

# ThermoForm

## Why the Vertical ICF is Better for Your Company



**IN-FILL WALLS:** In commercial in-fill applications, no one does it better and easier than ThermoForm. Installation of forms and placing of concrete is a snap with our offset c-channel.

**CONCRETE CONSOLIDATION:** is recommended-not discouraged!

**VARIABLE CONCRETE THICKNESS:** from 4" TO 24" to reflect any situation.

**RECYCLED CONTENT:** Important in today's "green" sustainable building marketplace (several additional points for the LEED® program).

**STEP FOOTINGS:** ThermoForm's vertical forms provide ease of construction on tough, steep job sites.

**\*PERFORM GUARD® OPTION:** Keeps termites and other boring insects at bay.

**WIDE ATTACHMENT STUD:** At two inches wide, 8" on center, and continuous from top to bottom, attachment points are much easier to find compared to other ICF forms.

**PLASTIC (PVC) OR GALVANIZED STEEL STUDS AVAILABLE**

**DIRECT APPLY EIFS:** No need to apply an additional foam layer before EIFS application.

**SHIPS FLAT:** Packing in more square footage per truck dramatically lowers overall freight cost.

**PANELIZATION:** Factory built accuracy, coupled with in-the-field speed, makes panelizing ThermoForm walls an attractive construction option.

**EXCELLENT DESIGN FLEXIBILITY**

\*Perform Guard is a registered trademark of AFM Corp.

866.983.9960  
www.tfsystems.com

**TF** FORMING  
SYSTEMS

# ThermoForm

## Why the Vertical ICF is Better

**VERTICAL ORIENTATION:** Setting forms vertically vs. horizontally eliminates the common occurring issues of floating, settling, gluing, taping, and tying providing more job site control and allowing for a higher quality project completed easier and faster.

**TALL WALLS:** The ability to lift individual poly panels to place concrete is unmatched by any other ICF or conventional poured wall system.

**OPEN WALL:** ThermoForm leads the ICF industry with its exclusive open wall capabilities. This allows for easy access to the interior of the wall cavity to install and tie rebar, allow for inspection, or to retrieve dropped objects.

**OFFSET HEIGHT FORMS:** Custom made from our manufacturing facility and shipped directly to your job site saving you time and money. Can be delivered to you at your height requirement. No need to end up on a 16" increment or spend valuable job site labor cutting and bracing blocks to meet plan dimensions. Any panel height from 16" to 10' is available.

**NO COMMON SEAM:** Block style ICFs need to stagger each course while trying to maintain alignment with their attachment points. This often results in an area of construction difficulty where a common seam is created. ThermoForm eliminates this problem due to its vertical format.

**LESS WASTE:** the amount of waste from a ThermoForm project will typically fit in a garbage bag.

**MOST VERSATILE ICF ON THE MARKET:** Any custom corner angle is available. 2" to 6" poly thickness is available to accommodate your R-value needs.

**CURVED WALLS:** Just look at our installation manual to see how easy it is!

**NO VERTICAL BRACING NECESSARY:** Only corner bracing is required.



# ThermoForm

The Vertical ICF

## Why You Should Use It in Every Project

### EXTREME ENERGY EFFICIENCY

ThermoForm walls provide a minimum R-factor of 25 and allow no air infiltration to give you unprecedented energy savings.

### LOW LIFE CYCLE COST

ThermoForm buildings perform optimally for generations with little or no maintenance, depending upon the selection of cladding materials.

### Green Building Materials/LEED Certification

ThermoForm uses recycled materials along with locally produced concrete to help in qualifying for LEED points.

### DESIGN FLEXIBILITY

ThermoForm components can be easily configured to achieve almost any design imaginable, including arched and curved walls.

### SEVERE WEATHER SECURITY

Poured, reinforced concrete walls can be engineered to withstand practically any weather event imaginable, including hurricanes, tornadoes, earthquakes, fire and floods.

