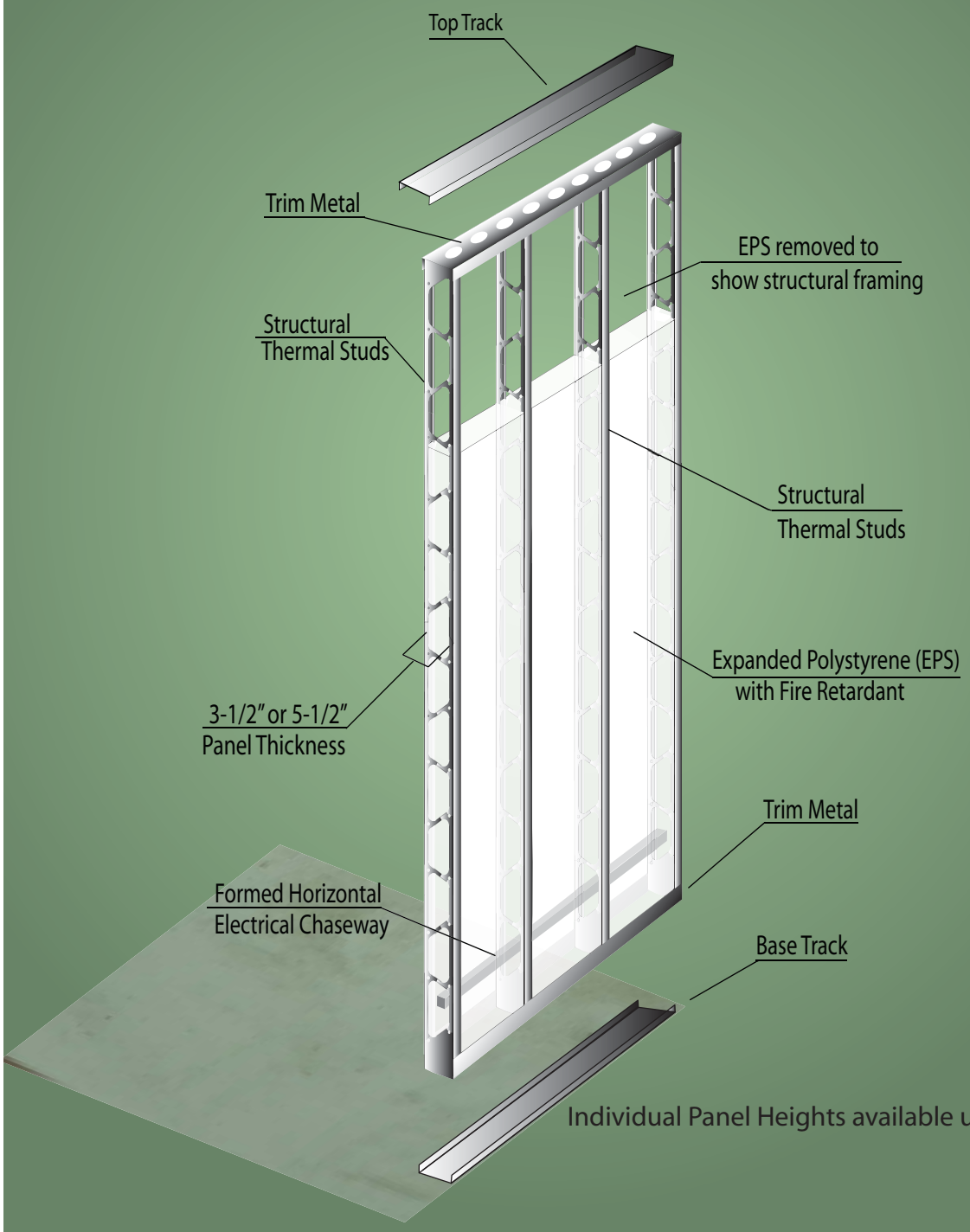
UltraFrame

Understanding the Art of UltraFrame Structural Insulated Panels



Individual Panel Heights available up to 12′

TRANSCON STEEL

FRAMING THE FUTURE

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Ultra Frame
Structural Insulated Panels

