



Sustainable Building System



At **THERMOROCK** our goal is to change the constructive culture, being one of the first sustainable technology companies in the bouquet of construction.

“Join THERMOROCK and change the world”

What is THERMOROCK?

It's a new concept of structural and thermal construction mezzanines usable as floors, walls and roofs. For both residential and commercial use.

One of the leading qualities is the ease of assembly and it's cleanability, contributing to the efficiency and speed of the installer, thus the acronym **ERM** (Ensamble Rapido Manual/ Fast Manual Assembly).

Thermorock fulfills its commitment to the environment, its structural coating is manufactured from recycled materials reclaimed from the industry by 95% and the remaining 5% are new materials.



Our values

Mission:

Being a company focused on the production of an alternative building system with ecological awareness, promoting sustainability, offering high quality materials with cutting edge technology, with competitive prices, innovating for the welfare of our clients.

Vision:

Growing up in the region as an entrepreneurial company and as the leading manufacturer of an innovative and practical system of sustainable modular building, which is friendly to the environment.

Objectives:

Being a profitable company, generating direct and indirect employment, generating a culture of efficient functional building practices and sustainable energy, providing a better quality of life for people, gaining acceptance from the relevant authorities for the implementation of alternative systems for social assistance projects and more, in our country.

Values:

Quality service, and innovation.



Features and benefits

THERMOROCK complies with its commitment to the environment:

- Recycled materials, recovered from the industry, such as organic fibers
- CFC, HCFC, HFC and Asbestos free
- Reducing pollution through energy conservation, saving as much as 30% to 40%
- Reducing noise pollution
- Reducing construction waste
- Use our panels as structural mezzanines, walls and roofs
- Insulation system is built into the panel
- Pre-grooved system inside the panel for easy electrical installation
- Quick installation and cleaner assembly
- Fast plastering of walls due to rectified panel
- You can paint without plastering whether for interior or exterior use

THERMOROCK panels were designed with the following properties:

- Fireproof materials
- Impact proof (vandalism)
- Rain and/or snow and fungal growth
- Highly thermal material, complies with standards set by the current building regulations
- Earthquake resistant
- Easy line production

THERMOROCK promotes buildings with low environmental impact by reducing the carbon footprint of the buildings for life.



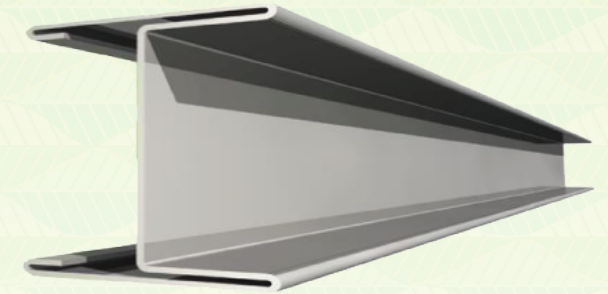
Sustainable Building System

High Density Expanded Polystyrene pre-grooved to standard measures for various utilities

Special water-based adhesive

POST H

Cold galvanized sheet folded, measures 2 1/2", 3 5/8" and 6", as required by the project. Post H serves to seal the **THERMOROCK system boards**.



THERMIC PANEL
(Thickness according to the project: 2 1/2", 3 5/8", 6")

Material
Reciclado

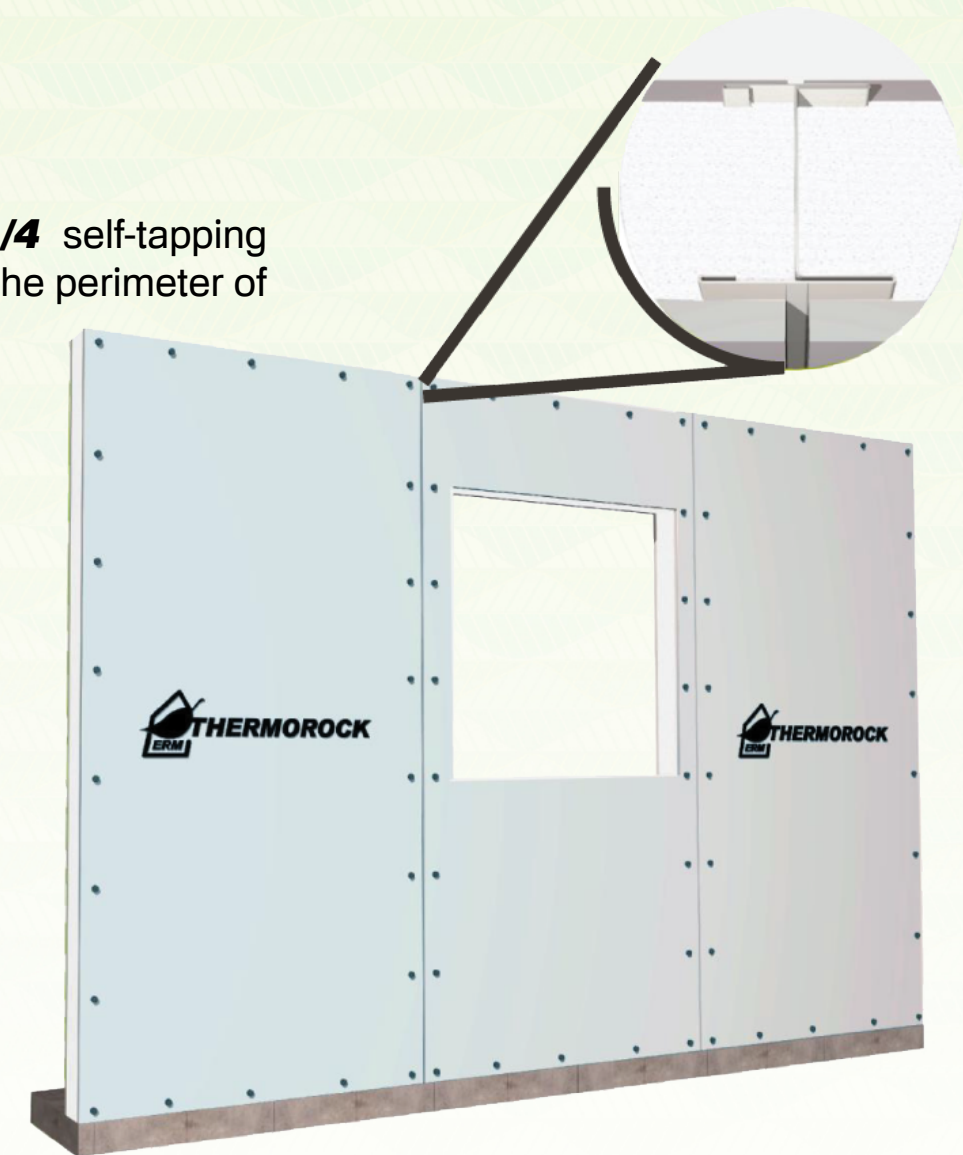


Sing concrete

Canal **mooring** fixed with nail anchor

Thumbnail screws **1"1/4** self-tapping tip drill every 8" around the perimeter of the panel.

Screws **7/16"** at poles.



Required Tools



Rotary Hammer
(optional)



Impact Gun



Level



Measuring Tape



Rubber hammer



Cutting Saw



Putty knife



Saw for drywall



Screwdriver

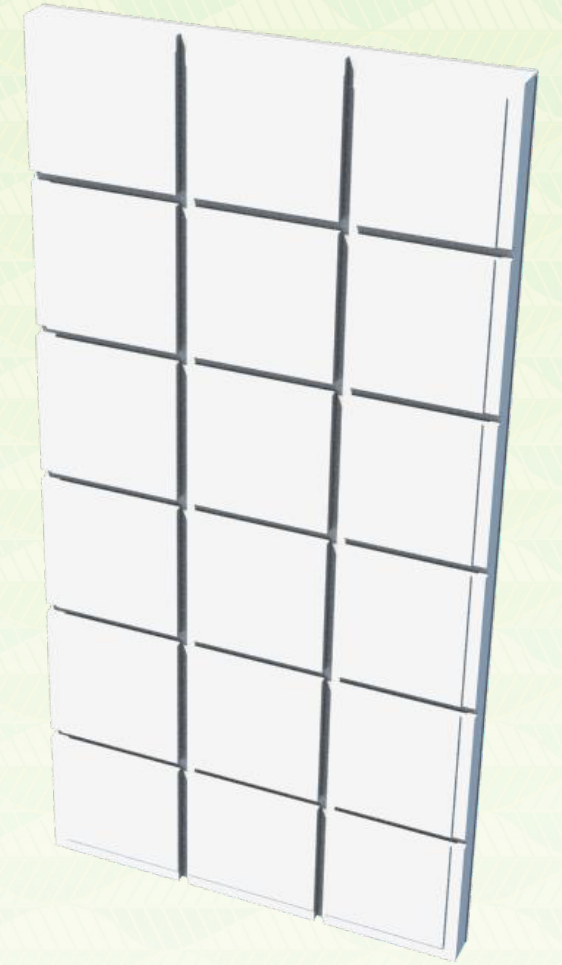
Installation Manual

This manual shows step by step guide for the correct installation of Thermorock's constructive system for a basic housing project.

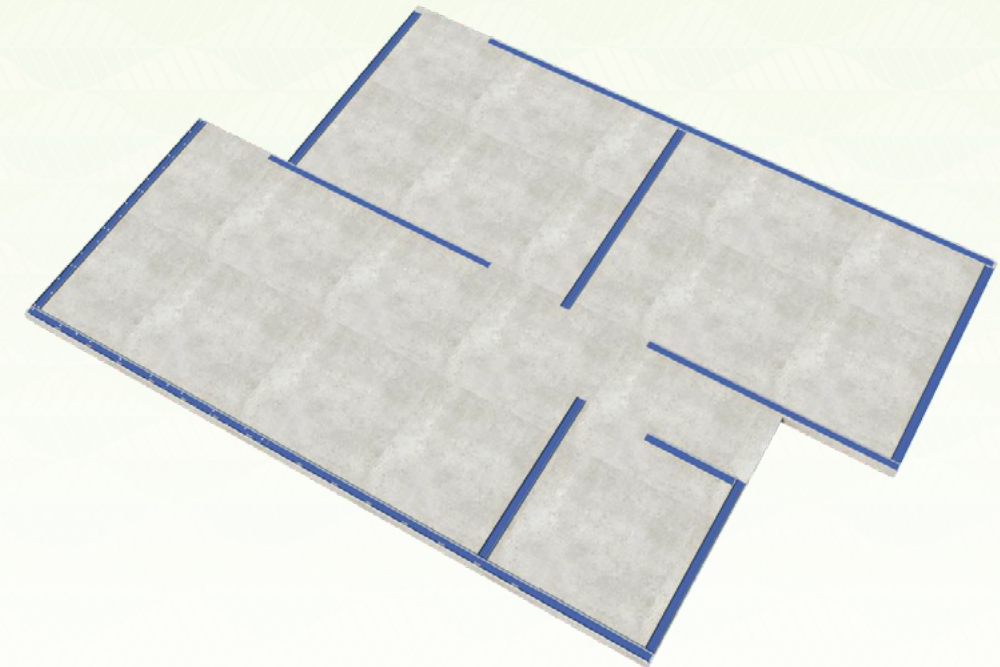
Electrical pre-grooving

Thermorock panels are pre-grooved with the purpose of facilitating electrical installation.

- 2 Vertical canals each 41 cm o 16"
- Horizontal canals each 41 cm o 16", to the standard height of luminary installations such as switches and outputs.



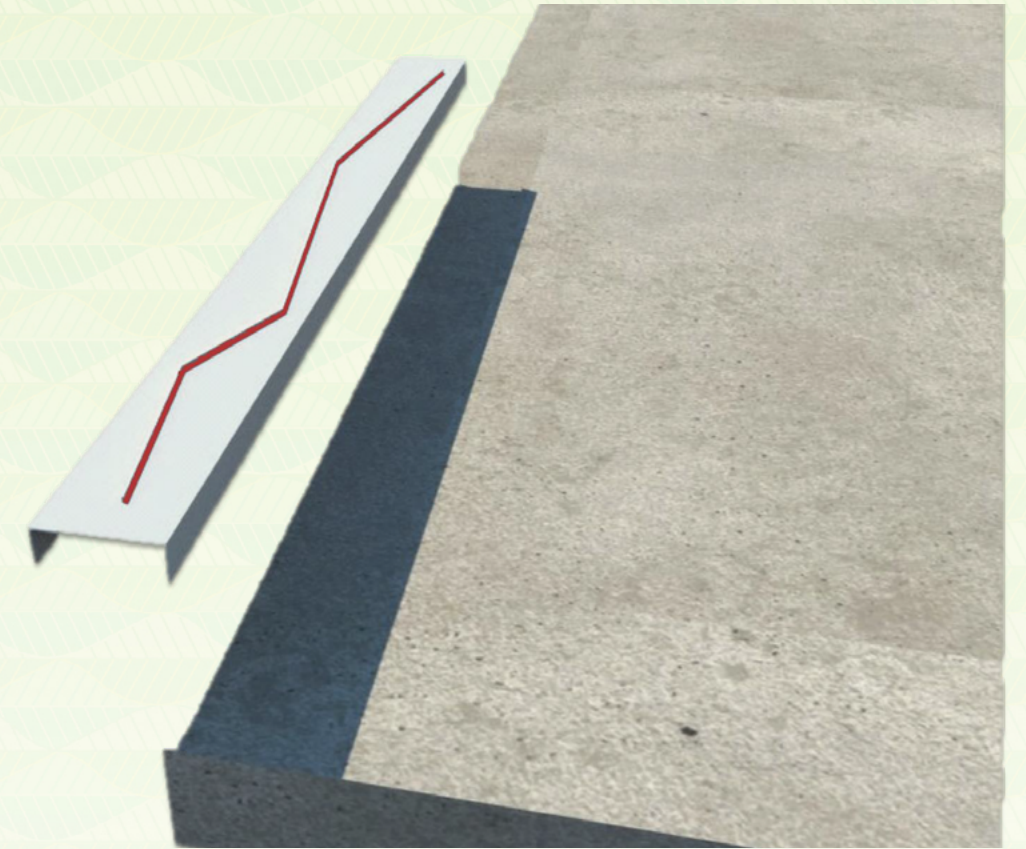
Architectural layout plan



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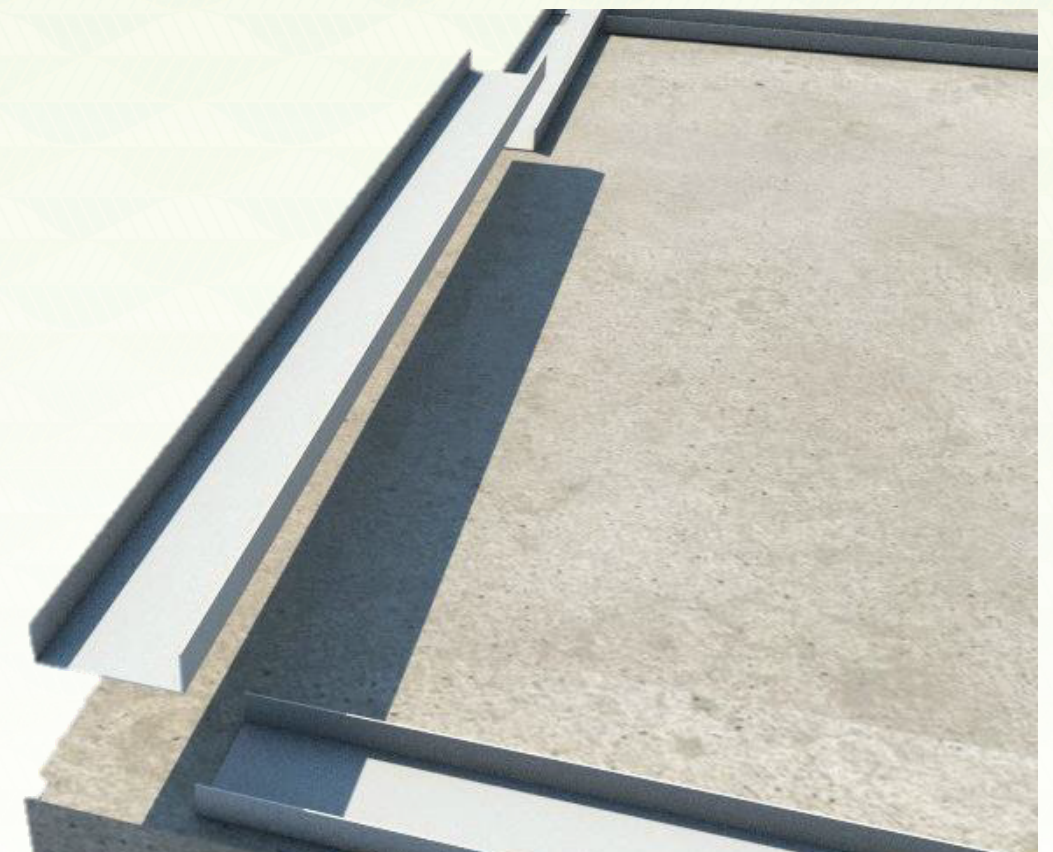
Installation Manual