### NOISE REDUCTION

Insulated Concrete Walls greatly reduce sound transmission due to the mass effect of the concrete and layered effect of several different types of construction materials. This is an excellent benefit for all buildings, particularly hotels, schools, medical offices and corporate buildings.

### FASTER OCCUPANCY

ThermoForm walls go up quickly as you are forming the wall and applying insulation at the same time.



# The Difference is in the ThermoForm

The Vertical ICF



**TF** THERMO  
FORM  
ICF Building

**Conventional Stick  
Frame Building**

Impenetrable solid reinforced  
concrete walls

16" center hollow cavities

No food source for termites

Food source for termites

Can exceed an R50 performance  
today, tomorrow and 100 years  
from now; reducing energy bills  
by 1/2

Realistic R12 performance once  
insulation settlement and air infiltration  
are calculated; increased energy bills  
over time

Inaudible noise transfer STC  
50+ (Sound Transmission Control)

STC 36 or less

Qualifies for energy  
rebate programs

None

Qualifies for insurance reduction

None

Qualifies for possible mortgage rate reduction

None

3 to 4 "hour" fire rating

1 hour

Bullet Resistance

None

Wind capacity 200+ MPH

130 mph

Green Technology, lower  
emissions and saves trees

Ten+ trees, global warming, clear  
cutting, 20% construction waste

Dust and pollen  
free homes

Four times more air exchange per hour

Bearing capacity 10 times  
stronger than wood

10 times weaker than concrete

# WHY AN ICF

## For Your Commercial or Residential Project?

**ThermoForm – The Vertical ICF** is a stay in place insulated concrete wall forming system that consists of expanded polystyrene panels connected by plastic stud rails. ThermoForm system combines the insulating effectiveness of expanded polystyrene (EPS) with the advantages of a steel reinforced monolithic concrete wall. The result is a wall system of unmatched energy efficiency, comfort, strength and noise reduction.

When filled with concrete, ThermoForm delivers a monolithic concrete wall thickness of 4", 6", 8" or 10", an insulation value of R-25, a fire resistance rating of three hours, and a sound transmission class of 50+.

Whether you are building a single story home or a multi-level commercial structure, you can't beat the rewards of building with ThermoForm Insulated Concrete Forms. Insulated concrete walls provide an energy efficient, cost effective, high strength alternative to using steel or wood frame.

### BENEFITS & FEATURES:

- Save significant \$\$ on your energy bill
- Safe and secure building
- Unmatched structural strength
- Ultimate in design flexibility
- Healthier environment without dusts and pollens
- Your building and employees/family are better protected from the weather, allergens, insects and noise
- Outside noises stay outside
- Your disaster resistant investment is protected
- Consistent inside temperatures
- Energy Efficient
- Resistant to Storms & High Winds
- Monolithic Wall
- Cast-in-place reinforced concrete
- Air-tight building envelope
- Sound resistant
- Fire resistant
- Mold resistant concrete and poly
- Insect resistant
- Superior insulation offers extreme energy efficiency
- Contributes significantly toward LEED Certification points

## CONCRETE HOME CONSIDERATIONS

### **Wiring:**

- ✓ Main electrical box needs a sleeve where box is to be attached to the wall.
- ✓ Exterior lights (porch lights) need a sleeve through the wall.
- ✓ Cable and telephone lines need sleeves.
- ✓ Need 3" electrical boxes that are attached to the concrete with mechanical fasteners or spray foam.
- ✓ Need hot knife or specialty tool for installing wires and boxes.
- ✓ Installing horizontal wiring requires the use of a saw to cut through the I-beams.
- ✓ When installing horizontal wiring you must cut through the I-beam at 6" or 1' marks from the top or bottom of concrete wall to avoid cutting through a crosstie.
- ✓ Plan for routing wiring behind the ledger in the floor system to service upper floors.
- ✓ To avoid cutting of I-beams NMS cable can be run vertical. (Will utilize more cable.)