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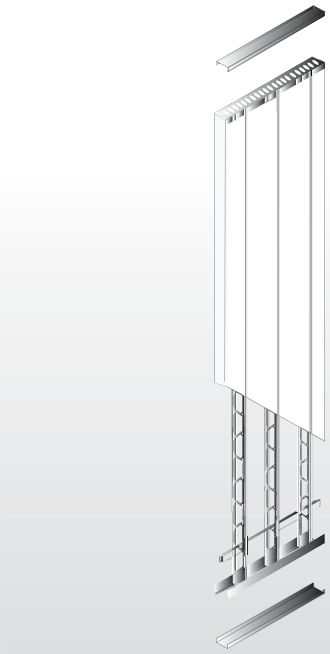


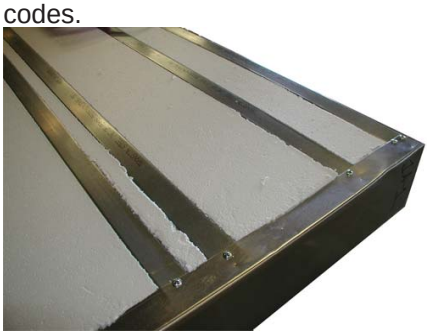
The System

Ultra Frame is a structurally insulated metal stud panel. It is comprised of modified expanded polystyrene (EPS) and thermal structural metal studs. Transcon Steel created the Ultra Frame insulated structural panel after completing ten years of alternative building material system analysis. Engineers, architects, builders, tradesmen, and inspectors were instrumental in the overall design of Ultra Frame. Below are the major criteria used to evaluate and determine the best products to comprise the Ultra Frame system. Transcon Steel is excited to manufacture and bring this remarkable system to market so that we all can begin "Framing the Future".

- **Insulation**
- **Stud**
- **Configuration**
- **Assembly**
- **Engineering**
- **Environment**
- **Longevity**
- **Cost**

Insulation

Transcon Steel experimented with Fiberglass, Cellulose, Icynene, Urethane, and Expanded Polystyrene (EPS) insulation systems. Measuring the R-Values, mold and water resistance, long-term performance, cost, and environmental impact, Transcon Steel determined that EPS was the best solution for the insulation system of Ultra Frame. Expanded Polystyrene is a closed-cell, lightweight, rigid plastic foam. The modified grade of EPS that Transcon Steel has selected contains a fire retardant to decrease the potential of fire spread from a small flame source. The grade of bead has been designed to meet domestic and international building codes.



Expanded Polystyrene (EPS)

Type	R-Value per Inch	Capacity to Recycle	Resistance to Mold	Resistance to Water
Expanded Polystyrene	4.5	Yes	Yes	Yes
Fiberglass	2.1-3.3	No	No	No
Cellulose	3	Yes	No	No
Icynene	4.5	No	Yes	Yes
Urethane	5.0-8.0	No	Yes	Yes

Outstanding Properties

- Excellent mechanical Properties - EPS provides resistance in compression and a capacity for dampening shocks caused by seismic and hurricane force winds.
- Insensitivity to water - EPS will not warp, twist, rot, delaminate, or break down.
- Capacity to Recycle - The very nature of polystyrene as a thermoplastic allows it to be continuously melted and reformed making EPS a highly recyclable product.
- Biodegradability - EPS will not biodegrade allowing a building to perform with the benefits of solid mass insulation indefinitely.
- Inorganic - EPS contains no food value for termites, ants, or other insects. Mold is also not attracted to EPS.
- Waste to Energy - Expanded polystyrene, when converted in state-of-the-art incineration systems, will yield 17,000 to 18,000 BTU of energy per pound, which is more than coal. Expanded polystyrene consists solely of hydrogen and carbon. Its complete combustion yields only carbon dioxide and water vapor. In fact, EPS may well be the cleanest inceneration source of energy.
- Contaminants - EPS contains no chlorofluorocarbons (CFC's), HCFC's, or Formaldehydes.

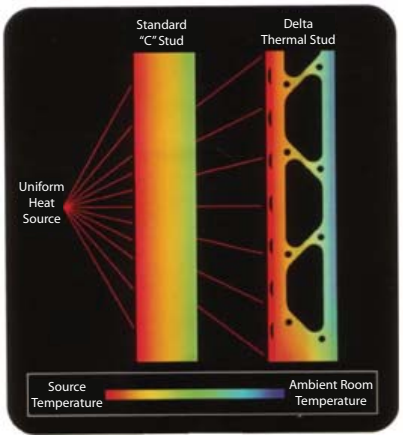
Understanding the Art of Ultra Frame

Stud

Transcon Steel experimented with various forms of metal stud framing and consulted globally with engineering and manufacturing firms to determine the best approach for creating a structural system that limited thermal bridging and removed the dependency of EPS as the primary structural element of Ultra Frame. Transcon Steel chose the Delta Stud metal framing system for its structural integrity, thermal performance, strength-to-weight ratio, and cost. The Delta Stud provided an additional benefit by being tested by Underwriter Laboratory (UL) as the only stud to surpass the one-hour fire rating with single layer 5/8" gypsum wallboard. The Delta Stud furthermore has been designed to meet domestic and international building codes.

