12	6	4	4	-	-
		4" Polyiso + 7/16" OSB	8	6	4	-	-	-
		4 1/2" Polyiso + 7/16" OSB	8	6	4	-	-	-

THERMABASEci™ w/ 7/16" OSB - Vertical Studs 24" o.c.[1,2,3,4,5,6]								
Framing Member	Fastener Type & Minimum Size	Max. Nominal Thickness of THERMABASEci™ (in.)	Maximum Vertical Spacing (in.) of fasteners along each stud to support the specified Cladding weight (psf).					
			5	10	15	20	25	30
	TruFast SIPTP	1/2" Polyiso + 7/16" OSB	24	24	20	12	12	8
		3/4" Polyiso + 7/16" OSB	24	20	16	12	8	8
		1" Polyiso 7/16" OSB	24	16	12	8	8	6
		1 1/2" Polyiso + 7/16" OSB	20	12	8	6	6	4
		2" Polyiso + 7/16" OSB	16	8	8	6	4	4
		2 1/2" Polyiso + 7/16" OSB	12	8	6	4	4	-
		3" Polyiso + 7/16" OSB	12	6	4	4	-	-
		3 1/2" Polyiso + 7/16" OSB	8	6	4	-	-	-
		4" Polyiso + 7/16" OSB	8	4	4	-	-	-
		4 1/2" Polyiso + 7/16" OSB	8	4	-	-	-	-

1. Minimum fastener penetration into stud is 1¼".
2. N/A = Not allowed.
3. THERMABASEci is installed directly to the studs with the OSB to the exterior of the structure.
4. Wood studs shall have a minimum specific gravity of 0.42.
5. Nail and screw values determined using NDS® Yield Limit Equations and TR-12 for evaluating the foam as a gap.
6. Nail fasteners shall comply with *ASTM F1667*, except nail length shall be permitted to exceed *ASTM F1667* standard lengths. Minimum bending yield strength for nails with a diameter up to 0.148", 0.162" and 0.225" shall be 90,000; 90,000 and 80,000 psi respectively. Proprietary fastener properties are per published data or testing.

Table 6: Allowable Cladding Fastener Load with THERMABASEci™– Vertical Studs 24" o.c.

6. Installation:

6.1. General

6.1.1. THERMABASEci™ shall be installed in accordance with the manufacturer's published installation instructions and this TER. In the event of a conflict between the manufacturer's instructions and this TER, the more restrictive shall govern.

6.2. Orientation

6.2.1. THERMABASEci™ shall be installed vertically with framing that has a nominal thickness of not less than 2" (1.5" actual, 38.1 mm) and spaced a maximum of 24" (610 mm) o.c.

6.2.2. THERMABASEci™ shear wall aspect ratio must not exceed 3.5:1.

6.3. Attachment

6.3.1. Fasteners shall be installed with a minimum edge distance of 3/8" (9.5 mm).

6.3.2. Bending yield strength of commodity fasteners shall be as shown in NDS, Table 11N, footnote 2. Bending yield of proprietary fasteners are as published by the fastener manufacturer.

6.3.3. Fasteners shall be installed with the on center spacing as indicated in Table 4, Table 5 and Table 6.

7. Test and Engineering Substantiating Data:

7.1. Test reports and data supporting the following material and structural properties of THERMABASEci™:

7.1.1. Flame spread and smoke developed ratings in accordance with *ASTM E84*, performed by Intertek.

7.1.2. Air permeance in accordance with *ASTM E2178*, performed by Exova.

7.2. Foam Sheathing Committee Tech Matters, *Guide to Attaching Exterior Wall Coverings through Foam Sheathing to Wood or Steel Framing*.

7.3. New York State Energy Research and Development Authority, *Fastening Systems for Continuous Insulation*.

7.4. The product(s) evaluated by this TER fall within the scope of one or more of the model, state or local building codes for building construction. The testing and/or substantiating data used in this TER is limited to buildings, structures, building elements, construction materials and civil engineering related specifically to buildings.

7.5. The provisions of model, state or local building codes for building construction do not intend to prevent the installation of any material or to prohibit any design or method of construction. Alternatives shall use consensus standards, performance-based design methods or other engineering mechanics based means of compliance. This TER assesses compliance with defined standards, accepted engineering analysis, performance-based design methods, etc. in the context of the pertinent building code requirements.

7.6. Some information contained herein is the result of testing and/or data analysis by other sources, which DrJ relies on to be accurate, as it undertakes its engineering analysis.

7.7. DrJ has reviewed and found the data provided by other professional sources are credible. The information in this TER conforms with DrJ's procedure for acceptance of data from approved sources.

7.8. DrJ's responsibility for data provided by approved sources conforms with *IBC* Section 1703 and any relevant professional engineering law.