### **Heating, Cooling, and Air Exchange:**

- ✓ Air exchange vents should be sleeved through wall ahead of time.
- ✓ Install a sleeve for the air conditioner line.
- ✓ Install furnace intake sleeve.

### **Interior Framing:**

- ✓ Install a nailer for attaching stick framed walls to concrete walls by cutting away polystyrene and affixing lumber to the concrete wall with mechanical fasteners and/or spray foam.
- ✓ Install corner attachment brackets to interior corners for attaching sheetrock if none provided.
- ✓ Keep in mind the dimensions for stairwells, fireplaces, and other tight rooms such as bathrooms that utilize an exterior wall, as the forms are wider than stick framing and you will lose some space.
- ✓ **Kitchen and other cabinets need plywood backing for attaching to ICF's because of the significant weight.**
- ✓ Window header height has to be considered where drop ceilings and heavy loads are a factor.
- ✓ Install a 3" strip of ½" plywood or osb around the interior bottom of the exterior walls to provide a nailer for trim and baseboard. Sheetrock sits on top of this strip.
- ✓ Windows and doors will have wide openings and ledges that need interior finishing. Caulk or spray foam accordingly to avoid air leakage around window or door bucks.
- ✓ Doorways will have a wide opening that may keep the door from opening all the way unless proper steps are taken during the building process.

### **Roofing:**

- ✓ Use a 2" x 8" top plate instead of a standard 2" x 6" to gain more bearing on the concrete wall.
- ✓ Consider weight loads on the gable ends and where the gable end truss is going to sit on the wall. Keep in mind the 2 ½" of polystyrene on the outside of the concrete wall. Double top plate may help. Furring out of the truss will be needed if held flush with the concrete instead of the poly. Use of a taper top TF Form panel will add to the bearing strength.

### **Siding:**

- ✓ Flat head, smooth shank, stainless or coated, 1 1/4" long (min), coarse thread, sharp tip screws are needed for attaching siding. Always use stainless or coated screws to attach building materials to TF System walls. Cabinet screws are available to purchase thru TF, which are used to attach siding.

### **Miscellaneous:**

- ✓ Some other protrusions needed before pour: plumbing, range hood vent, dryer vents, doorbell, outside faucets, and outside outlets.
- ✓ Any exposed polystyrene has to be covered on the interior and exterior.
- ✓ Schedule a meeting with the subcontractors to discuss concrete home considerations.
- ✓ 2x4's embedded in the poly are needed for attaching the shower surround. Chances of the surround landing on an I-beam are slim.
- ✓ Curtain rods may need an attachment point such as a sure-grip grappler from Wind-Lock.





ThermoForm – The Vertical ICF

## **BUILDING THE MOLD FREE STRUCTURE**

Building the mold free, healthy structure is now an unavoidable requirement because the potential liabilities are too excessive to deny. Those of us who ignore these problems will pay a very high price for our unwillingness to change. We have a tendency in the construction industry to be hesitant about trying something new or different from the way we have always done things in the past. We also have been guilty of always trying to find the cheapest and quickest way to do the job. Our bad habits are now starting to catch up with us in the form of increased insurance costs and liabilities. Claims for mold related problems have increased dramatically nationwide. ThermoForm Systems resist the growth of mold. Concrete, steel, and expanded polystyrene are not food sources for mold. Building with ThermoForm System can drastically minimize the possible health hazards related to mold growth in residential and commercial buildings.

But don't just take my word for it, read what the experts have to say about the issues concerning mold in residential and commercial buildings. The following websites offer excellent, objective information that can help you make informed decisions in this quickly changing construction industry.

