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CSI CODES  
DIVISION 5 METALS  
SECTION 05400 COLD-FORMED METAL FRAMING

DIVISION 7 THERMAL AND MOISTURE PROTECTION  
SECTION 07050 BASIC THERMAL AND MOISTURE PROTECTION MATERIALS AND METHODS

## 1. Product Name

Thermasteel Building System

## 2. Manufacturer

Thermasteel Inc.  
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## 3. Product Description

The Thermasteel Building System is composed of insulated Thermasteel Panels, using composite steel and expanded polystyrene (EPS) technologies, which are both 100 percent recyclable.

### Basic Use

The Thermasteel Building System is used for commercial construction projects, High rise curtain walls, mid-rise and single, multi-family and military housing projects.

### Characteristics

- ▶ **Code approval - IAPMO Report ES-128 ([link>>](#))**  
**IAPMO is a Nationally Recognized Testing Laboratory (NRTL) [OSHA NRTL link>>](#)**
- ▶ **Thermal resistance R36-47, ASHRAE 90.1-2013, Zones 1-7**
- ▶ **No thermal bridging**
- ▶ **STC standard assembly use for commercial - 58 STC (see figure 1, page 10)**
- ▶ **Hurricane and Projectile Protocol approved by Miami Dade County, Florida**
- ▶ **Seismic - 9 Richter Scale tested and approved internationally**
- ▶ Axial distributed load - max LRFD 14,059 plf
- ▶ Racking shear - max LRFD 1,746 plf
- ▶ Transverse loading - max LRFD 88 psf
- ▶ Load bearing fire test - 1hr 3,850 plf
- ▶ Non-load bearing fire test - 2hr
- ▶ Flame spread - 5+
- ▶ Smoke development - 55-75
- ▶ Life expectancy - 300+ years
- ▶ 100% recycled materials
- ▶ Pre-molded electrical chases

Thermasteel Panels feature a patented process using composite technology consisting of structural grade double steel frames with rigid, fire retarding EPS bonded to the steel frame. This process produces a

lightweight composite panel, load bearing, high Thermal resistance, insulation and vapor barrier in one unit. Thermasteel Panels are installed using top and bottom steel tracks. The panels are then screwed together along the leading-edge steel to form a fast-to-assemble super structure with wall, insulation and vapor barrier all together. Panels weigh approximately 50 lbs each. Because the studs are oriented parallel to the face of the panel and the tongue and groove joints are used at the edges, the system has a complete thermal break providing superior thermal performance. Rough openings for doors and windows are formed during the manufacturing process. The panels have a molded horizontal chase to accommodate electrical wiring. Other chases for plumbing are usually made in the field with a hot knife.

The Thermasteel Building System can support multi-story loads. They can also be used in high-rise buildings as in-fill or curtain wall applications. The “H” panel passed the Southern Florida Hurricane Test. It has also undergone third-party testing for energy code approval, including Uniform code approval IAPMO-ES 0128 ([link>>](#)).

Table 1 - Thicknesses, Dimensions and Weights\*

Thickness	Dimensions	Weight*
3-1/2" (89mm)	4 x 8' (1219 x 2438mm)	45–50 lbss (20–22 kg)
	4 x 10' (1219 x 3048mm)	
	4 x 12' (1219 x 3658mm)	
4" (102mm)	4 x 8' (1219 x 2438mm)	45–50 lbs (20–22 kg)
	4 x 10' (1219 x 3048mm)	
5-1/2" (140mm)	4 x 8' (1219 x 2438mm)	50–55 lbss (21–23 kg)
	4 x 10' (1219 x 3048mm)	
	4 x 12' (1219 x 3658mm)	
7-1/2" (190mm)	4 x 8' (1219 x 2438mm)	55–60 lbs (23–27 kg)
	4 x 10' (1219 x 3048mm)	
	4 x 12' (1219 x 3658mm)	
*Weight depends on the gauge of steel studs		

**Composition and Materials Panels**

Thermasteel Panels consist of EPS adhered to steel studs and are available in 3-1/2, 4, 5-1/2 and 7-1/2 inch thicknesses.