Delta Stud Structural Thermal Performance

One of the most impressive advantages of the Delta Stud is unparalleled thermal efficiency. As shown by this color temperature chart, when subjected to the same exterior wall heat source, Delta Stud transfers much less heat to the interior wall side compared to the conventional "C" stud. The reason is simple: Delta Stud's large web openings reduce the path for heat transfer across the stud. Heat flow is confined to the slender ribs that cross the web.



In a typical 8 foot section, Delta Stud shows 75% less thermal transference than "C" studs. Encased in structural foam, the thermal and structural performance of through-wall metal stud framing is unmatched.

Delta Stud also delivers a higher Sound Transmission Coeffient (STC) rating due to the acoustic superiority of the profile.

Available Sizes and Gauges

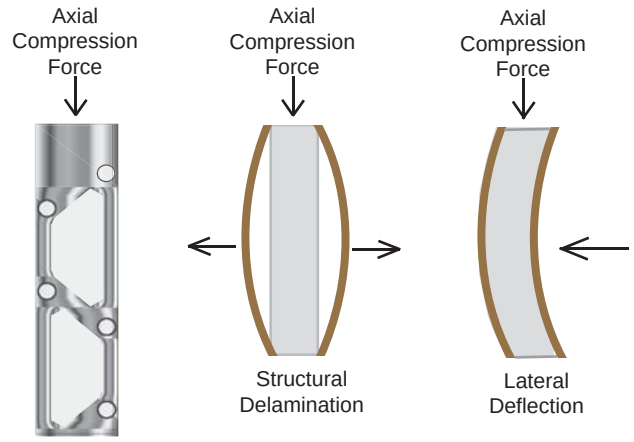
Sizes	Gauges / Mils
3-1/2"	20 / 33
3-5/8"	18 / 43
4"	16 / 54
5-1/2"	14 / 68
6"	12 / 97
8"	

Configuration

Through ten years of alternative building system design analysis, Transcon Steel evaluated all forms of alternative system concepts, designs, and configurations. Insulated Concrete Forms (ICFs), Straw Bale, "sandwich" Structural Insulated Panels (SIPs), and Aerated Concrete Block were evaluated. Based on the analysis, it was determined that Transcon Steel must develop a composite panel that comprised EPS and through-wall structural studs. Transcon avoided the "sandwich" metal and wood skin panel concept because of the limits to customization of plumbing and electrical services, risk of delamination, and most importantly, when exposed to fire the sandwich panel insulation can weaken causing structural failure and risk of injury. ICF construction was also avoided because of cost, construction limitations, and moisture creation in volatile climate zones. The through-wall structural framing approach with thermal studs was the best approach for developing a system to support over six story construction. The approach allows any engineering firm to design without proprietary knowledge, and safety factors can be reduced resulting in less steel requirements and lower construction costs.

Through-Wall Structural Design

Transcon Steel has developed Ultra Frame with a through-wall framing approach to metal stud Structural Insulated Panel (SIP) construction. The rationale to this approach is to provide additional structural protection where other systems stop. Unlike most alternative systems, Ultra Frame has dual structural resistant technology. Structural EPS is injected into a structural panel encasing the thermal studs.

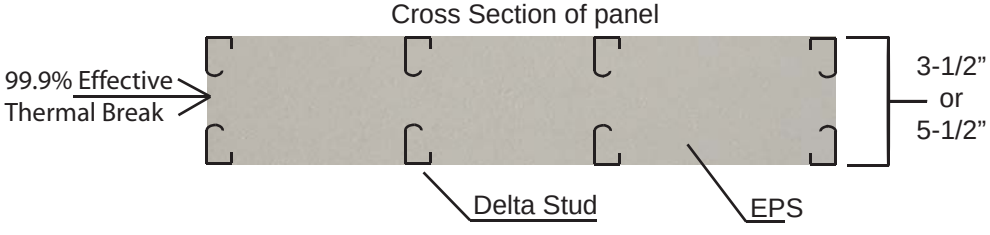


Ultra Frame

Adhesive bonded Sandwich Panels
Wood and Metal Clad

The result is an Ultra Frame building system that when exposed to fire, wind, and seismic forces will stand fast as most systems fail. The structural stud reinforcement of Ultra Frame increases the overall performance of the panel well beyond the competition.