### **MOLD RESOURCES**

Source: U.S. Environmental Protection Agency  
<http://www.epa.gov/iaq/molds/moldresources.html>

### **DISEASES DUE TO ENVIRONMENTAL MOULDS**

Source: DoctorFungus.org  
[http://www.doctorfungus.org/mycoses/environ/mould\\_disease.htm](http://www.doctorfungus.org/mycoses/environ/mould_disease.htm)

### **JOE'S TOP TEN**

Source: Building Science Corporation/Dr. Joseph Lstiburek  
<http://www.buildingscience.com>

**RICE**  
**ENGINEERING**

May 16, 2008

**RE: T/F Systems Vertical ICF**

**To Whom It May Concern:**

The T/F system for insulated concrete forms is in essence, a concrete form which stays in place after construction. During construction, the expanded polystyrene panels (EPS) serve as the main form, and the "I Beams" hold the EPS panels in place until the concrete has hardened.

In the completed wall, the concrete forms are not a structural component, As such, the wall should be designed using its actual concrete thickness in accordance with ACI 318, or other approved methods.

The Forms do serve two other purposes in the completed wall, both as insulation, and as an attachment method for finish materials. Both the EPS panels, and the I-Beams have been tested by a third party testing agency for burn rate, and ignition temperature for compliance with chapter 26 of the international building code.

The I-beams have also been tested for their tensile properties, for screw withdrawal, and screw shear. The test results show that with a safety factor of 4, the tensile capacity is 144 #, and the shear capacity is 113# using # 10 screws.

The evaluation reports have been included as an attachment for your reference.

Please feel free to call with any questions.



Benjamin T. Gerold, P.E.

L. David Rice, P.E.  
I hereby certify that this plan, specification,  
or report was prepared by me or under my  
direct supervision and that I am a duly  
Registered Professional Engineer under the  
laws of the State of Minnesota.



Date MAY 16 2008 Registration No. 22137



# BITTNER ENGINEERING, INC.

113 SOUTH 10TH STREET, ESCANABA, MICHIGAN 49829 • 906-789-1511 • FAX 906-789-9977



September 24, 1999

Mr. Don Rudolph  
Wisconsin Thermo-Form, Inc.  
185 East Walnut  
Sturgeon Bay, WI 54235

RE: Design Basis  
Thermo-Form Walls

Dear Don:

In reply to your inquiry, I design the walls, lintels, and the occasional column all in accordance with the American Concrete Institute building code (ACI-318, latest revision). This code covers building concrete materials, methods, reinforcing, and design; and is adopted by reference by every building code in the United States and many other countries.

The design of the concrete sections and reinforcing is independent of the forming materials used and would be unchanged if steel or wood removable forms are used. Since a great number of your projects are residential, frequently the loading is so light that non-reinforced concrete is acceptable. In these cases, the design is still covered under ACI-318 for plain concrete. A few nominal reinforcing rods are added to minimize any shrinkage cracking.

Please call me if you have any questions.

Sincerely,

Harvey G. Johnson, P.E.  
Civil/Structural Engineer

HGJ:lah

## TF System<sup>®</sup> Specification Data

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<b>PRODUCT NAME</b>	ThermoForm System		
<b>MANUFACTURER</b>	TF Forming Systems, Inc (TF System – The Vertical ICF, Inc) 3030C Holmgren Way Green Bay, WI 54304 USA Web: www.tfsystem.com Phone: 800-3600-4634 Fax: 920-983-9962 E-mail: info@tfsystem.com		
<b>PRODUCT DESCRIPTION</b>	Thermo-Form System <sup>®</sup> is an insulated concrete forming system consisting of expanded polystyrene panels (EPS) held in place by structural vertical studs. When filled with concrete the result is a full width, monolithic concrete walls of exceptional strength and energy efficiency. The stud substructure also serves as a convenient and predictable attachment point for both interior and exterior wall treatments.		
<b>APPLICATION STANDARDS</b>	Thermo-Form System <sup>®</sup> walls are subject to ACI (American Concrete Institute) Chapter 318 (latest revision), which indicates reinforcement requirements for standard poured walls. Because TF System <sup>®</sup> forms are <b>NOT</b> waffle grid or post and beam design, no additional engineering is required except for cases where ACI 318 calls for engineering of specific applications. Essentially, TF System <sup>®</sup> walls are conventional poured walls with the insulation applied before, rather than after, the pour.		
<b>DIMENSIONS</b>	EPS Panels	Width	8-inches
		Height	Variable up to 10 feet
		Thickness	2.5-inches standard (2.0, 3.0, 3.5, 4.0-inches optional)
	Studs (steel)	Flange Width	2-inches
		Height	Variable up to 12 feet
		Thickness	4, 6, 8, 10, 12, 14, 16, 18, 20, 24-inches (nominal concrete wall width)
	Studs (PVC)	Flange Width	2-inches
		Height	Variable up to 12 feet
		Thickness	4, 6, 8, 10-inches (nominal concrete wall width)