*Note: Standard 4 x 8 feet x 3-1/2 inches (1219 x 2438 x 89 mm) panel weighs only 45 pounds (20 kg).*

**Studs**

Studs are 24-12 gauge with standard galvalume and galvanized steel. They are positioned at either 16 inches (406 mm) or 24 inches (609 mm) on center on both sides of the panel.

**Cladding**

Facings are not required until after panels are in place on site. Assemblies are also available with one-hour or two-hour rating. Exteriors may be clad with any type of approved siding.

## Facings and Foam

Table 2 - EPS Densities:

Panel Dimensions	EPS Density
3-1/2 inch (89 mm)	1.5 lb/ft <sup>3</sup> (24 kgf/m <sup>3</sup> )
4 inch (102 mm)	1.5 lb/ft <sup>3</sup> (24 kgf/m <sup>3</sup> )
5-1/2 inch (140 mm)	1 lb/ft <sup>3</sup> (16 kgf/m <sup>3</sup> )
7-1/2 inch (191 mm)	1 lb/ft <sup>3</sup> (16 kgf/m <sup>3</sup> )

Interior walls must be covered with a minimum of 1/2 inch (13 mm) drywall or plaster for a minimum 15 minute fire rating. Assemblies are also available with a one-hour or two-hour rating.

## Panel Attachment System

Panels interlock with tongue and groove joints and self-tapping tech screws. The preferred method is to use metal track for the top and bottom plate. If wood plates are used, only single plates top and bottom are required. Plates are attached to the panel with 3 x 5 inches (76 x 127 mm) galvanized shear plates at each stud. Shiplap joints and sheet metal screws allow quick and easy panel connection.

## Wiring

Horizontal chases can be pre-molded in the panels.

## Colors/Finishes/Coverings

All Thermasteel Panels can be clad in the field with synthetic stucco, vinyl, Hardy Board, brick, rain screens or virtually any other cladding materials.

- ▶ Eliminates labor costs associated with insulating, sheathing, installing vapor barriers, blocking, let-ins, ladder bracing and thermal barrier.
- ▶ Waste and cleanup costs are minimized.
- ▶ Minimizes installation time, which equates to lower construction loan interest and security costs.

## Benefits

- ▶ Meets energy code requirements without adding extra material while remaining structurally sound per ASTM C-1363, ASHRAE 90.1 and International Energy Conservation Code.
- ▶ No food value for insects.
- ▶ Suitable for multi-story, high-rise applications as well as infill or curtain wall applications.
- ▶ Offers load bearing, sound reduction, thermal insulation and vapor barrier characteristics.
- ▶ Flexibility with both gauge of steel and panel thickness to meet projects requirements.
- ▶ High R-value and Thermally broken.
- ▶ Reduced framing time.

## Product Limitations

The panels should not be used in areas where solvents such as gasoline or other hydrocarbons, including acetone, are present.

## 4. Technical Data

### Applicable Standards

American National Standards Institute (ANSI).

- ▶ ANSI/UL 263 Standard for Safety for Fire Tests of Building; One-hour Load Bearing Fire Endurance American Society for Testing and Materials (ASTM).
- ▶ ASTM C518 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow.
- ▶ ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- ▶ ASTM C1512 – Freeze/Thaw.