Apply in urethane runner



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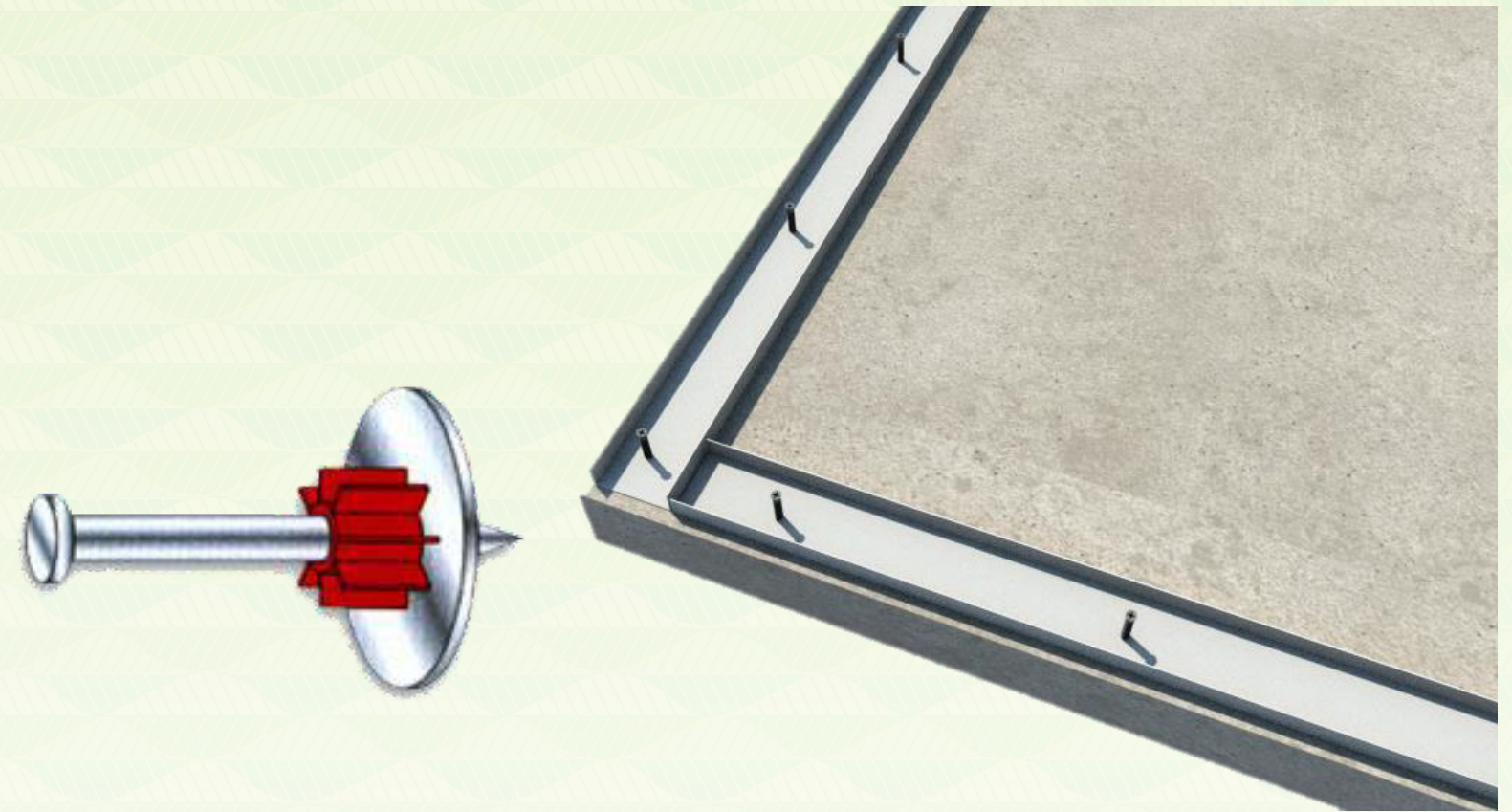
Setting runner with impact nail



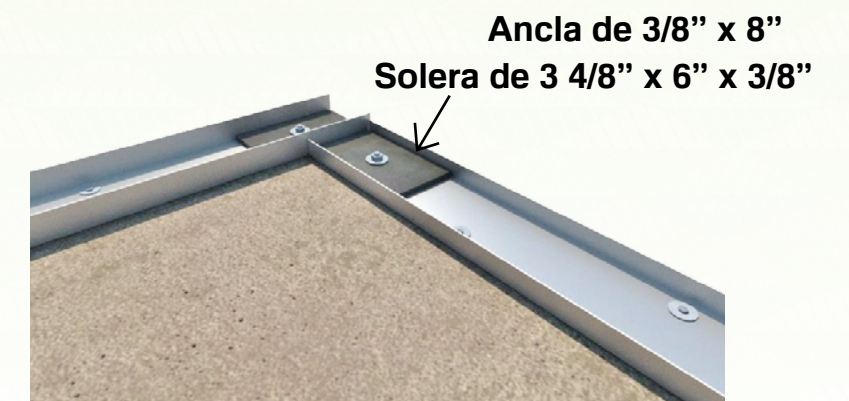
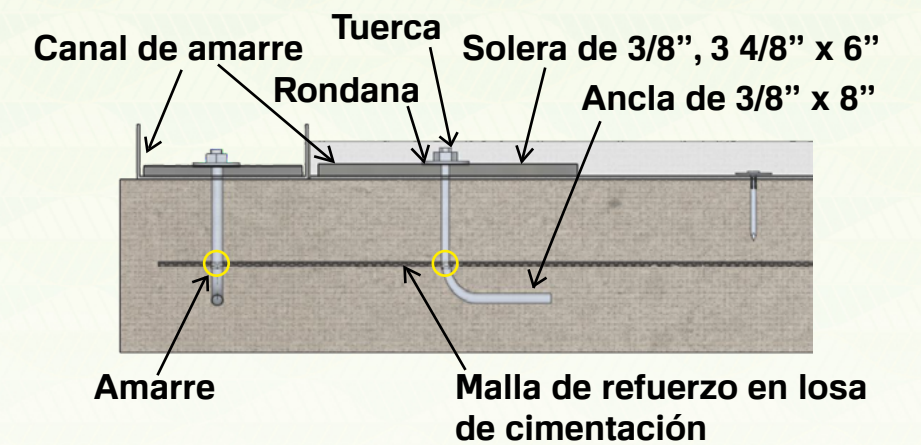
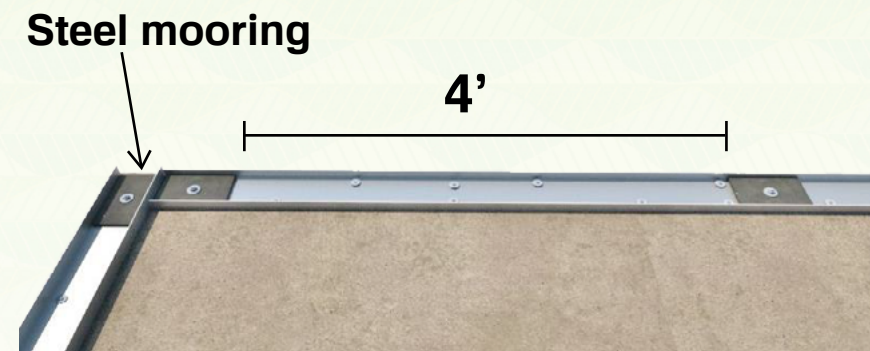
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Installation Manual

Fixing total runner in foundation



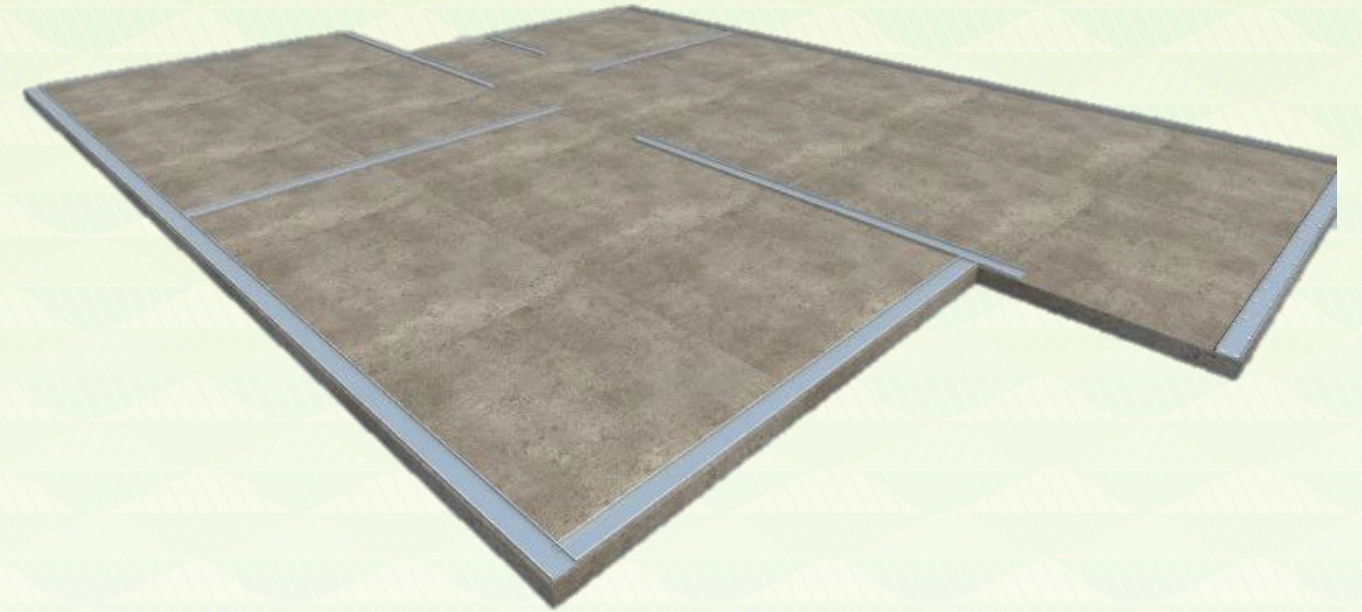
Special fix for mooring



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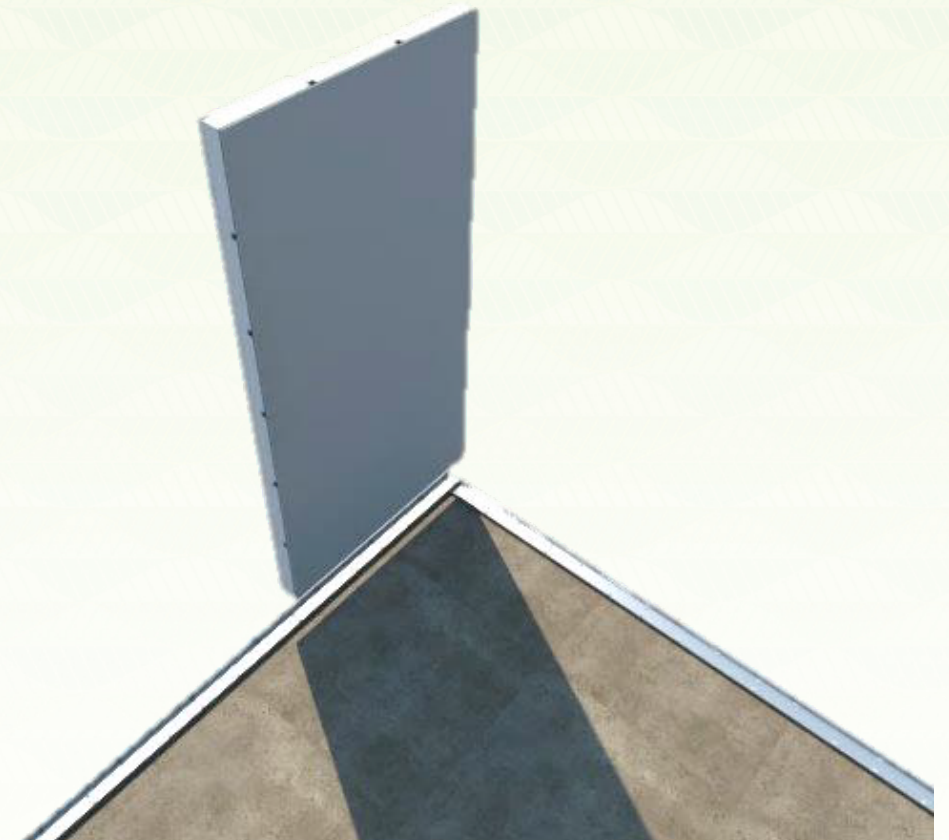
Installation Manual