### PHYSICAL PROPERTIES

Steel Studs

Content	Galvanized sheet metal	
Thickness	0.17 – 0.20 doubled	
Shaping Method	Roll forming	
Fastening Method	Norlock Technologies double clinch	
Screw Pullout Test	# 6	235 lbs.
	# 8	277 lbs.
	# 10	307 lbs.

PVC Studs

Content	Recycled PVC
Thickness	0.125
Shaping Method	Extruded

Expanded Polystyrene

Polystyrene insulation used in TF System<sup>®</sup> is approved by applicable code enforcement agencies. See physical properties table:

Density (minimum)	1.35 lbs. per cubic foot
Compressive Strength	15 psi @ 10% deformation
Flexural Strength	35 psi
Dimensional Tolerance	∇ 0.030 inch/ft. length ∇ 1/16-inch width ∇ 1/16-inch thickness
Thermal Resistance (minimum per inch)	4.0 @ 75° F 4.4 @ 40° F
Oxygen Index (minimum)	24.0
Flame Spread	20 as tested per ASTM E84
Smoke Density	150-300 as tested per ASTM E84
Applicable Code Listings	ICBO PFC568C, SBCCI PST & ESI Report No. 94136D; ICC Evaluation Service, Inc. ESR-1006
Labeling	UL Virgin Certified material (no recycled content)
Termite Resistant Treatment (optional)	PerformGuard <sup>®</sup> borate treatment (PerformGuard <sup>®</sup> is a registered trademark of AFM <sup>®</sup> Corp.)
Resins Permitted	Specified by TF System <sup>®</sup> - The Vertical ICF Inc.

**SOUND TRANSMISSION**

Thermo-Form System<sup>®</sup> 6-inch concrete wall:

uncovered 42 dB STC  
with 5/8" drywall on both sides 55 dB STC

**FIRE RATING**

Concrete walls have a 2 - 4 hour fire rating depending upon concrete thickness.

**AVAILABILITY**

International, contact manufacturer for local TF System<sup>®</sup> representative.

**COST**

Insulated concrete forms are very cost competitive. TF System<sup>®</sup> walls provide comparable R-value to conventional poured concrete wall assemblies with 2x6 stud framing, six-inches of fiberglass batt-insulation, and one-inch of exterior sheathed insulation. Contractors find the speed of installation provides labor cost savings. Building owners continually appreciate lower life cycle costs, including lower utility bills, reduced insurance premiums, and higher resale value.

**WARRANTY**

Refer to Terms and Conditions of Sale Document available from manufacturer.

**MAINTENANCE**

Maintenance of Thermo-Form System<sup>®</sup>, if installed per manufacturer's instructions, is not required.