## Maximum LEED System Points

Table 3 - Environmental Considerations

Objectives	Residential	Commercial
EA 1: Optimize energy performance	34	19
EA 2.1: Insulation	2	-
EA 3: Air filtration	3	-
MR 1.4: Framing efficiencies	3	-
MR 1.5: Off-site fabrication	4	-
MR 2: Construction waste management	2	2
MR 2.2: Environmentally preferable materials	3	-
MR 3.2: Construction waste reduction	-	-
MR 4: Recycled content	-	2
MR 5: Regional materials	-	2
RP 1: Regional priority	-	4
ID 1: Innovation in design	-	1

## Technical Reports

- ▶ Hurricane Test Laboratory (HTL) Structural Test Report#98072.
- ▶ IAMPO Report 128 in Compliance with the following code and regulations: 2012, 2009, & 2006 International Building Code (IBC) 2012, 2009, & 2006 International Residential Code (IRC).
- ▶ IAMPO Report 128 Evaluated in Accordance with: 2007 & 2001 North American Specification for the Design of Cold-Formed Steel Structure Members (AISI).
- ▶ ASCE 7-2005 & 7-2010 Minimum Design Loads for Buildings and Other Structures.
- ▶ South Florida Code Compliance #HTL 98072.
- ▶ Underwriters Laboratory (UL) BRYX.R4775 Foamed Plastic.
- ▶ Uniform Code approval ES 128.
- ▶ U.S. Department of Housing and Urban Development (HUD) Structural Engineering Bulletin 1072, Rev. 2.

## Testing

Laboratory test results are available for compressive, transverse and racking shear using the standard ASTM E72 to determine the strength of the system. Fire and sound test data are also available. A modified "H" panel has passed the Florida Hurricane Test Lab requirements for Dade and Broward County. Test results for large impact, cyclic load, air and water infiltration are also available.

## Environmental Considerations

Thermasteel is a 100% environment friendly. All materials and production are 100% recycled. Thermasteel Panels are used, not only in commercial and industrial projects, but also in residential projects and as such, can qualify for credits based upon the LEED 2009 for New Construction and Major Renovations rating system.

## Material Safety Data Sheet

MSDS documentation is available from the manufacturer. ([link>>](#))

## Firespread/Smoke Performance

Closed Cell Expanded Polystyrene (EPS) meets the flame-spread and smoke performance characteristics shown in Table 4.

Table 4 - EPS Smokespread and Smoke Performance

Thickness (max)	1" (25mm)	2" (51mm)	4" (102mm)	5" (127mm)	6" (152mm)
Flamespread	5+	5++	5+++	5+++	5+++
Smoke Development	50-90+	50-90++	50-90+++	50-175+++	50-175+++

## Fire Rated Wall

Thermasteel Panels meet a one (1) hour load bearing fire endurance and hose stream tests in accordance with the Standard, Fire Tests of Building Construction and Materials, ANSI/UL 263, (ASTM E119, NFPA No. 251) and satisfies non-loading bearing fire requirements in accordance with other tested assemblies per NFPA 285.

## R Values

*Note: Meets or exceeds 2012 and 2013 energy code for both commercial and residential buildings. See Table 5a, b, and c.*

## Commercial or Non-Residential Construction

Table 5a

Building Code (Occupancy Type)	Complaint Zones	Additional R-Value to reach compliance
ASHRAE 90.1-2007 or 2010 (Non-Res)	All	None
ASHRAE 90.1-2013 (Non-Res)	1-5	Zones 6-7, R-1.5 , 8, R-8.0
IECC 2009 (Com)	All	None
IECC 2012 (Com)	1-7	Zone 8, R-3.3
IECC 2009 (Com) - Group R)	1-6	Zones 7, R-0.3, 8, R-8.0
IECC 201 (Com - Group R)	1-6	Zones 7, R-0.3, 8, R-3.3

## Residential Construction

Table 5b

Building Code (Occupancy Type)	Complaint Zones	Changes to reach compliance
ASHRAE 90.1-2007 or 2010 (Non-Res)	1-6	Zones 7-8, R-5.0
ASHRAE 90.1-2013 (Non-Res)	1-5	Zones 6, R-1.5 , 7-8, R-5.0
IECC 2009 (Com)	All	None
IECC 2012 (Com)	1-5	Zone 6-8, R-2.0