Final runner installation in foundation



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Positioning the first panel



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Installation Manual

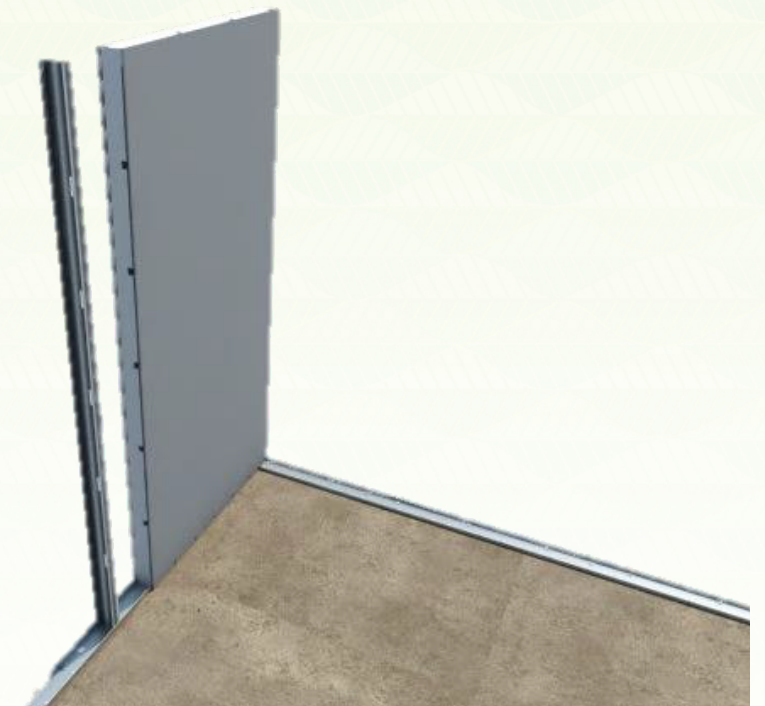
Fixing Thermorock Panel

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Post H placement

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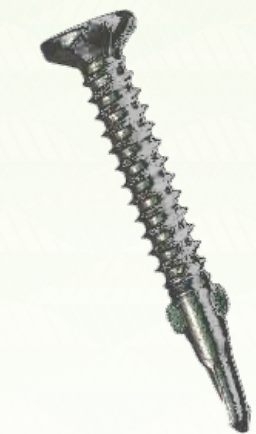


Installation Manual

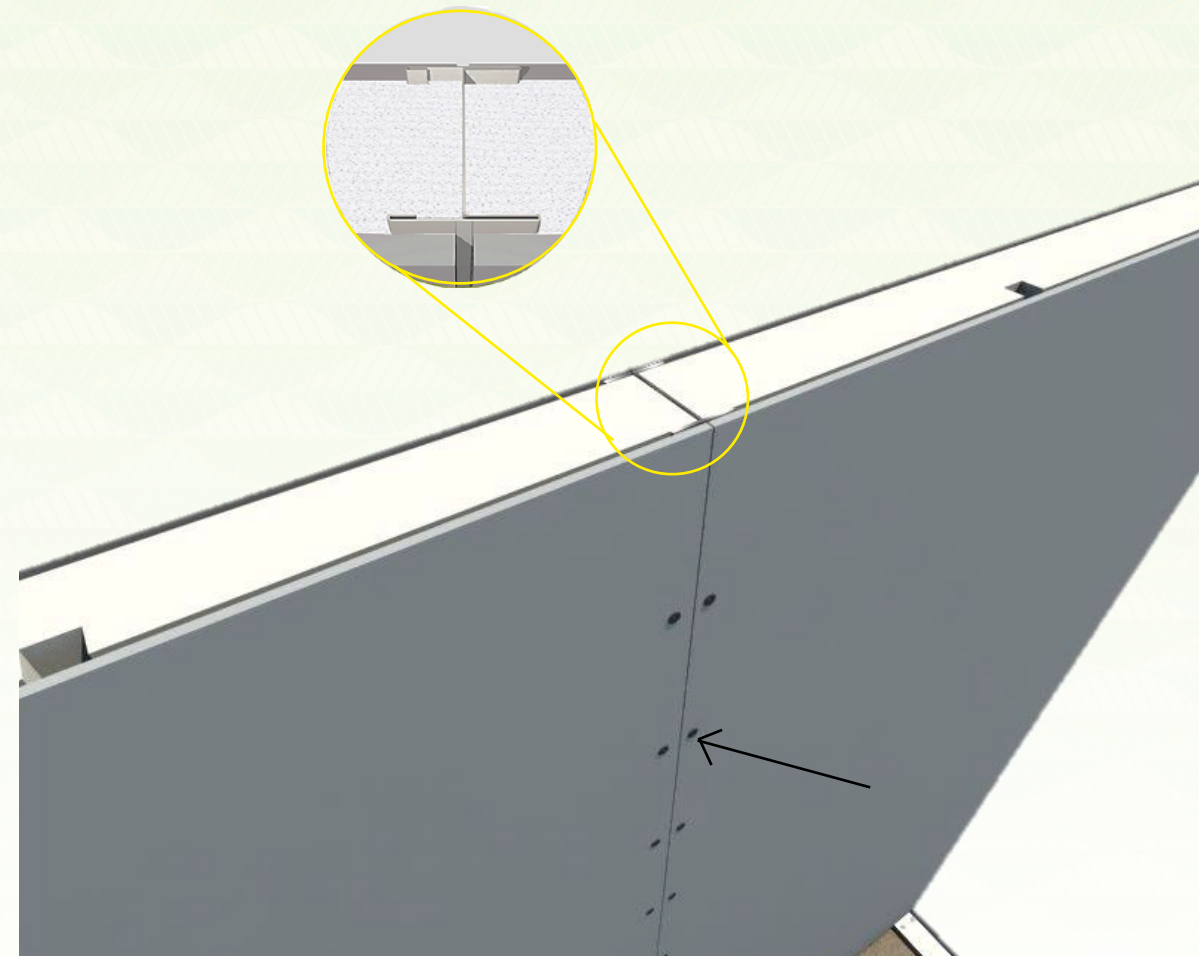
Linear assembly panels

Usage of post H

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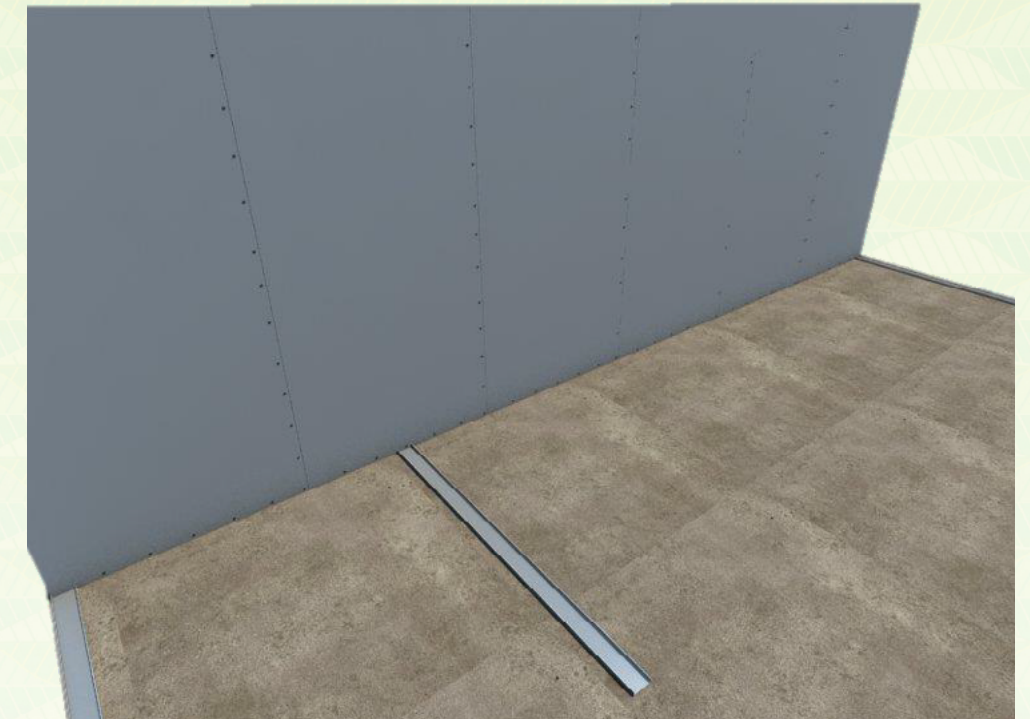
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Installation Manual

Continuity walls

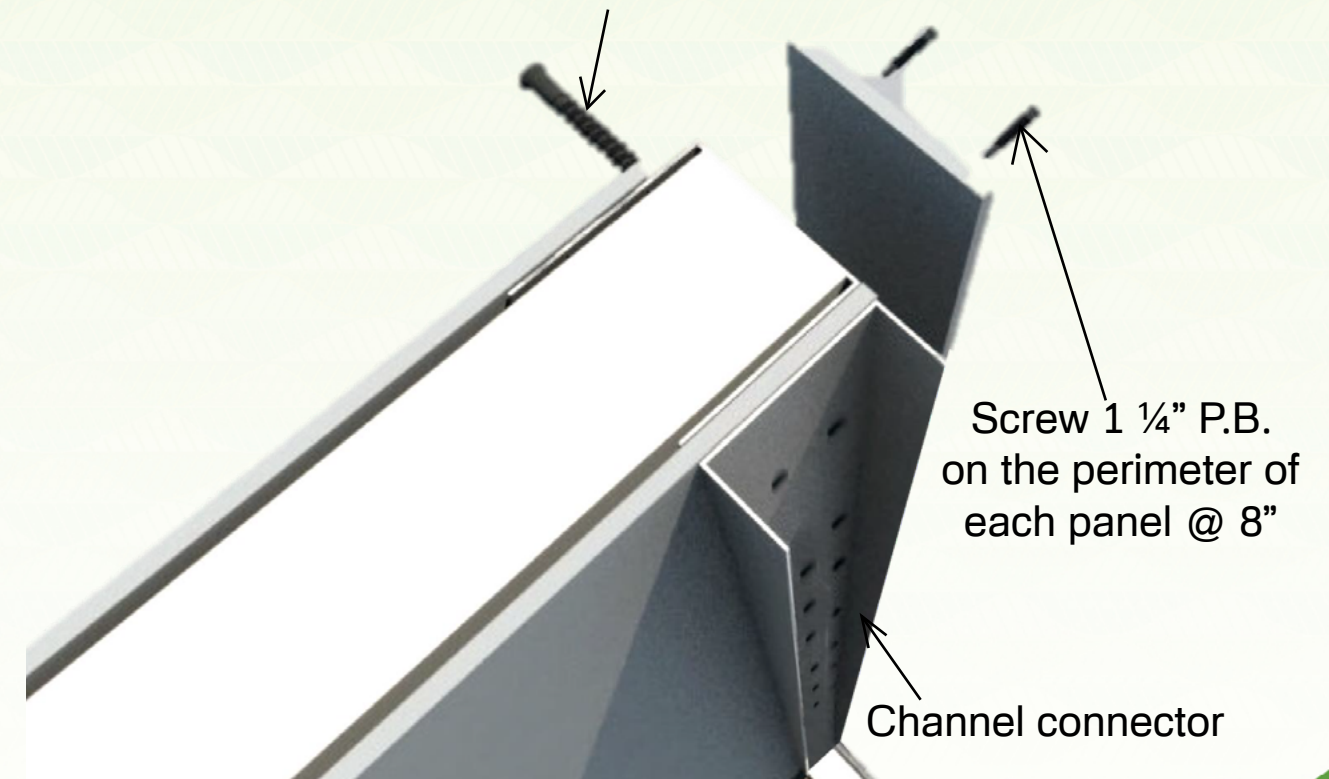
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Flat head screw 5"

Connector detail channel

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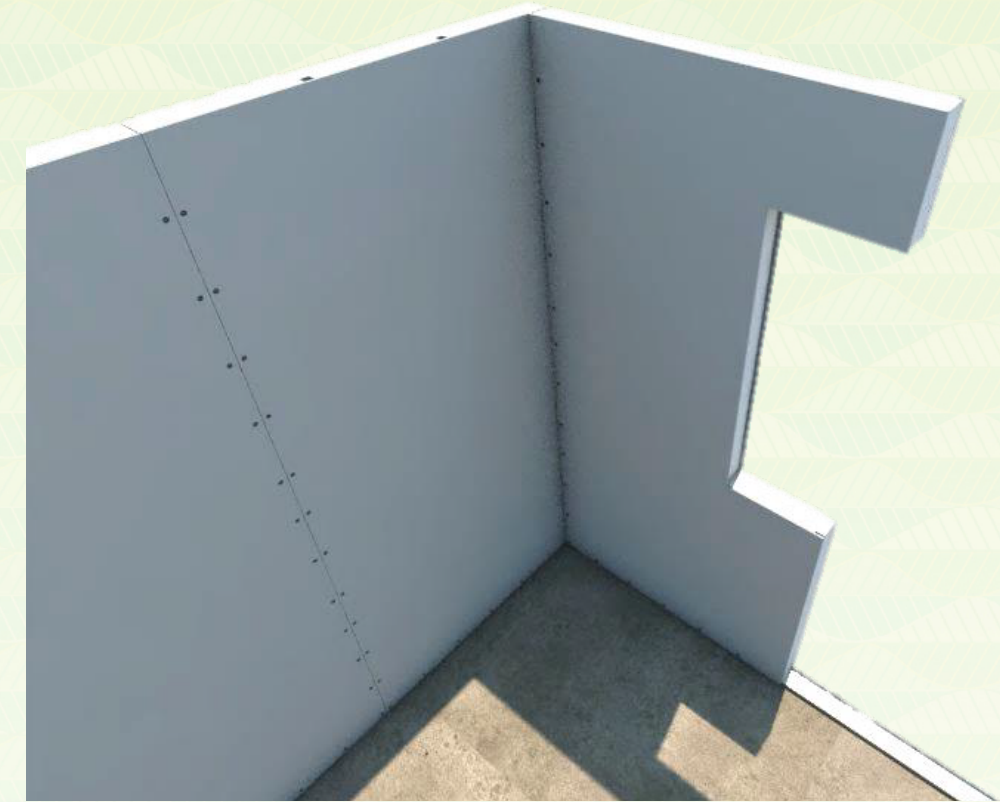
Screw 1 1/4" P.B.
on the perimeter of
each panel @ 8"