7.9. Where appropriate, DrJ relies on the derivation of design values, which have been codified into law through codes and standards (e.g., *IRC*, *WFCM*, *IBC*, *SDPWS, NDS, ACI, AISI, PS-20, PS-2*, etc.). This includes review of code provisions and any related test data that aids in comparative analysis or provides support for equivalency to an intended end-use application. Where the accuracy of design values provided herein is reliant upon the published properties of commodity materials (e.g. lumber, steel, concrete, etc), DrJ relies upon grade/properties provided by the raw material supplier to be accurate and conforming to the mechanical properties defined in the relevant material standard.

8. Findings:

8.1. When installed in accordance with the manufacturer's installation instructions and this TER, THERMABASEci™ complies with, or is a suitable alternative to, the applicable sections of the codes listed in Section 2 for the following applications:

8.1.1. Use as a nail base for support of cladding materials when installed in accordance with the manufacturer's installation instructions and this TER.

8.1.2. Thermal resistance for use as insulating sheathing in accordance with *IECC* Section R402.1 and *IRC* N1102.1.

8.1.3. Foam plastic insulation performance in accordance with *IRC* Section R316

8.1.4. Performance for use as an air barrier in accordance with *IECC* Section C402.

8.1.5. Wind pressure resistance in accordance with *IRC* Section R301.2.1 and *IBC* Section 1609.1.1.

8.2. *IBC* Section 104.11 and *IRC* Section R104.11 (*IFC* Section 104.9 is similar) state:

> **104.11 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 has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code. … Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons the alternative was not *approved*.

8.3. This product has been evaluated with the codes listed in Section 2, and is compliant with all known state and local building codes. Where there are known variations in state or local codes that are applicable to this evaluation, they are listed here:

8.3.1. No known variations

8.4. This TER uses professional engineering law, the building code, *ANSI/ASTM* consensus standards and generally accepted engineering practice as its criteria for all testing and engineering analysis. DrJ's professional engineering work falls under the jurisdiction of each state Board of Professional Engineers, when signed and sealed.

9. Conditions of Use:

9.1. Where required by the authority having jurisdiction (AHJ) in which the project is to be constructed, this TER and the installation instructions shall be submitted at the time of permit application.

9.2. Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the code official for review and approval.

9.3. Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed.

9.4. When combined lateral (shear) and gravity loads are to be considered together, an approved design shall be submitted to the building official for approval.

9.5. General

9.5.1. Walls shall not be used to resist horizontal loads from concrete and masonry walls.

9.5.2. THERMABASEci™ may be used as a nail base for cladding. Fastener size and spacing for attaching THERMABASEci™ to the wall framing shall be in accordance with Table 5 and Table 6.

9.5.3. Cladding attachments shall be in accordance with the cladding manufacturer's installation instructions or an approved engineered design.

9.6. Design

9.6.1. Building Designer Responsibility

9.6.1.1. Unless the AHJ allows otherwise, the Construction Documents shall be prepared by a Building Designer for the Building and shall be in accordance with *IRC* Section R106 and *IBC* Section 107.

9.6.1.2. The Construction Documents shall be accurate and reliable and shall provide the location, direction and magnitude of all applied loads and shall be in accordance with *IRC* Section R301 and *IBC* Section 1603.

9.6.2. Construction Documents

9.6.2.1. Construction Documents shall be submitted to the Building Official for approval and shall contain the plans, specifications and details needed for the Building Official to approve such documents.

9.7. Responsibilities

9.7.1. The information contained herein is a product, material, detail, design and/or application TER evaluated in accordance with the referenced building codes, testing and/or analysis through the use of accepted engineering practice, experience and technical judgment.

9.7.2. DrJ TERs provide an assessment of only those attributes specifically addressed in the Products Evaluated or Code Compliance Process Evaluated sections.

9.7.3. The engineering evaluation was performed on the dates provided in this TER, within DrJ's professional scope of work.

9.7.4. This product is manufactured under a third-party quality control program in accordance with *IRC* Section R104.4 and R109.2 and *IBC* Section 104.4 and 110.4.

9.7.5. The actual design, suitability and use of this TER, for any particular building, is the responsibility of the Owner or the Owner's authorized agent, and the TER shall be reviewed for code compliance by the Building Official.

9.7.6. The use of this TER is dependent on the manufacturer's in-plant QC, the ISO/IEC 17020 third-party quality assurance program and procedures, proper installation per the manufacturer's instructions, the Building Official's inspection and any other code requirements that may apply to demonstrate and verify compliance with the applicable building code.

10. Identification:

10.1. THERMABASEci™ described in this TER is identified by a label on the board or packaging material bearing the manufacturer's name, product name, TER number, and other information to confirm code compliance.

10.2. Additional technical information can be found at Rmax.com.

11. Review Schedule:

11.1. This TER is subject to periodic review and revision. For the most recent version of this TER, visit drjengineering.org.

11.2. For information on the current status of this TER, contact DrJ Engineering.

- Mission and Professional Responsibilities
- Product Evaluation Policies
- Product Approval – Building Code, Administrative Law and P.E. Law