## Semi-Heated Space

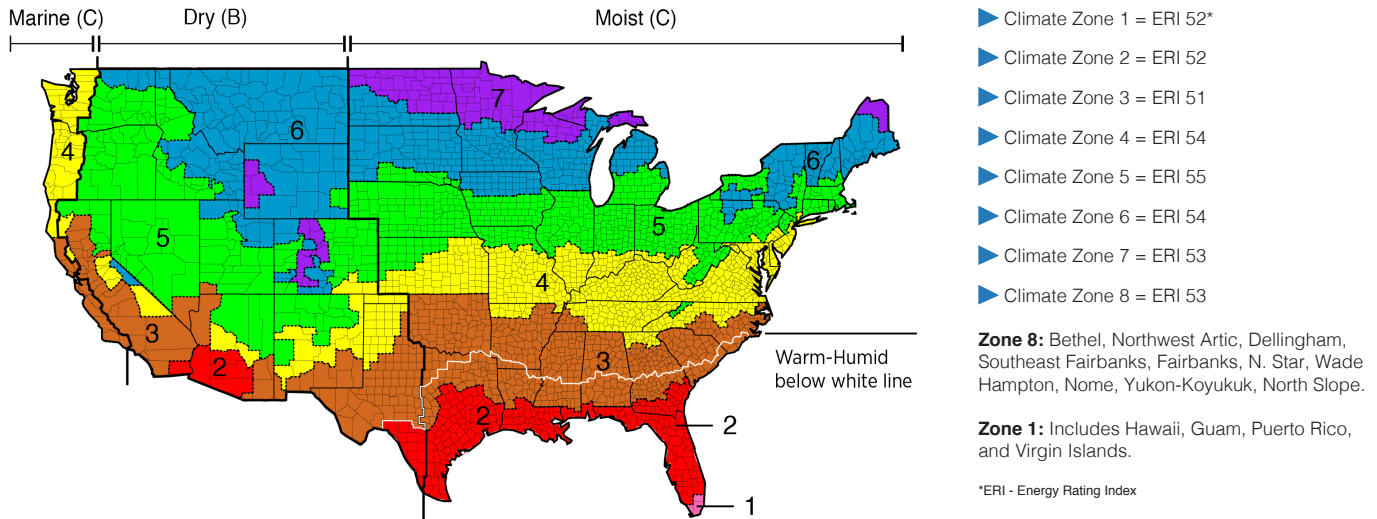
Table 5c

Building Code (Occupancy Type)	Complaint Zones	Changes to reach compliance
ASHRAE 90.1-2007, 2010, or 2013 *IECC exempts semi-heated space from its requirements	All	None

Add R-0.3: One sheet of ½" gypsum board (R=0.45) on final assembly  
 Add R-1.5: Add ½" gypsum +3/8" of insulation board (R=1.1 min)  
 Add R-2.0: Add ½" gypsum +1/2" of insulation board (R=1.6 min)

Add R-3.3: Add ½" gypsum +3/4" of insulation board (R=2.9 min)  
 Add R-5.0: Add ½" gypsum +1" of insulation board (R=4.6 min)  
 Add R-8.0: Add ½" gypsum +1-1/2" of insulation board (R=7.5 min)

For reference, all the United States, except Alaska, portions of northern Maine, Wisconsin, Michigan, North Dakota and a few areas in Wyoming and Colorado are in Climate Zones 1-6. The image below shows the different climate zones as they are defined for both ASHRAE and IECC Codes.



### Thermal Conductivity

Unlike other insulations, the thermal conductivity of closed cell EPS use with Thermasteel Panels decreases at lower average mean temperature per ASTM C518.

### Sound Performance

The panels have been tested in accordance with ASTM E90, E413 as a wall system for basements, walls, roofs and ceilings.

### 5. Installation Instructions

Contact manufacturer for design and assembly documentation.