Channel connector

Installation Manual

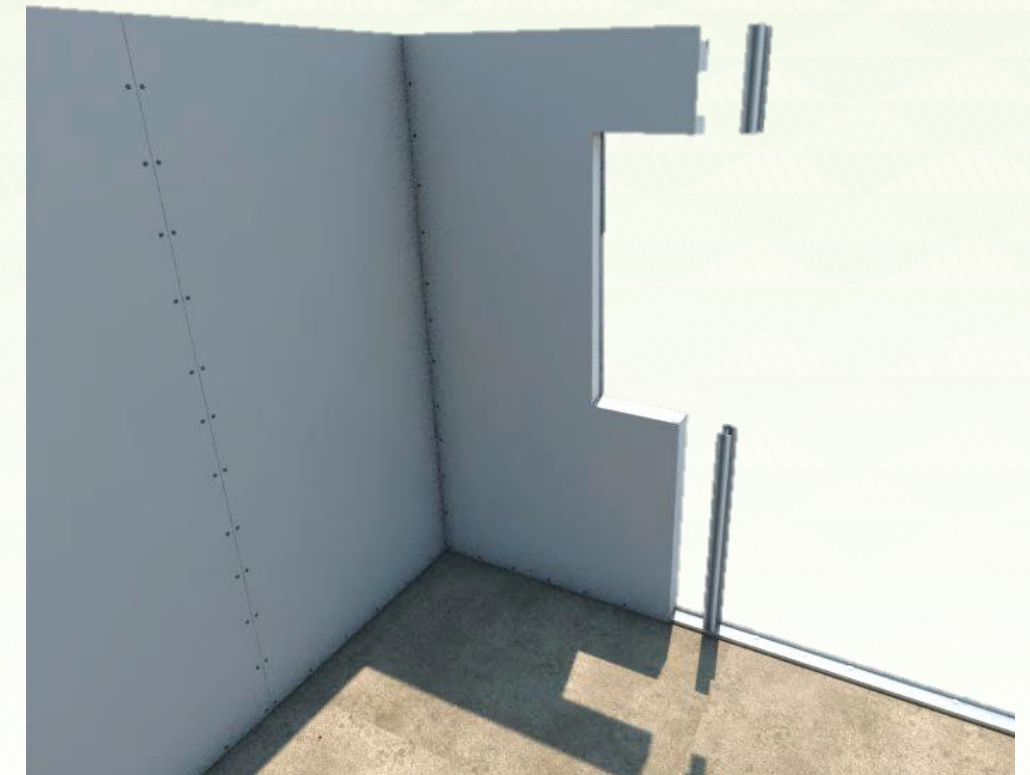
Extreme cutting and post H window

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Pole attachment H, clear window

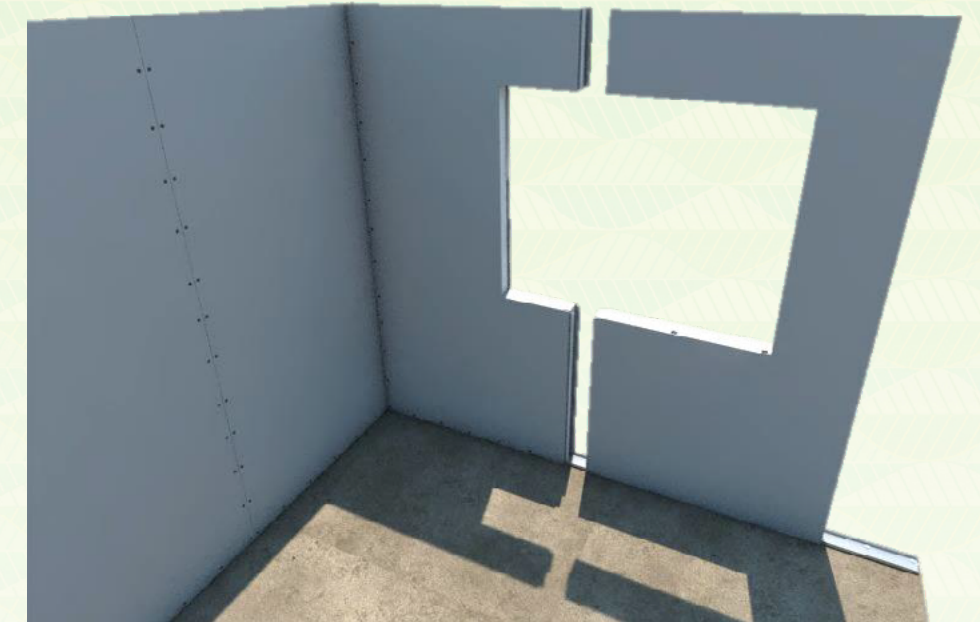
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Binding on window panels

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Installing interior panels

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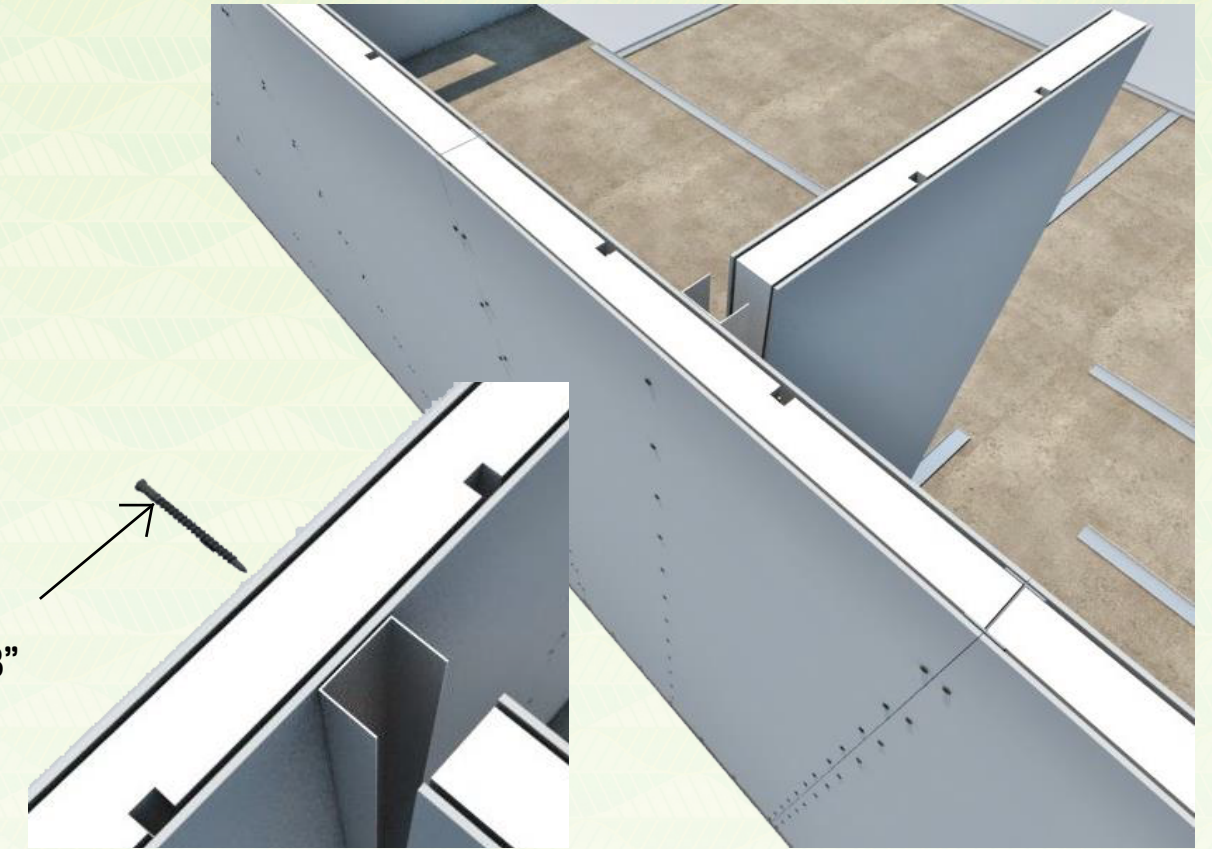


Installation Manual

Installing Interior panels

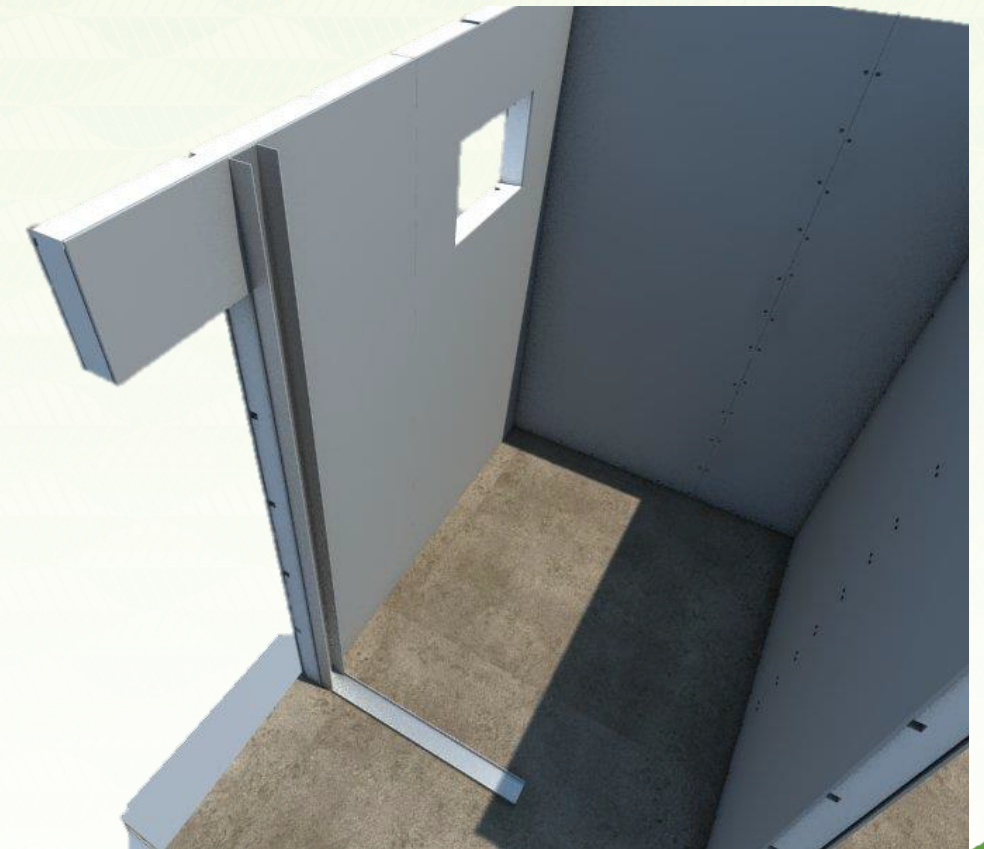
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Fixing with fine
point screw @ 8"



Thumbnail central wall connector channel

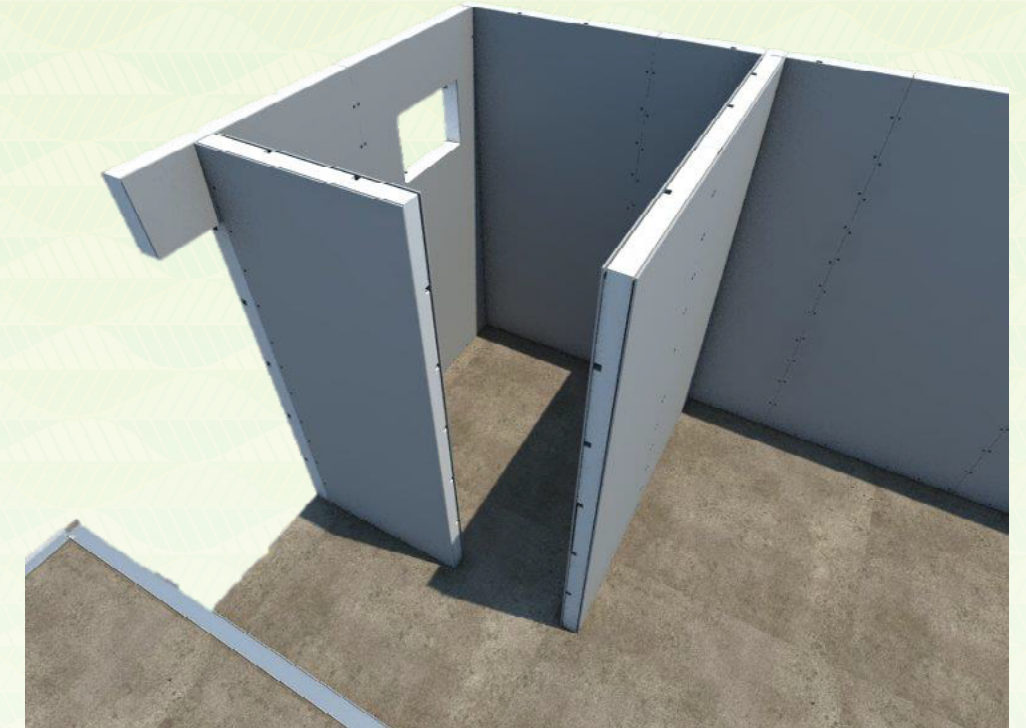
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Installation Manual

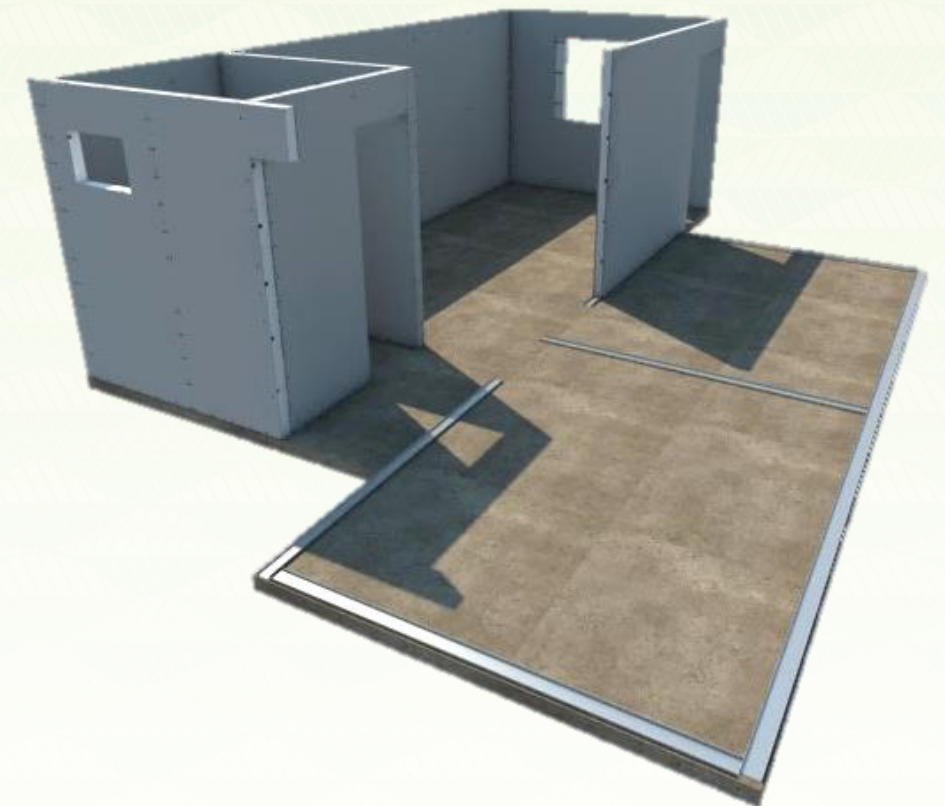
Interior panels

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Interior walls

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Installation Manual

Detail of central wall connector channel



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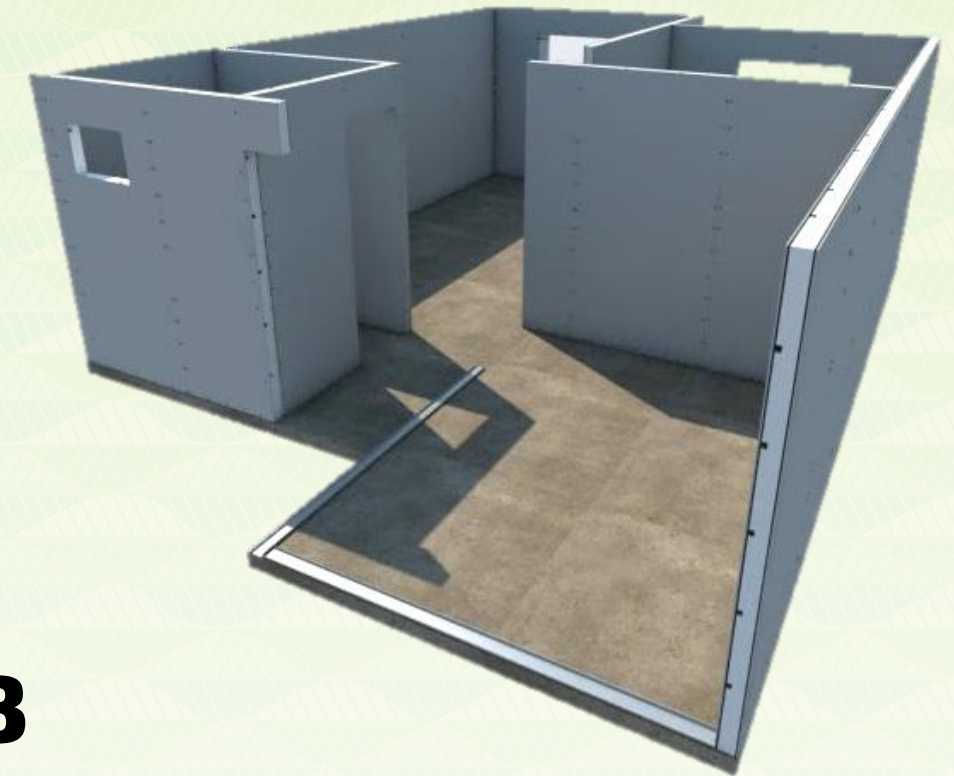
Installing antetecho panel