Thermal Performance of Ultra Frame



Understanding the Art of Ultra Frame

Assembly

Transcon Steel has taken a simple solution to an on-site panelized framing approach. After ten years analyzing national and international installation instruction approaches, with concepts ranging from color designations, arrows, panel numbering, delivery approaches, and erection scenarios, Transcon Steel has formulated a multilingual framing designation system. As a standard all panels are installed from left to right, each wall is labeled alphabetically, and each wall panel is labeled in sequential order. Each panel also receives a "Top" / "Outside" marking to further support correct panel installation. The panel labeling system can be easily changed per project into any language and measurement standard to support local requirements.

The Ease of On-Site Construction

Each Ultra Frame panel has a 24 gauge trim metal on both top and bottom. This trim metal is to provide protection of the EPS during the install so that it will easily slide into the structural bottom and top track.

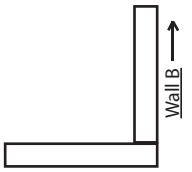
The approach to framing:

1. Set perimeter wall moisture sealer
2. Anchor structural bottom track
3. Mark track with panel widths
4. Set Ultra Frame panels to each mark
5. Install structural top track
6. Screw or nail fasten track to panel studs

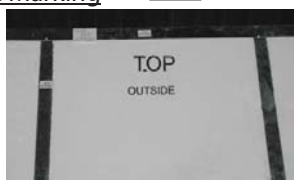
Panels are bundled per wall group and delivered on a flat bed trailer for ease of off-loading.

Panels are light weight and do not require the use of cranes or lifts. A typical panel weighs the same as a sheet of 3/4" plywood.

Sample Layout



Sample Marking



Sample Label

Project Name: General Office Complex
Project Number: TX-07-0231
Fabrication Date: Oct - 14 - 2007

1A-7

Produced with Pride
www.TransconSteel.com
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Engineering

Engineering was a major focus in the design of Ultra Frame. Transcon Steel found that too many alternative framing systems were focused on being as unique as possible resulting in proprietary testing requirements. Furthermore, Transcon Steel found that engineers were leery in designing structures that were not manufactured to standard construction practices, especially in high-risk zones indicated to the right.

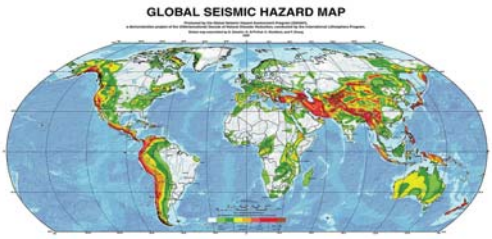
Transcon Steel took the approach with Ultra Frame to remove the reliance on composite testing requirements and to focus on developing a building system that met conventional building and engineering standards. Ultra Frame has simply replaced conventional construction framing with an inorganic highly energy-efficient building system that any engineer can design within any region of the world.

An engineer only needs to design a metal stud framed building with the approapriate gauge, size, and spacing. Transcon Steel will panelize Ultra Frame to the exact engineering specifications. This further reduces construction risks by delivering a pre-fabricated, pre-engineered building system for commercial and residential applications.

Engineered for Global Use

Hurricanes - Steel is recognized as one of the best building components to resist the devastating impacts of hurricane force winds and debris damage. Ultra Frame can resist wind loads over 150 m.p.h.. When flying debris strikes Ultra Frame cladded with sheet steel, the steel stops the debris while the EPS acts as a shock resistant product causing the debris to bounce off of the Ultra Frame wall.

Seismic - Structural EPS in its formed state is a terrific shock absorbing product. Racking load test performed on EPS building products have proven to resist the damaging impacts of the highest zone 4 seismic activities. The system memory of structural EPS can return a building after seismic exposure to 99% of original position.



Multi-Story - Cold formed steel has been approved for up to eight story construction unsupported by concrete or structural steel. Complimented with structural EPS, the encased studs have little to no opportunity to deform under normal stress; providing a greater safety factor. To support extreme shear loads, the Ultra Frame panel can be externally X-Braced with engineered strapping sized to necessary gauges and widths.