#### Preparatory

1. Study the appropriate drawings before beginning construction and assembly.
2. Unload the flatbed trailer at the job site.
3. Stack the panels for each floor so that they are in the necessary sequence for erection.

*Note: Panels are usually set starting at one corner of the building and proceeding in a counter-clockwise fashion.*

4. Verify that the dimensions of the slab or subfloor are in accordance with contract documents and coordinate with shop drawings.

*Note: Dimensions should be within the tolerances stipulated by the design professional and/or by good construction practices.*

5. Locate conduit stub-ups (if any) and drill holes in base plate.

#### Methods

A level work area is recommended. This area should be cleared of debris and a base line marked at the bottom and left hand side of the assembly area.

#### Preparation of the Foundation

1. Attach panels to the foundation using wood plates or steel channel track per local code.
2. Set steel tracks in a waterproof inhibitor such as roofing felt, foam tape, etc.

*Note: Size and spacing of anchors shall be determined by a design professional based on building code requirements.*

3. Caulk and set base-plates or track to building dimensions and secure to the slab or subfloor using

anchors as per the design drawings.

*Note: Verify the plates are level and the corners are square. If the foundation is not level, shim and grout with cement to obtain a level base-plate (track). Do not try to obtain a level wall by shimming the panels.*

4. Once the bottom base-plates (track) are set and level, verify each panel dimension along the base-plate.
5. Nail attachment plates to both sides of wood base-plates or put two screws per stud for track.
6. Locate the attachment plates to fall at each panel joint and each steel stud when using wood plates.

### **Wall Assembly**

There are two ways to assemble walls one panel at a time or pre-assemble wall sections and set them in place. Sections are usually pre-assembled in 12–16 feet (3658–4877 mm) sections.

1. Once the assembly area is cleared and marked, consult the floor plan and determine which sections are to be assembled and in what sequence.
2. Using the element numbers as reference, obtain the necessary panels and lay them out with the interior face down.
3. If specified, caulk joints and push the tongue and groove together.

*Note: Each tongue and groove can be gaped open up to 1/4 inch (6.4 mm) as needed to adjust for discrepancies in wall length.*

4. Check the section for overall dimensions and for square-ness.
5. Once satisfied with the alignment, screw the panels together through the leading overlap edge metal as shown by the applicable engineering drawing or by attaching shear plates as indicated in the IAPMO ES 128 report ([link>>](#)).
6. If any, locate conduit stub-ups on panel and drill up from panel bottom.

*Note: Mark the location of the conduit stub-ups on subfloor.*

### **Top Plates**

1. Follow the applicable guidelines and procedures in the assembly and installation of wall plates.
2. Tie Sections together using wood top plates or C-channel steel top track per the specification drawings.
3. Cut the top plate or track on site to allow overlap to the center of the next panel section steel stud at 16 or 24 inches (406 or 610 mm).
4. Fasten attachment plates to the top plate or track so that the attachment plates will fall at each panel joint and vertical steel stud in the panel.
5. Drill the top plate or track to match conduit or wiring chase locations, if any, in the assembled section before attaching the plate or track to the panels.
6. Caulk the wood plate or track (or panel end) and attach the top plate or track to the wall section by placing screws in the shear plates or track, depending on what is used.

*Note: This connection is temporary and is used only to keep the top plate in place during erection of the walls. The top plate is permanently secured to the wall sections after the floor or roof system has been set, which loads the wall.*

### **Setting the Wall**

1. Caulk the top of the base-plate (or track) and raise the assembled wall section into place.
2. Connect the panels to the base-plate per the engineering drawings and installation guide.
3. Attach the overlapping top plates (or track) to each other per the engineering drawings and installation

guide.

4. Temporarily brace the top of the wall to the ground or floor so it stands true and plumb.

“C” or Composite Openings for Doors, Windows, Etc.

