Composite Technologies Corporation (CTC) was founded in 1980 by Robert T. Long. His innovative thinking and vision led to the development of the THERMOMASS® Building Insulation System. At the heart of the THERMOMASS® system is a patented continuous fiber composite connector, which is used to structurally tie two layers of concrete together through predrilled, prefabricated, extruded Dow brand insulation products. The non-conductive, chemically resistant, fiber composite connector allows the creation of an uninterrupted envelope of insulation throughout the exterior walls of the building. This creates a highly energy efficient building system that is virtually maintenance-free and has the ability to not only resist mold, but stand up to fire, earthquakes, hurricanes and tornadoes as well.

The continued development of this system represents a dramatic advancement in building technology for many types of temperature and atmosphere controlled facilities throughout the world and offers unsurpassed advantages over block/brick, steel and insulated metal panel construction.

A HISTORY OF SUCCESS

For over 20 years, THERMOMASS® has been the industry leading system for concrete sandwich wall construction. Extensive testing, research and development of innovative technologies keeps CTC at the forefront. With a track record of over 100,000,000-sq. ft. of sandwich walls in the US and around the world in use today, we have more experience than all other building insulation systems combined.

The energy efficiency of the finished building combined with the ease and speed of construction has made our building system the preference of industries ranging from education and correctional facilities to freezers, coolers, distribution centers and retail facilities. They keep returning to the THERMOMASS® Building Insulation System because it provides them with unparalleled construction quality, aesthetic versatility and energy savings.
The THERMOMASS® Building System is a technologically advanced system that delivers exceptional construction with superior insulation effectiveness.

Connectors
Our family of continuous fiber composite connectors is made from a resilient composite matrix and possesses incredible strength and durability. They are far superior to steel and or plastic connectors in sandwich wall panels because they are non-corrosive, chemically resistant and have low thermal conductivity with unsurpassed structural strength.

Insulation:
Dow brand insulation products are a "closed cell" structure, that means no gaps or voids between cells. The rigid board construction resists all forms of water penetration including water vapor transmission. The high thermal resistance and high compressive strength make it a valuable component in the THERMOMASS® Building System.

Dow insulation used in the THERMOMASS® Building System:
Styrofoam® Brand Extruded Polystyrene
ISOCAST R Polyisocyanurate
ProPEL® Extruded Polypropylene
ENERGY EFFICIENCY

- Energy Star Partner
- Consistent thermal control
- Higher R-values due to "Mass Effect"
- Reduces HVAC loads
- Eliminates moisture condensation and frost build-up in freezers
- Impedes mold growth
- Interior space comfort - no cold spots
- Reduces energy bills by as much as 50%
- Continuous fiber composite connectors
- Third Party Testing
- Traceable Third Party Quality Control

FEATURES AND BENEFITS

A variety of options to choose from depending on climate, location and building needs and requirements.

- High R-value for energy efficiency
- Tested in accordance with ASTM C578
- Lowest water absorption possible, impedes mold
- High compressive strengths

CONSTRUCTION

THERMOMASS® tilt-up concrete sandwich panels are load bearing elements. These panels eliminate the need for perimeter structural steel framing and protective curbing. Instead the insulation, structure and cladding are provided in one assembly. This offers significant design and construction savings by simplifying the building perimeter structural conditions while increasing usable interior space.

- Reduces HVAC System Construction Cost
- Fewer Construction Trades
- Fast-Track Construction = Quicker Turn-Key

CONNECTORS

Thermomass® Fiber
Composite Connectors
have the strength to carry the long term loads of the facia wythe with out thermal bridges.

Non-Composite Panel

Composite Panel
Aesthetic Variety

The THERMOMASS® building system offers finishes ranging from natural concrete, paint, sandblasting, exposed aggregate, as well as cast in brick veneer, rustications and reveals. Our building system has been used in scores of buildings that have received numerous design awards.

Investment Value

- Longer building life
- Lowers building maintenance costs
- Fire and theft resistance lowers insurance costs
- Continued ROI and energy cost savings throughout the life of the building
- Healthy Building – Impedes mold growth

Low Maintenance

- Withstands forklift and truck damage
- Resists insects and vermin
- Easily cleaned
- Maximum Security Advantage

System Fabrication

Drawings are sent directly from CAD to CNC to assure there are no breaches in the insulation envelope by providing a precision fit and taking the guesswork out of foam and connector placement. This process dramatically reduces the cost of installation.