Fire - The UL fire testing performed on the Delta Stud in early 2007 showed the best fire resistant results over any other prior tested metal stud. As a secondary step, the EPS in Ultra Frame has also been modified with fire retardants and approved by UL for construction.

Strength-to-Weight Ratio - Ultra Frame is one of the strongest building systems in the global market. Weighing less than 1/3 the weight of conventional lumber construction, a 4 foot by 8 foot 20 gauge panel with studs at 16 inches on center weighs approximately 70 pounds and can support an ultimate axial load of over 36,000 pounds.

Understanding the Art of Ultra Frame

Environment

Environment protection is the core of Transcon Steel's mission in designing building systems that support energy efficiency and sustainability. The focus was to develop a building system that was made of recycled products that can be virtually recycled indefinitely. Ultra Frame is prefabricated to eliminate jobsite waste. The system is designed with a zero-waste manufacturing approach and has been designed to reduce the carbon footprint of buildings supporting the Leadership in Energy and Environmental Design (LEED®) green building goals.

Protecting Our Earth

Each year over 4 billion trees are harvested worldwide for construction purposes, equating to each 2000 sf residence consuming over one acre of virgin timberland. Building responsibly, one Transcon Steel residence will require the use of only six recycled cars.

Transcon Steel continues to monitor and refine new building technologies to maximize long-term environmental sustainability goals that support the "greening" of the constructed world. The Ultra Frame panel is one of many lasting technologies that can expect to come from Transcon Steel. We are creating the responsible approach to building.

Transcon Steel wants to be your partner in "Framing the Future". We understand the total life-cycle analysis to environmental product selection; and we as a company strive to provide education to the marketplace on ever evolving trends.

Longevity

Transcon Steel selected EPS and cold formed steel as the core building products for the simple fact that they are both considered highly recyclable and non-biodegradable. This means that EPS can last for hundreds to thousands of years in its solid state. The cold formed steel selected for Ultra Frame has been galvanized and zinc coated for corrosion resistance, providing an average design life in the most corrosive global zones of 275 years. In temperate climates, the chosen steel can support over a 1200 year design life.

Built for Generations

Maintenance - Ultra Frame requires minimal to zero maintenance for the life of the system.

Resistance - Ultra Frame is inorganic and therefore provides no food value for termites, wood ants, and other insects. Another benefit to the inorganic nature of Ultra Frame is that it does not support mold growth or the transference of mold.

Water Damage - Long-term resistance to water damage, mold, and rot will protect your structure for generations. This makes Ultra Frame one of the best building systems in the world for flood resistant construction. If a flood occurs, remove the interior veneer to flood level, let the wall system dry for 24 hours, then re-veneer the wall.

Fire - Ultra Frame is treated with fire retardant qualifying the system for fire-rated assemblies. Furthermore, during fires, the treated EPS has a health safety 2.5 times that of white pine.

Cost

As an investor in a building endeavour, it is important to determine the proper selection of your building materials to maximize your future return on investment. We have to look beyond today and plan on building for the future buyers of homes and office buildings if we want to maximize resale value. With the tremendous push towards "Green", energy-efficient, environmentally responsible building products, deciding to construct today with traditional building materials can be viewed as a step back. Traditional products are not competitive with future construction trends and will only limit resale value; much like the value today of a 1986 computer.

Ultra Frame has been developed to maximize both short and long-term returns.

Making Building Green Affordable

Building Envelope - A sealed thermal envelope building provides an investor many benefits making building green affordable. First, energy demands are 30-80% less, requiring less solar panel investment. Second, the buildings typically require 1/2 of the HVAC mechanical tonnage. Third, windows can be cost effective double pane low-e.

Jobsite Waste - Ultra Frame is custom prefabricated to engineered specifications. The benefit is little to no waste on site. Builders have safer jobsites, generally with no need for dumpsters during framing stage, and rapid construction with limited noise pollution. Ultra Frame will not warp, twist, or delaminate like other systems.

Rebates - Today, builders can qualify for up to a $1250 per unit rebate on their federal taxes, and home owners can qualify for over $500 rebate on their personal taxes by building with Ultra Frame and other Transcon Steel products.

Investments - Ultra Frame is one of the most cost effective building systems that actually compete in cost to conventional building approaches. Ultra Frame is 1/3th to 1/5th the cost of other comparable alternative building systems.

Insurance - Constructing projects in metal provides builders with discounts in Builder's Risk insurance and workers compensation fees. Owners benefit with reduced permanent insurance rates that have annual increases less than traditional built structures.

Contact Us

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