**TECHNICAL SERVICES**

Thermo-Form System<sup>®</sup> Installation Manual, available by request or at [www.tfsystem.com](http://www.tfsystem.com)

Telephone Support, 800-360-4634  
Jobsite Training, contact manufacturer for availability and rates

**ADDITIONAL INFORMATION**

[www.tfsystem.com](http://www.tfsystem.com)

## Thermo-Form System<sup>®</sup> Technical Bulletin

### 12003-1

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#### Thermo-Form System<sup>®</sup> Code Compliance

There are three unique types of Insulated Concrete Forming systems currently available in the marketplace. They are the waffle-grid, post and beam, and straight wall designs. The post and beam and waffle-grid systems are designed to reduce the amount of concrete used in a particular wall cavity and as such need to have special code approval or be specifically engineered to ensure correct reinforcement requirements. Straight wall systems are designed to provide a wall that is of the same dimension and cross section as conventionally formed concrete walls. Thermo-Form System<sup>®</sup> is a straight wall form that was designed to closely mimic conventional plywood, steel, or aluminum forms. As such, **Thermo-Form System<sup>®</sup> does not require a separate evaluation report.**

Thermo-Form System<sup>®</sup> is a straight wall type form that results in a full width, monolithic poured concrete wall and is therefore subject to American Concrete Institute 318-08, which spells out reinforcement requirements for poured concrete walls. In addition to ACI 318-08, local codes must be followed as well. Reinforcement within a Thermo-Form System<sup>®</sup> wall is exactly the same as conventionally formed concrete walls of the same dimension.

Concrete exerts a significant amount of pressure as it is poured into formwork and until it acquires the strength to support itself. In this regard, Thermo-Form System<sup>®</sup> has been field and laboratory tested to determine the strength of its individual components. Thermo-Form System<sup>®</sup> crossties were determined to have a tension value of 850 pounds. The polystyrene planks (2.5 inches thick, 1.5 lbs/ft<sup>3</sup> density) have a capacity of 525 psf.

Using these figures, we recommend a pour rate of four feet per hour in conjunction with adequate bracing (as shown in our Thermo-Form System<sup>®</sup> Installation Manual). Consolidation of the poured concrete inside the form system is encouraged if done in a proper manner.

**The rigid polystyrene panel component of Thermo-Form System<sup>®</sup> is fully code approved and meets all flame spread and smoke development ratings.**

## Thermo-Form System<sup>®</sup> Technical Bulletin

### 12003-2

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#### Thermo-Form System<sup>®</sup> Fastener Pullout Testing of Steel Studs

In many applications Thermo-Form System<sup>®</sup> walls will be covered with a variety of treatments including, but not limited to, drywall, vinyl siding, wood siding, fiber cement siding, paneling, and brick or stone veneer. These treatments will need to be attached to the walls by means of installing screws through the treatment (or in the case of brick and stone through the wall ties) and into the flange of the Thermo-Form System<sup>®</sup> stud rail.

Thermo-Form System<sup>®</sup> stud rails were subjected to screw pullout testing and the following average results were achieved:

#### 1 5/8" Type W Gypsum Board Fasteners

Withdrawal load strength: average max load 222.2 lbs

Lateral load strength: average max load 346.8 lbs

Always follow manufacturer's recommendations or accepted construction practices to determine pattern and frequency of fasteners. Use corrosion resistant fasteners in applications exposed to the elements.

## **Thermo-Form System<sup>®</sup> Technical Bulletin**

### **12003-3**

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#### Thermo-Form System<sup>®</sup> Sound Transmission Characteristics

Above grade residential, multi family, and, in many instances, commercial structures need to be designed to achieve a certain level of sound attenuation. Insulated concrete walls naturally provide a high level of sound control. This sound control ability is measured in STC (Sound Transmission Classification), and is determined through testing room sized wall section in an approved sound testing laboratory.

A Thermo-Form System<sup>®</sup> wall section was tested on September 8<sup>th</sup>, 1999 at Riverbank Laboratory in Geneva, Illinois. This wall section had a 6-inch concrete core with five/eighths inch thick drywall screw attached to both sides. An STC rating of 55 was established for this particular wall.

This level of sound control is considered to be an excellent rating for most applications. In all cases where specific STC levels are required, it is the responsibility of the project design team to determine the components necessary to achieve these levels.