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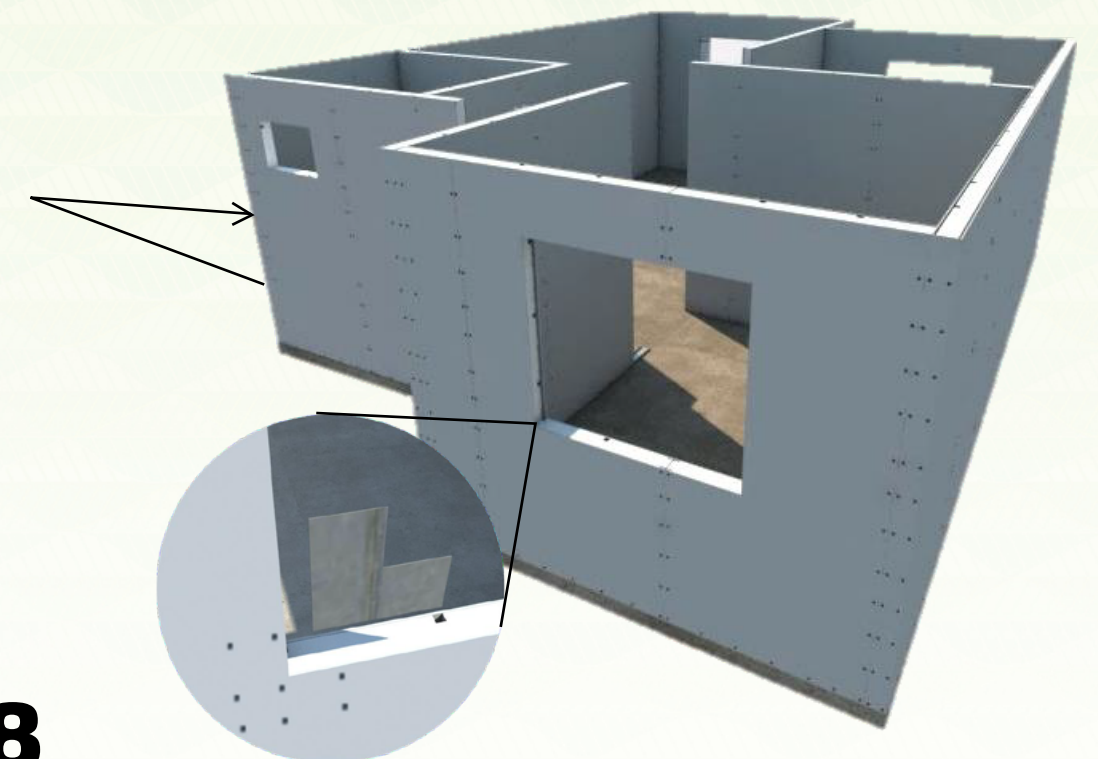
Installation Manual

Repeat interior panel installation



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Perimetral canal installation in channels

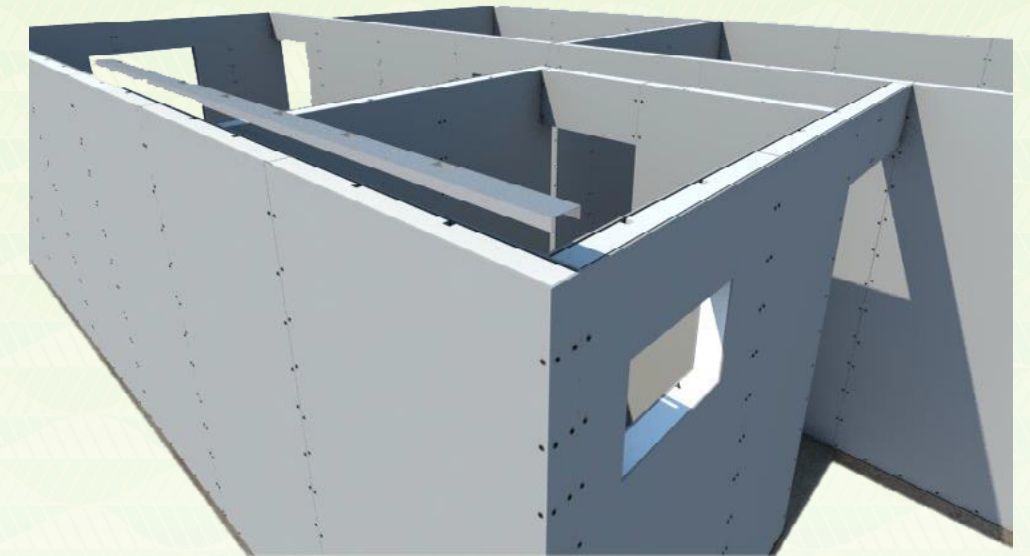


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Installation Manual

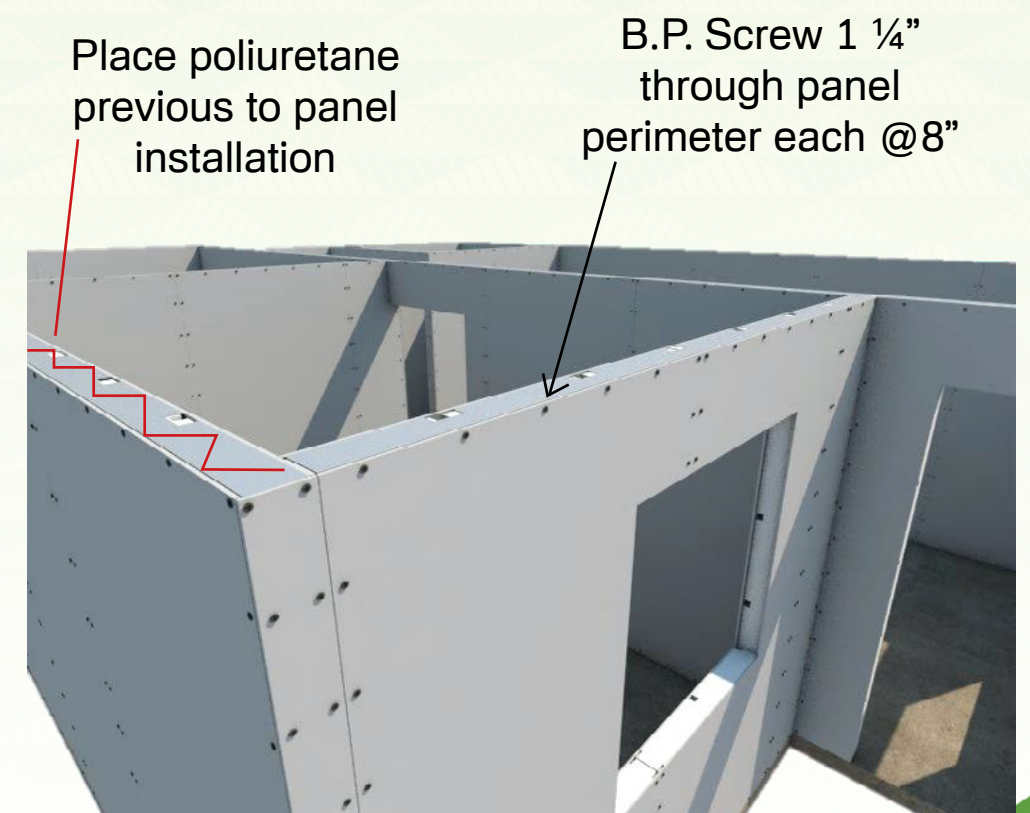
Perimetral canal installation in channels

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Perimetral canal installation in channels

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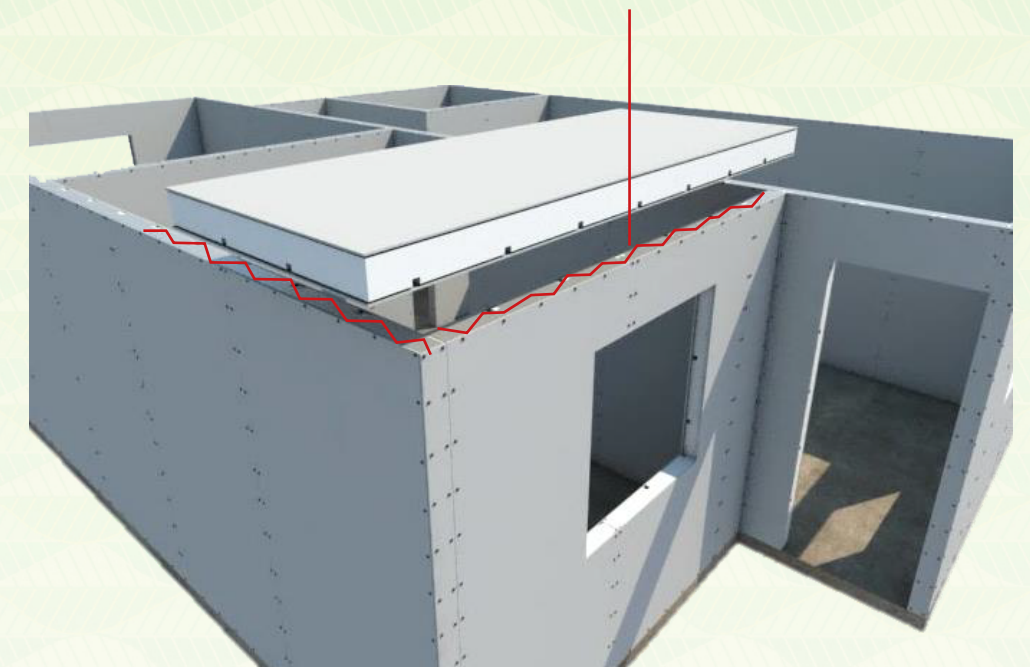
Place poliuretane
previous to panel
installation

B.P. Screw 1 ¼"
through panel
perimeter each @8"