Superior Strength

The Tilt-Up insulated sandwich wall is a load bearing element and eliminates the need for perimeter structural steel framing and protective curbing. This reduces construction cost and does not waste any interior square footage.
TECHNICAL DESIGN ASSISTANCE

- Determination of system compatibility with your project
- Recommendation of design modifications to assure the integrity of the project
- CAD generated panel layouts that simplify and speed up the construction process
- CAD generated panel and joint design and construction details

CONSTRUCTION ASSISTANCE

- Pre-Construction meetings
- On site installation training and assistance
- Ongoing project consultation

ANALYSIS SOFTWARE APPLICATION TOOLS

With our State-of-the-art analysis application suite, we can produce studies and testing on the transfer of moisture, heat migration and humidity levels on panel wall systems. By using these software applications, we can accurately predict reactions to weather from both external and internal climate conditions. Our analysis application suite includes:

- Isothermal analysis
- Mass Performance analysis
- Energy Efficiency and Cost Reduction analysis
- Construction Cost Estimates and Building Life Cycle Payback analysis
- Dewpoint analysis, Moisture and WUFI
- Thermographic analysis
- Finite Element analysis

DETAILS ON CD
Complete architectural details are available on CD in AutoCAD format.
The THERMOMASS® System has undergone, and continues to undergo extensive third party testing. Connectors have been tested for tensile strength, compression strength, shear strength, fatigue and cyclic loads, low temperature stress, fire resistance and flexure.

- Our family of connectors has been tested to have pullout capacities in concrete exceeding 5,000 lbs.
- Our family of connectors possess shear capacities as great as 2500 lbs each.
- The tensile strength of the composite materials used in our family of connectors is up to 145,000 psi.

The connectors have been tested by a leading United States fire testing agency where a panel constructed with THERMOMASS® fiber composite connectors was subjected to 1093˚ C (2000 ˚F) for 4 hours with no degradation. The temperature of the surface of the wall opposite the fire rose only 20.8 ˚C (37.6 ˚F) during the testing period. The standard for passing this test was 121 ˚C (250 ˚F).

The THERMOMASS® System has proven itself in the laboratory and in the field withstanding earthquakes, hurricanes, tornadoes and fires. Institutions have verified the outstanding structural capabilities and energy efficiency of the THERMOMASS® Building Insulation System:

**INDEPENDENT TESTING**

Southwest Research Institute  
**TESTS:**  
- Tension and Shear  
- Fire  
- Pullout  
- Pullout Tests at Elevated Temperature

Iowa State University  
**TESTS:**  
- Effect of Elevated Temperature  
- Pullout Strength  
- 100 Year Aging Alkali Resistance  
- Shear Capacity  
- Compression Capacity  
- Full Scale Panel  
- Low Temperature Fatigue Behavior  
- Connector Orientation  
- Mechanical Properties

United States Department of Energy  
**TESTS:**  
- Steady State / Dynamic Studies

Architectural Testing, Inc.  
**TESTS:**  
- Full Scale Composite Panel – Prestressed and Post Tension

Underwriters Laboratories, Inc.  
**TESTS:**  
- Fire

Construction Technologies Lab  
**TESTS:**  
- Sandwich Panel Flexural  
- Connector Fatigue

University of Kaiserslautern, Germany  
**TESTS:**  
- Panel Shear  
- Pullout and Shear Capacity  
- Tension, Shear and Combined Tension/Shear  
- Long-Term Shear/Creep  
- Cyclic Tension  
- 100 Year Aging Alkali Resistance  
- Cyclic Shear

"We are committed to the total success of each project we encounter."
E D U C A T I O N A L

THERMOMASS® and tilt-up construction will make your educational facility a healthy and safe one. By creating a building envelope that is both thermally efficient and moisture resistant, THERMOMASS® helps impede mold growth within a building’s walls. The THERMOMASS® insulation system used in tilt-up sandwich panels addresses the mold issue through its design. Using edge to edge and opening to opening insulation with fiber composite connectors, THERMOMASS® walls eliminate thermal bridges and take away the possibility of moisture build-up within the building’s walls. THERMOMASS® walls also combine the benefits of energy efficiency with a facility that is low in maintenance. School districts have been able to reallocate funds saved in annual energy and maintenance costs towards additional teachers, computers and text books.

C O R R E C T I O N A L

Correctional facilities are built for one primary reason... security. Tilt-Up concrete sandwich walls insulated with THERMOMASS® can give you that peace of mind. Insulated concrete sandwich walls have smooth finishes which are easy to maintain and can withstand massive amounts of abuse.