Some panel openings are assemblies consisting of two or more components. These are shipped disassembled and must be assembled on site. Refer to the data sheets provided and assemble these sections before setting them in place. As in all assemblies, carefully check the unit for overall dimensions and square-ness before setting it into wall section.

### **Assembly of Panels**

All bottom plates (or track) must be level before the panels are set.

*Note: If shimming is necessary to obtain level bottom plate (or track) shim (and grout) under the plate and not between the panel and plate. Before making the final connections to the erected wall, the walls must be plumb. Once the panels are in place for one floor the overall dimensions and square-ness of the building should be checked before proceeding with the assembly of any upper floor deck or roof system.*

### **Precautions**

Protect panels from high winds and sharp impact.

### **Inspection of Panels**

Panels have been checked for density and fusion quality and for dimensions before shipment, but should be checked for damage and spot-checked for dimensions as they are unloaded and stacked.

As a general rule, any defect in the polystyrene core of the panel such as small cuts or nicks will not affect the integrity of the panel. Damage to the metal will affect the panel's strength and integrity and can result in a rejected panel.

### **On-Site Changes**

In general, any changes deemed necessary on-site must be cleared with the manufacturer before the changes are made.

### **Buckles or Dents**

Reject any panel with vertical steel members that have any buckles or dents. The panel can be salvaged by cutting out the damaged section and inserting a wood or metal building stud. Fill gaps with insulation. Bends may be straightened in the horizontal metal at the top and bottom edges of the panel. Straighten any bends or dents in the leading edge overlap metal.

### **Electrical Boxes**

Use a hot knife or other acceptable cutting tool. Do not exceed the box dimensions and, where possible, locate the box beside a vertical steel channel for screw attachment. Boxes should have recessed ears or brackets behind the wall cladding.

### **Wiring or Conduit Chases**

If chases provided are not used, vertical chases may be cut in to the polystyrene with a hot knife or other acceptable cutting tool. Vertical chases shall be cut a minimum of two inches (51 mm) from any vertical steel channel. Do not exceed half the panel thickness in depth or one inch (25 mm) in width when making these cuts. Horizontal chase cuts may be extended behind the vertical metal by drilling with a one inch (25 mm) bit near mid-depth of the panel.

### **Safety Considerations**

The panels may be handled by one or two workers. The following rules should be followed:



- ▶ Gloves should be worn at all times when moving panels; the metal edges must be handled carefully to avoid cuts.
- ▶ Do not remove panels in high wind conditions; the surface of the panel will catch the wind and can create a potentially hazardous condition.
- ▶ If high winds are possible, panels must be sheltered, weighted or otherwise protected from moving.

## **6. Availability and Cost**

### **Availability**

Products are shipped both nationally and internationally. Contact manufacturer for further details.

### **Cost**

Prices are calculated per square foot of wall, floor and roof panels. Since project applications and structural load requirements often dictate the size and type of panels needed, the manufacturer's standard policy is to provide quotations from architectural drawings. The price per square foot of wall may vary between different types of panels.

In most cases, the manufacturer will adapt the customer's plans to its system, but the manufacturer can also provide a limited number of stock plans that are pre-engineered to maximize the benefits of Thermasteel. The manufacturer can readily provide a quotation for customer's set of drawings. For further information, contact the manufacturer.

## **7. Warranty**

The manufacturer offers a limited warranty for its product. Contact the manufacture for details and limitations.

## **8. Maintenance Instructions**

None required.

## **9. Technical Services**

A technical representative is available at the manufacturer's offices to review technical details and plans if needed. Local Thermasteel representatives can also provide local technical support. Additional support personnel can be hired on a per diem basis.

The manufacturer offers detailed set of shop drawings and an assembly manual to assist clients in the assembly of Thermasteel products. Certain designs and regions require a seal or letter of recommendation from a licensed structural engineer. For an additional fee, Thermasteel can provide engineering support on a case-by-case basis.

\*Figure 1



\*RSIC-1 Acoustic Clip by PAC International.  
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