Installation Manual

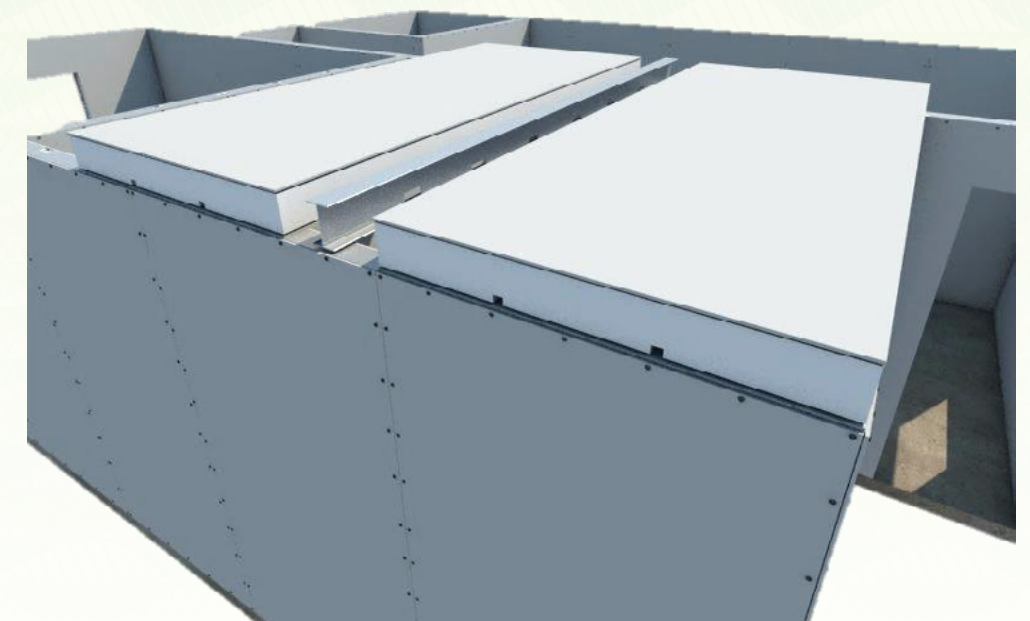
Installation of cover

Place poliurethane between panels



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Installing H post on deck

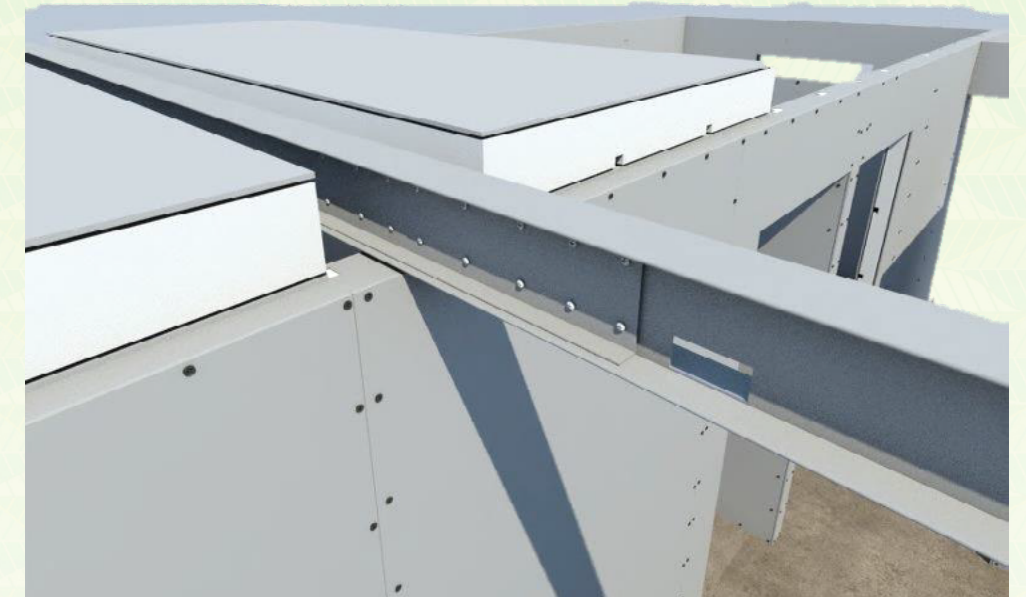


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Installation Manual

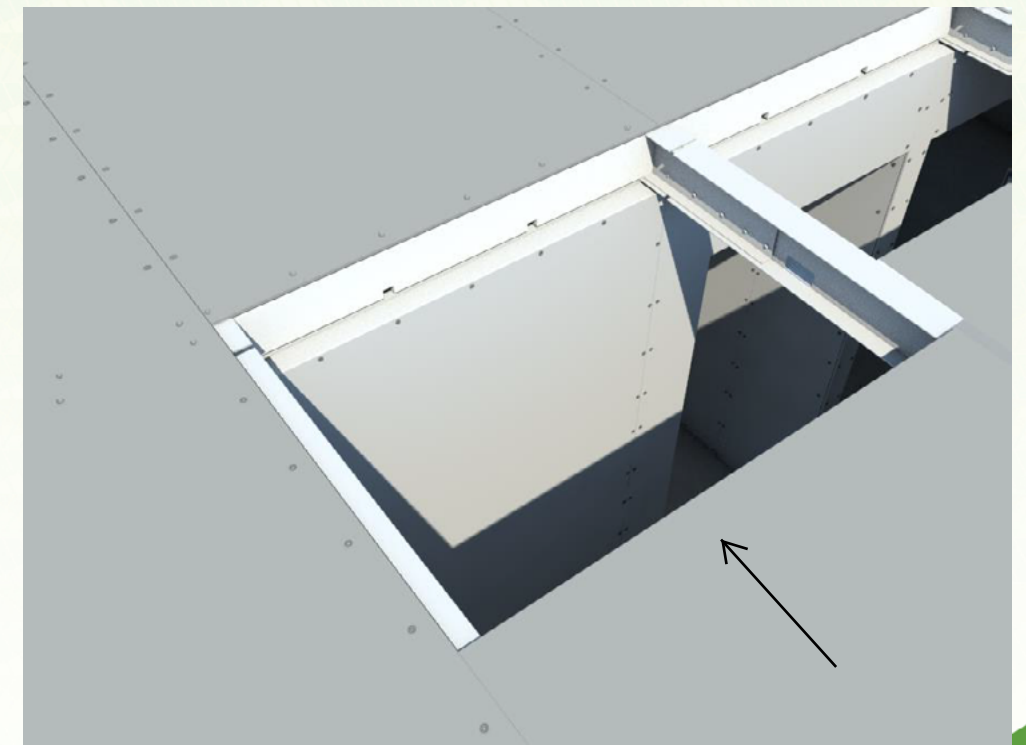
Detail of the installation of H post on deck

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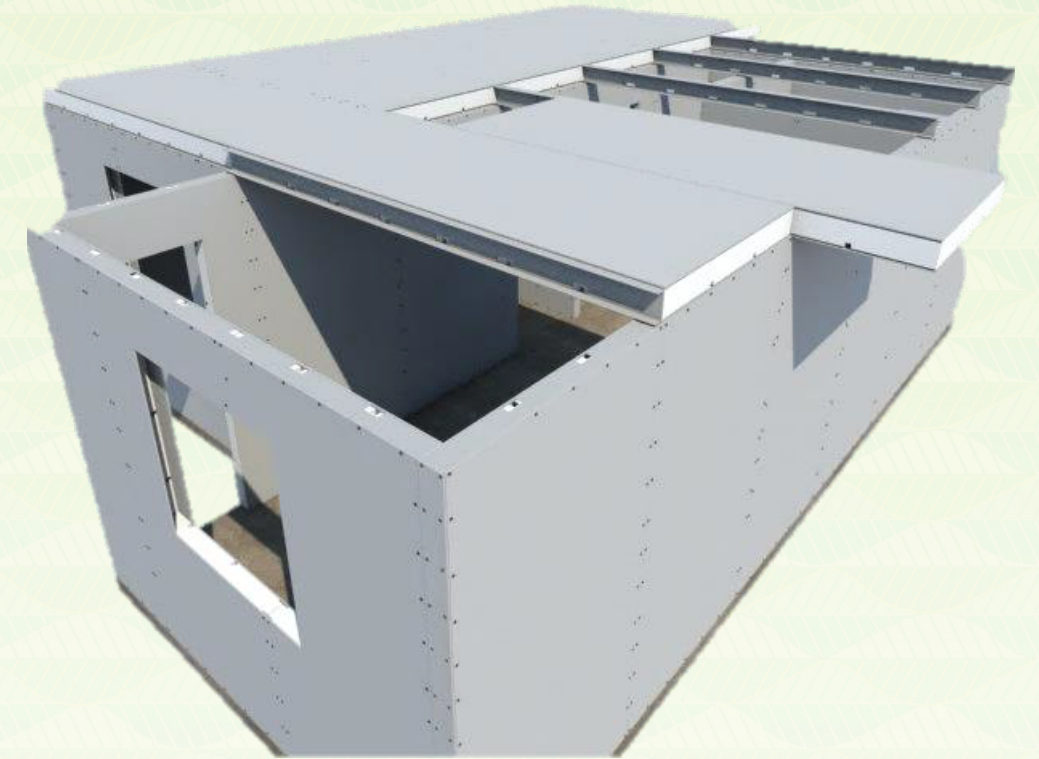
Installing H post in transversal way

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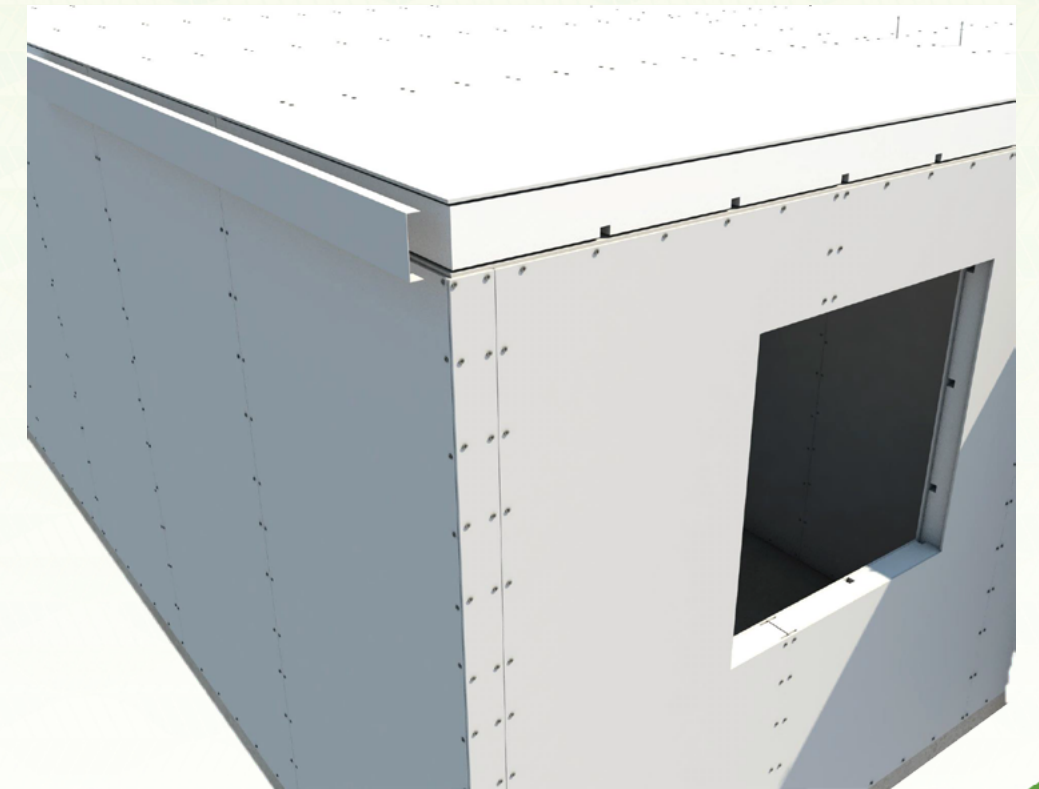
Installation Manual

Repeating process of deck installation



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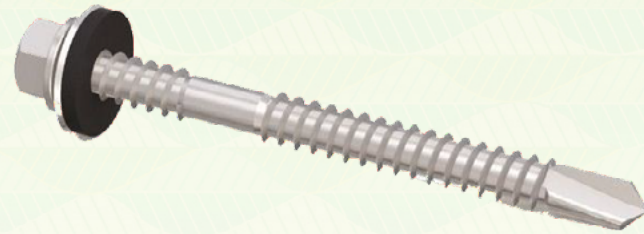
Details of installation of H Post in Deck



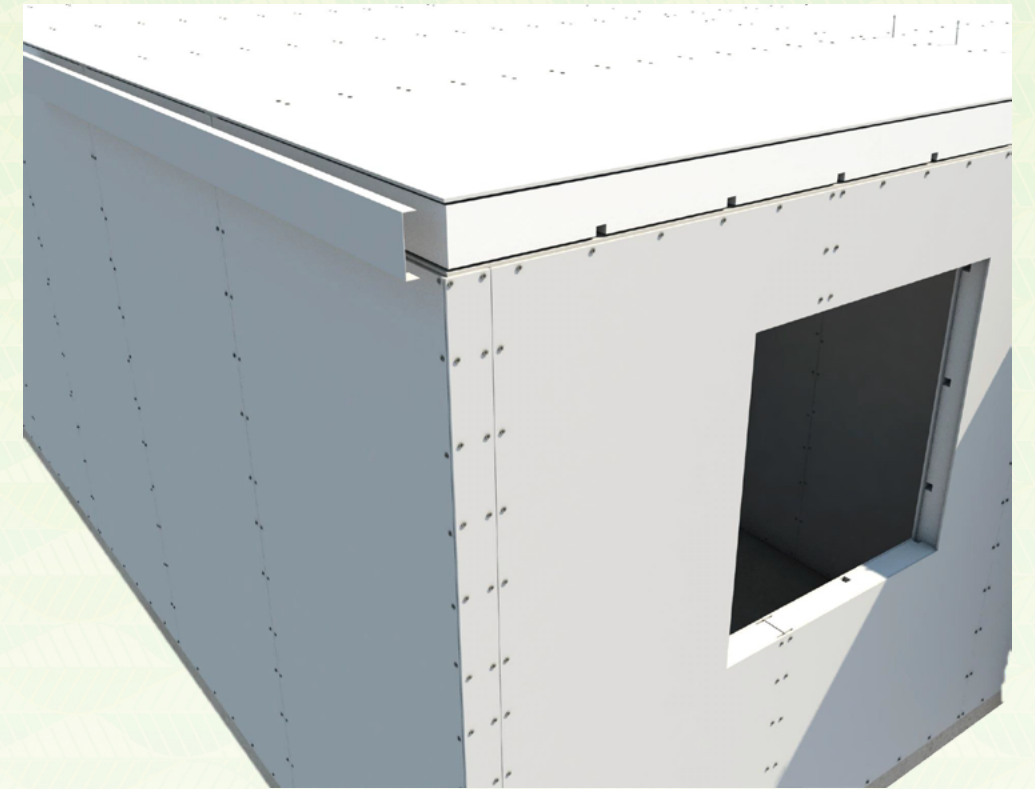
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Deck anchors

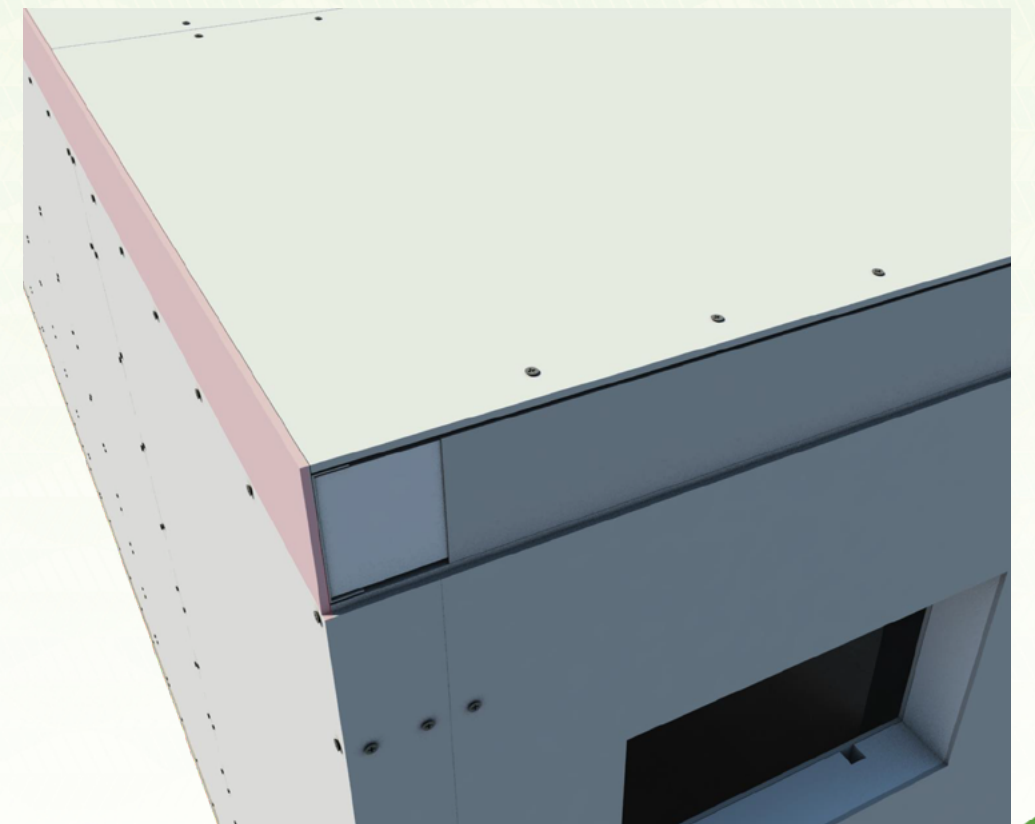


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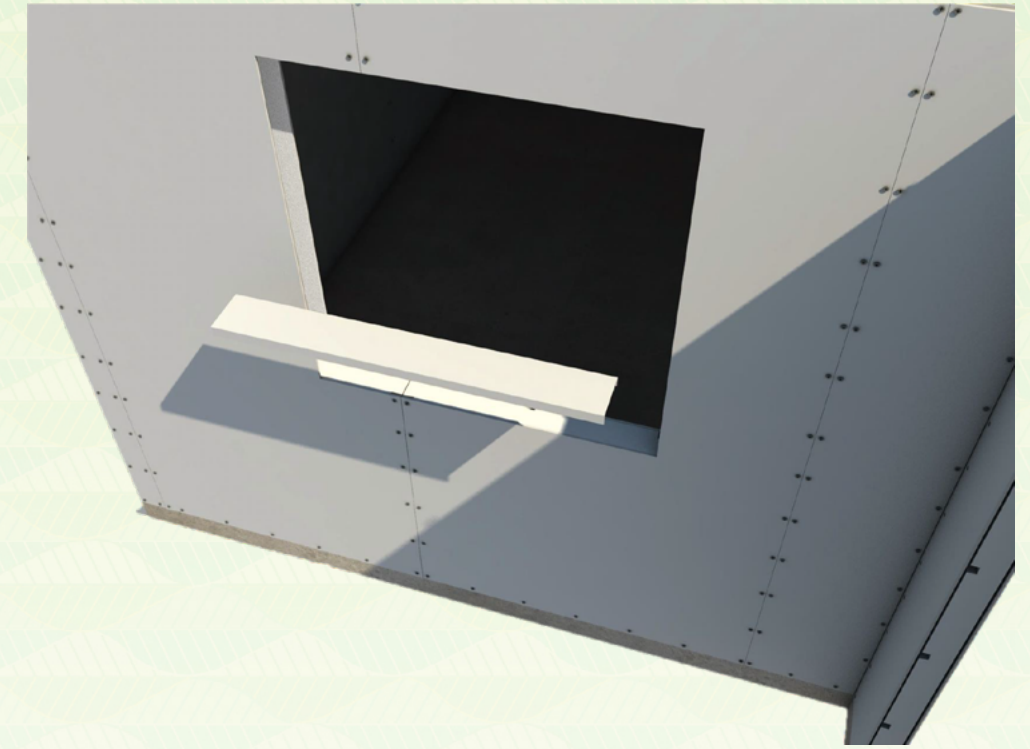
Details of installing fibercement in deck