While any insulated concrete wall system can offer you security, THERMOMASS® walls go above and beyond other systems. By adding energy efficiency and mold resistance to the equation, THERMOMASS® insulated walls outperform other insulation systems time after time.
F R E E Z E R / C O O L E R

THERMOMASS® will save the low temperature facility owner money on cooling costs. Because the tilt-up concrete sandwich panels insulated with THERMOMASS® have excellent thermal storage properties, facilities built with them have a reduced total load requirement. Owners of these buildings have taken advantage of this by purchasing multiple smaller refrigeration units, thereby allowing them to stage compressor usage. THERMOMASS® cold storage warehouse owners have also been able to apply pre-cooling and load shifting techniques to the operation of the facility. These techniques reduce the energy costs by as much as 50%.

The same components that give our THERMOMASS® insulated concrete sandwich panels the ability to control energy also prevent vapor transfer and thermal leakage. Because our low temperature construction details are so secure, there will not be any moisture and ice build up in a THERMOMASS® low temperature facility.

B E V E R A G E  D I S T R I B U T I O N

Having a stable environment in a beverage facility is very important. Industry leaders such as Anheuser Busch, Coors, Miller Brewing, Mondavi Wineries and Pepsi, to name a few, know this. That is why they have chosen THERMOMASS®.

Products subjected to massive temperature swings can be ruined or “skunked” and therefore made undrinkable. The THERMOMASS® system creates a controlled atmosphere on the interior of the building and takes temperature fluctuation worries out of the picture.

Our insulated walls take advantage of the “thermal mass” effect. “Thermal mass” is the ability of our concrete sandwich panels to store BTU’s and hold interior temperatures steady while external temperatures vary. Because energy will be stored within our walls spikes of temperature variation that are inherent to low mass buildings, such as those constructed with Insulated Metal Panels, will be eliminated.

The thermal mass effect gives the insulation a higher “performance R-value” resulting in smaller HVAC equipment and less energy usage while standing up to the heavy traffic associated with a beverage distribution facility.
WAREHOUSES AND DISTRIBUTION CENTERS have traffic flowing in and out every day. All the traffic movement around a building causes wear and tear to take place and the need for building maintenance. THERMOMASS® insulated tilt-up facilities require less building maintenance than those built using other construction methods. THERMOMASS® walls are more durable than post insulated concrete walls or block and metal buildings which are easily damaged by forklifts or other equipment and are penetrable by vermin and insects.

Distribution facilities constructed with THERMOMASS® insulated tilt-up panels are also open for business sooner. Because of the speed of tilt-up sandwich wall construction, many building phases can be done simultaneously and the construction schedule is condensed.

MANUFACTURING

Manufacturing facilities are built with the intention of standing for a long time and tilt-up concrete sandwich panels insulated with THERMOMASS® accomplish just that. With careful pre-planning insulated tilt-up facilities can be designed to allow for easy expansion by simply detaching and relocating the concrete panels or cutting new openings. Exterior walls can be double load bearing (interior and exterior wythes equal in thickness) allowing for expansion.

Having a controlled atmosphere inside is very important to most manufacturing operations. The THERMOMASS® insulation system creates a controlled atmosphere and offers the best energy efficient solution to heating and cooling issues. With its edge to edge insulation and fiber composite connectors, THERMOMASS® eliminates thermal bridges and reduces temperature swings in the building’s interior.
OFFICE SPACE

THERMOMASS® insulated tilt buildings don’t have to look like boring rectangular structures. They can be constructed with a variety of finishes. Colored concrete and textured paints can be combined with reveals for an unlimited array of effects. Cast-in thin brick can authentically reproduce the look of masonry buildings. The look of the building is limited only by the imagination of the designer.

The sound absorption properties of concrete walls allow for a quieter work environment if your office is situated in noisy office parks.

THERMOMASS® insulated walls also combine superior energy efficiency with the ability to control moisture and mold build up. This helps increase the building’s longevity and decrease the insurance rates.

RETAIL

The speed and efficiency of tilt-up construction with THERMOMASS® allows you to get your doors open sooner resulting in quicker return on your investment. Wall panels are constructed with the insulation sandwiched inside and erected on-site. This allows other trades to get in quicker and complete the project sooner cutting weeks or months off the construction schedule. In addition to the fast-track construction that tilt-up and THERMOMASS® offers, you’ll also have one of the most energy efficient buildings in the marketplace. Whether temperatures are hot or cold, THERMOMASS® walls provide superior energy savings up to 50%.