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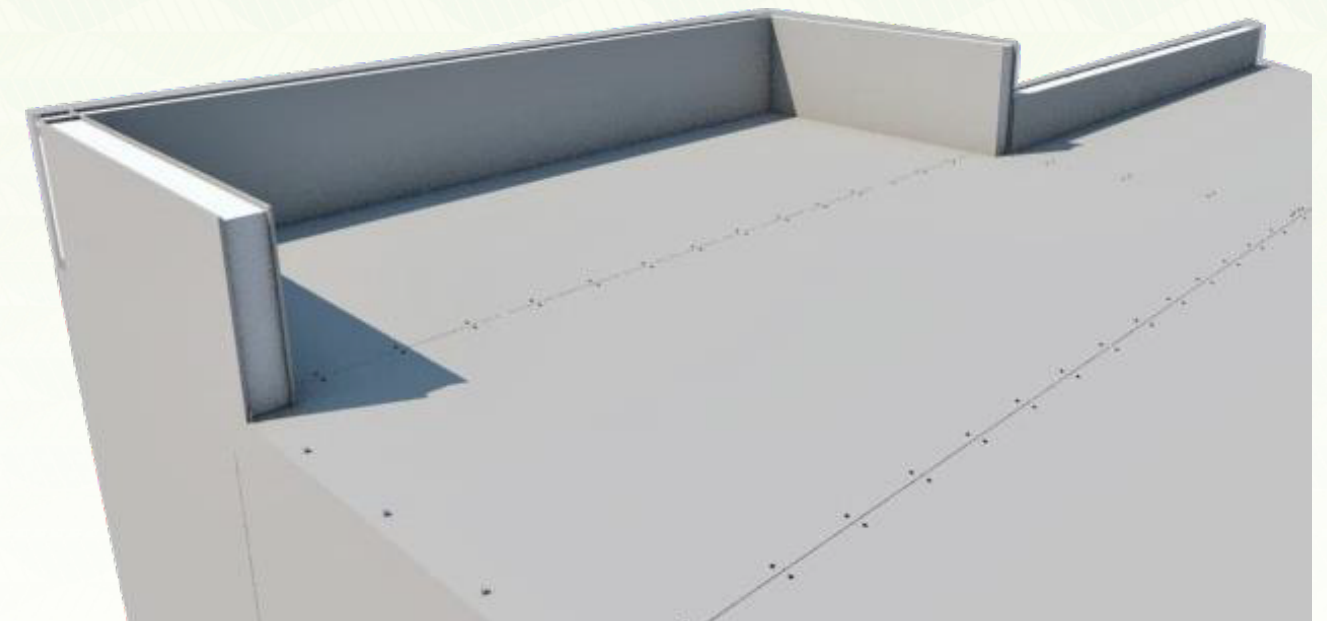
Installation Manual

Channel installation and covers singing in
vain



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Placing funnel

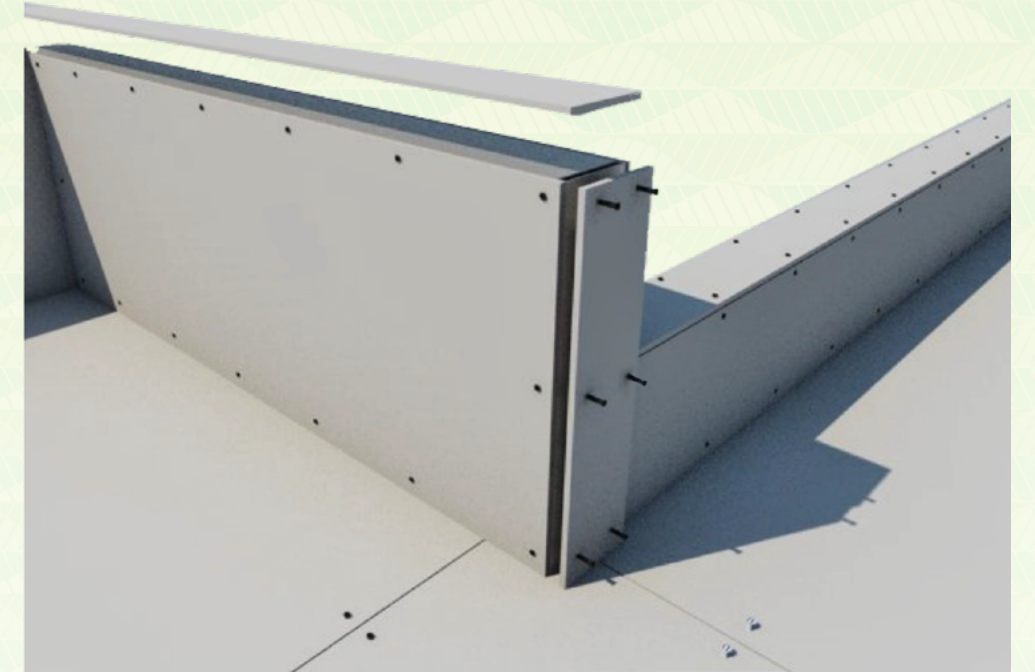


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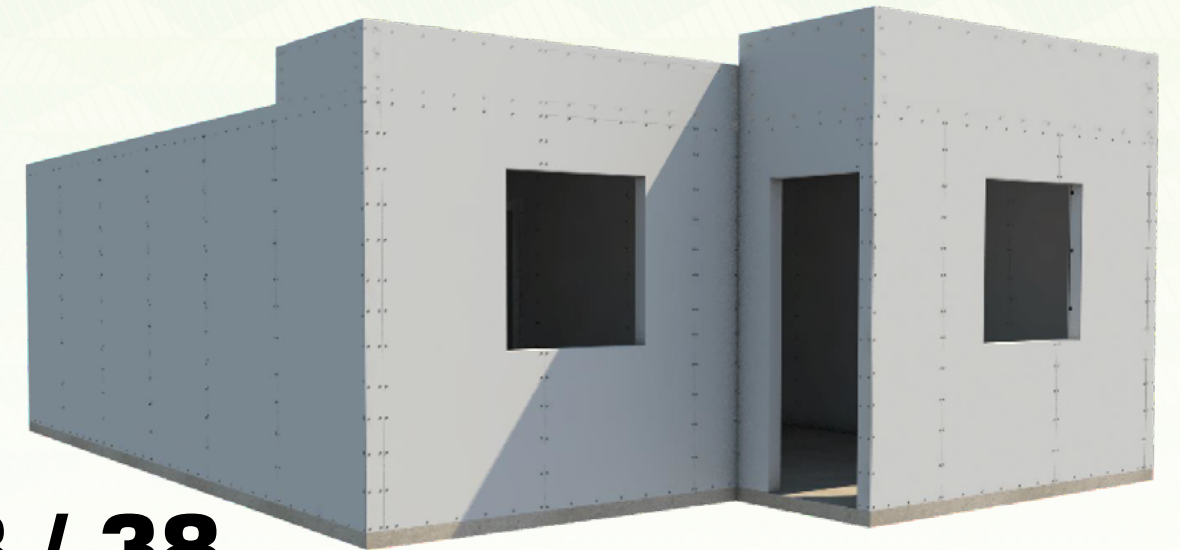
Details of funnel placing

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Details of H post installation on deck

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THERMOROCK finishes

Exterior walls with apparent or beveled panel boards



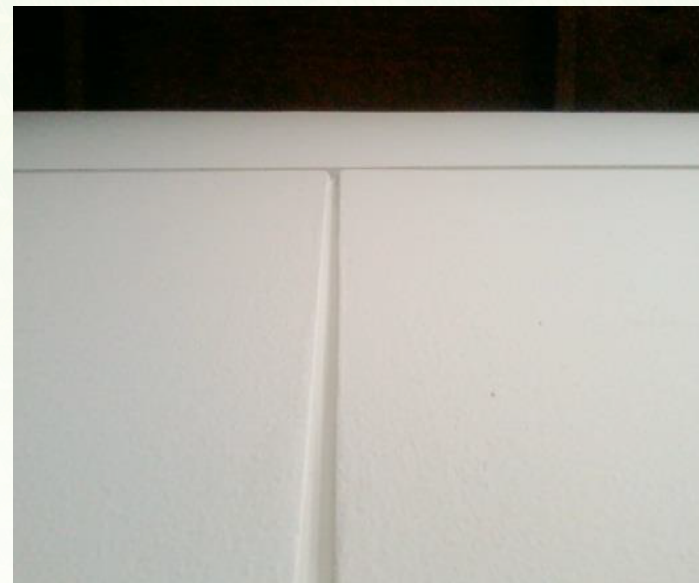
Apparent sealed joints



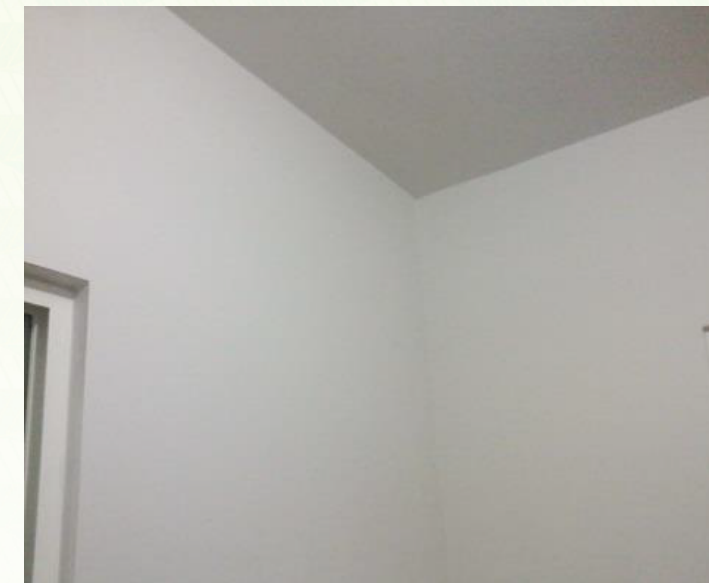
Biselated joints



Latilla



Apparent sealing



Smooth flattened

Sustainable alternative

PANEL THERMOROCK : AN ALTERNATIVE FOR SUSTAINABLE CONSTRUCTION

Background

Sustainable construction , efficient use of resources and materials , renewable energy and green building design issues that we are already playing , in addition to research being developed by universities and private institutions.

The sector of the construction industry in all areas hits greatly due to the large number of inputs used and variability of this environment and the environment, either by extraction of raw materials, transformation of these to get the product end.

And during the construction of buildings and throughout its life, we are therefore faced with a complex process in which multiple actors to achieve a real improvement in the efficient use of the constructions .

The construction of housing and buildings whether commercial or industrial will have a great impact on the planet and some global data are:

60% of the material extracted from the lithosphere, are destined for construction.

50% of CO₂ emissions emitted into the atmosphere originates from the construction and use of buildings.

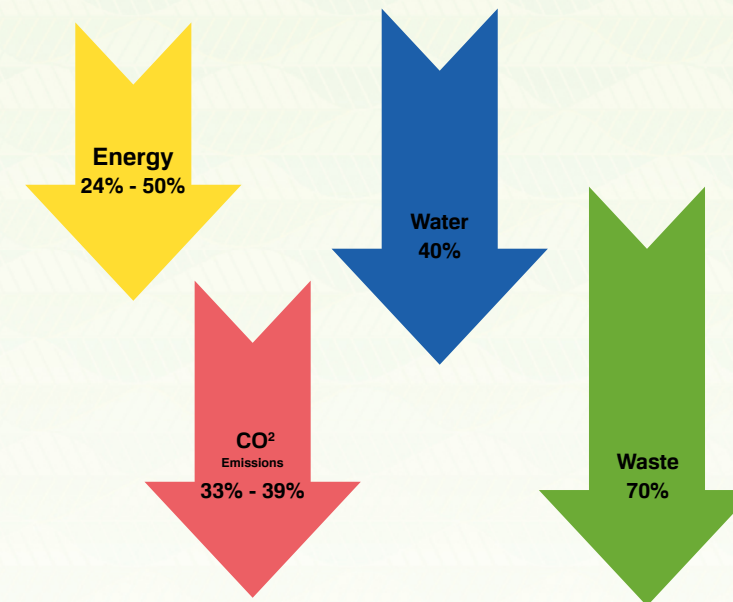
40% of the primary energy consumed worldwide aim buildings.

75% of the electricity goes to buildings and housing.

20% of freshwater is consumed in the use of buildings.

60% of solid waste is produced in the construction and demolition of buildings 1.3 tons per person / year.

So building contributes greatly to the major environmental problems of today, such as global warming, depletion of natural resources, air pollution, among others. If we do not start designing buildings or structures in general these can cause direct health effects.



PERCENTAGE OF CONSUMPTION IN BUILDINGS:

Actually this is not an issue that can only raise construction professionals because not all decisions of the construction process , nor the most important , are decided by technicians, or for strictly technical reasons.

Of course the technicians responsible for the construction of buildings and other structures have much to say and do and we must anticipate change , but the role of the developer and user demands are key contributors in the development and the speed of this exchange .

Sustainable construction is more than a few solar panels on the roof , a few more inches in thermal insulation or the use of a painting without solvents or that aspect of the buildings have cabins.

THERMOROCK: Lecture

Is having first a comprehensive design approach that incorporates not only environmental, but also aesthetics, functionality, health, comfort, flexibility, social and economic aspects among many points.

Only if from the initial phase of the project aspects of sustainability are incorporated, you can get maximum benefit, reducing additional costs or even make economic constructions.

In this sense **THERMOROCK**® company the task of achieving lightweight materials research to build a panel of fiber cement sheets with polystyrene core with structural capacity occurred.



T H E R M O R O C K **structural panels:**

The **THERMOROCK**® panel is a concept of lightweight material, which conforms to the needs of sustainable construction required today.

Thermorock® components are easily assembled panel and structuring for traditional housing projects, commercial and industrial developments, provides a smooth surface for interior and exterior finishes, saving time in the process of building and optimizing delivery times.

It also offers thermal comfort due to polystyrene core being handled to the needs of the project density, fiber cement sheets are made with 95% recycled fibers mixed with Portland cement rendering it resistant to impact, gravity loads, resistance interperismo and fire.

Analyze the factors that contribute to environmental degradation, the panel Thermorock® achieves many advantages over materials and construction systems as we have:

Energies due to the ability to maintain pleasant ambient climates decreases energy use helping having nice weather and environments for users.

CO₂ emissions due to the type of thermal material in nature using weather teams is reduced significantly.

Water, in the construction process uses no water, so that the percentage of environmental damage in this area is 0%.

Solid waste, because you can minimize the stroke from project no waste materials in the construction

Panel measurements

- 1.22m x 2.44m
- 1.22m x 3.05m
- 1.22m x 3.66m

The panel is resistant to weathering, insect attack, heat and humidity has warmth of wood and allows any type of water-based acrylic paint quality to generate an infinite number of effects.

process, taking savings cleaning, plus the Thermorock® system is modular and this can be recovered in its entirety when you move one place to another.

Description:

Thermorock® The panel consists of two concrete slabs manufactured with the most advanced technology, based on Portland cement, natural fibers and selected after being subjected to autoclaving processes acquire their properties additives. This formulation allows for such a versatile product that can be worked easily and at the same time offering the virtues of cement.



THERMOROCK: Lecture

Applications:

According to its thickness and structural analysis
Can be used in:

- Load-bearing walls
- Or exterior facades
- Interior walls and partitions
- Perimeter walls in industry
- Construction in wet areas
- Ceiling
- trimmings
- covers
- mezzanines
- skirts



Features:

Humedad
Fuego
Ambientes salinos
Roedores y termitas
Esfuerzos
Agentes químicos
Ruido y calor
Al paso del tiempo
Impermeabilidad

Incombustibilidad
Anticorrosivos
Inmunidad
Resistencia a la flexión
Larga vida
Aislamiento
confortable
Garantía por 50 años

Benefits:

Textura
Acabados
Trabajabilidad
Flexibilidad
Económico
Lisa y textura en
madera

De gran versatilidad
Adaptable a todos los
sistemas
Opciones de diseño
Facilidad de instalación

Technical specs

Fiber cement board have the following specifications:

Parámetro	Valor	Tolerancia	Método de prueba
Espesor		± 10%	ASTM-C-1186
Absorción de agua	≤ 35%	± 10%	
Densidad ambiente promedio	1,25 kg/dm ³		
Resistencia a cargas axiales placa de 8 mm esp total 11	8.6 tn/ml		ASTM-E72-1980
Resistencia a la flexión (ambiente) min.	Longitudinal 12 MPa Transversal 8 MPa		ASTM-C-1186
Resistencia a la flexión (Saturado) min.	Longitudinal 8,5 MPa Transversal 6 MPa		
Rectitud de esquinas		± 2,6 mm/m	
Escuadreo del producto		± 2,6 mm/m	
Encogimiento (Saturado a Seco)	≤ 2 mm/m		
Combustibilidad	Nula		ASTM-E-136
Indice de desarrollo de flama	0		ASTM-E-84
Número de generación de humo	0		
Conductividad térmica	0,264 W/mK	± 3%	ASTM-C-518

Of these we mention the fire-resistant, resistance to damage from abrasion, impact and transmission properties of sound depending on the arrangement of the panel, the thickness of the fiber cement and the presence or absence of a filler for sound absorption in cavity.

De la estructura metálica, el panel lo confinamos con canal de arrastre calibre 22 de acero galvanizado, y en la parte laterales con un perfil H del mismo material pero con calibres desde 20 hasta 14 dependiendo del proyecto estructural de la misma manera en la parte superior, fijado con tornillo con punta de broca.

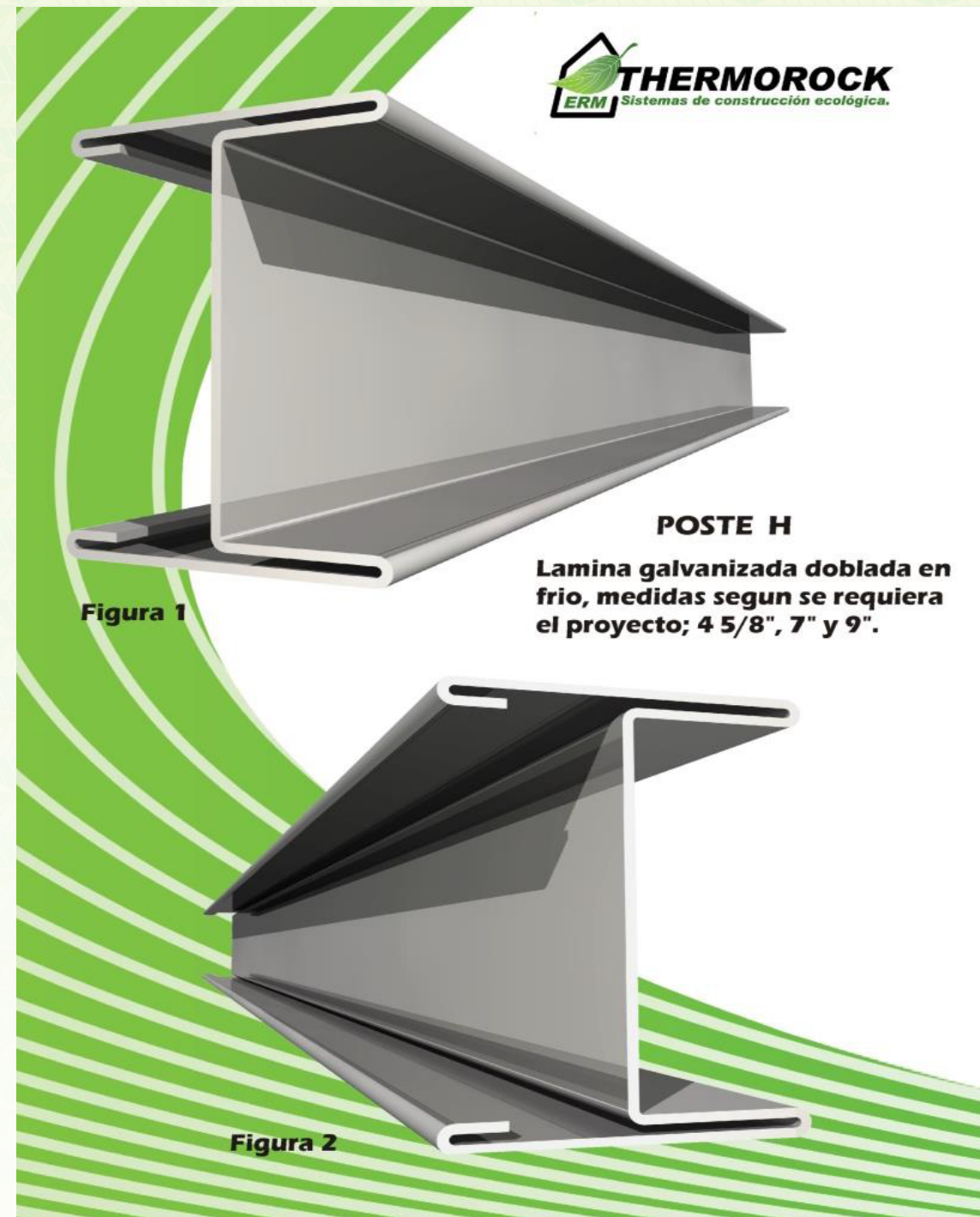
Del sistema de entrepiso el panel Thermorock® se utiliza con espesores totales desde 15 hasta 25 cms con perfil H de 15, 20 y 25 cms de acuerdo al proyecto estructura. Teniéndose capacidades desde 450 kg/m², hasta los 850 kg/m² según el proyecto estructural.

Technical specs

The following table shows the axial load design t_n / ml that supports being the most recommended for the traditional housing 8mm 11 for walls with load capacity of 8.6 tons / ml panel.

Because being a light weight material 40 kg/ m², review panels together and separately, this system supports structural seismic forces obtained from the Building Regulations Baja-92-04 and NTCDF Manual of Civil Works CFE-08.

Carga Tn / ml	6	7	8	9	10	11
Altura						
Altura						
Altura						
Altura						



Sustainable construction

In this presentation we have tried to give the benefits of panel Thermorock® : An alternative for sustainable construction , describing the characteristics of both materials being friendly to the environment as their construction helping to mitigate the deterioration process .

We discuss the benefits of having the panel. Both the process of inputs with which it is made and the process of construction where the environmental impact is less than traditional systems , saving tempos in this process to a third party.

The advantages of this type of sustainable building panels are manifold. First are reducing environmental costs, social and health . You can also reduce costs and operational risks (energía!) and maintenance of the building, and on the other hand, increasing the value of the property and the rental or sale prices due to increased valuation of owners and users .

A sustainable building even can substantially improve worker productivity addition to the characteristics of being a friendly material environment .

Of course there are other issues as water conservation , reuse of gray or black water and the use of rainwater is also an increasingly important issue due to the

growing shortage of fresh water on the planet .

The effects on the health of building occupants need to be carefully avoiding the use of materials made with toxic elements , such as asbestos.

There are also agencies that certify sustainable buildings , creating clear criteria on the level of sustainability of a building and enable comparisons between different buildings , some countries were developed assessment instruments (building assessment tools) as LEED (U.S.) GreenCalc (Netherlands) and GBTool (international).

These instruments can also serve as a tool for decision making during design and use of materials like Thermorock® panel , we know that there are great challenges for environmental improvement .

Creating sustainable technology systems is part of the work of the company do Thermorock® efficient use of our building system causing it to reach all levels of society, and for all types of residential, tourist , commercial and industrial buildings .

Conclusions and recommendations:

Currently conducted studies and material testing for continuous improvement Thermorock® panel and its fittings .

Tests ability to vertical and lateral loads for the various panel presentations, to have complete design guidelines , the scope of the Structural Engineers and the same way the benefits of this structural system as a terminal building for architectural projects all professionals construction .

Use systems as shown by us in the construction process markedly help the quality of life of users and the surrounding environment , reducing costs in this type of materials vs. traditional construction systems is subject to pay attention builders and users using the same systems as the Thermorock® panel

The work of the company Thermorock® is fascinating because we have a very fertile field work.

References

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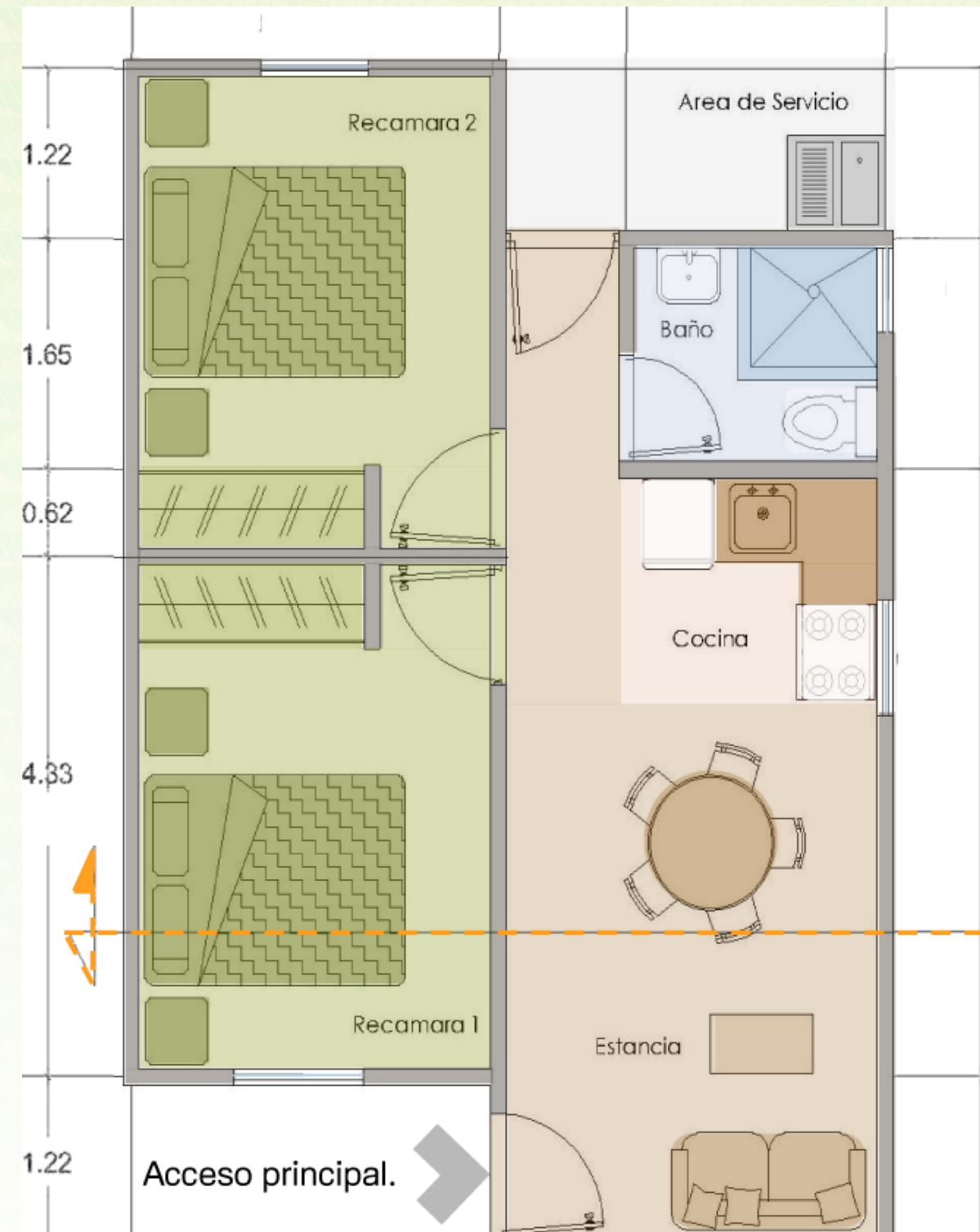
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C.V.: Cesar Ulises López Torres. Ingeniero Civil. Egresado del Instituto Tecnológico de Tijuana (ITT) 1988, obtuvo grado de Maestro en Ciencias en Ingeniería de la Construcción en 2010, del mismo ITT, ha realizado trabajos de Ingeniería Estructural para varias empresas de Tijuana, Consultor de Ingeniería Estructural para desarrolladores de vivienda y construcción de edificios habitacionales, escolares y comerciales, proyectos e investigación de Ingeniería Geotécnica en varios estados del país. Es Profesor desde 1996 de materias de Ingeniería Estructural, Ingeniería Geotécnica e Ingeniería Sustentable en el Instituto Tecnológico de Tijuana.

Living Model Brisa

44 m² Housing Model



Residential sector



Mining Sector



Industrial Sector



Vertical Construction





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