**Thermo-Form System<sup>®</sup> Technical Bulletin**  
**12003-4**

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Thermo-Form System<sup>®</sup> Wall Assembly calculated R-value

In most applications Thermo-Form System<sup>®</sup> walls will use 2½” thick polystyrene panels on both sides of the concrete wall. In this case the calculated R-value would be as follows:

Polystyrene (R-4.4 per inch @ 40°F x 5” thickness)	= R-22
Concrete (R-1.1 @ 8” thickness)	= R-1.1
Drywall (R-.45 @ ½” thickness)	= R-.45
Exterior Surface Resistance	= R-.68

**Total R-value of a standard Thermo-Form System<sup>®</sup> wall assembly = R-24.23**

R-value of Thermo-Form System<sup>®</sup> walls may be increased by using thicker polystyrene panels on either one or both sides of the concrete wall. These panels can be custom ordered and may require additional delivery time.

An example using 4” thick polystyrene panels and the resulting R-value follows:

Polystyrene (R-4.4 per inch @ 40°F x 8” thickness)	= R-35.2
Concrete (R-1.1 @ 8” thickness)	= R-1.1
Drywall (R-.45 @ ½” thickness)	= R-.45
Exterior Surface Resistance	= R-.68

**Total R-value of Thermo-Form System<sup>®</sup> with optional 4” thick poly = R-37.43**

Several ICF companies claim inflated R-values based upon thermal mass and other alleged characteristics of insulated concrete walls. We claim only the values assigned to building materials that can be proven beyond doubt.

## Thermo-Form System<sup>®</sup> Technical Bulletin

### 12003-5

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#### Thermo-Form System<sup>®</sup> Water Vapor Permeance

The panels used in the Thermo-Form system are made of type II expanded polystyrene which is rated at 3.5 perms per inch. This gives a 1.4 perm rating to a 2.5” thick panel. Thermo-Form system panels thus qualify as a vapor retarder. As a comparison, most home wraps are rated at 58 perms. (<http://www.home-siding-info.com/tyvek-advantages.html>)

As with any construction method, onsite conditions and installation techniques play a key role in reaching our product’s maximum performance potential.

## **Thermo-Form System<sup>®</sup> Technical Bulletin**

**12003-6**

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### Thermo-Form System<sup>®</sup> Cold Weather Concrete Placement

TF System - The Vertical ICF, Inc. advises contractors to always follow the prescriptions of ACI-306R-88 when placing concrete into insulated concrete forms in below freezing temperatures.

These American Concrete Institute prescriptions show that insulated concrete forms can protect concrete under very cold conditions. TF System - The Vertical ICF, Inc. recommends that concrete not be placed at temperatures below 10° F.

## **Thermo-Form System<sup>®</sup> Technical Bulletin**

### **12003-7**

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#### Thermo-Form System<sup>®</sup> Damp Proofing and Water Proofing

TF System<sup>®</sup> defines damp proofing as applying a tar-like substance to the exterior surface of a basement wall. TF System<sup>®</sup> defines water proofing as applying an actual physical membrane to the exterior surface of a basement wall.

Damp proofing is accomplished by spraying or brushing on a water-based emulsion asphalt product similar to tar. It is important to make certain that the product selected is compatible with expanded polystyrene. We recommend that contractors test a sample of polystyrene with the intended product to assure that there will be no compatibility issues.

Water proofing is used in areas where there is the likelihood of hydrostatic pressure against the basement walls at any time. Water proofing products include sheet applied membranes, plastic dimple board membranes, and spray applied membranes. Always follow the manufacturer's installation instructions carefully in order to satisfy the particular product warranty. Spray applied or brush applied membranes should also be tested to assure they are compatible with expanded polystyrene.

The decision whether to use damp proofing or water proofing is site specific and is best made between the owner, general contractor, and excavator while following local applicable building codes.

# TF Forming Systems, Inc

## Terms and Conditions of Sale & Warranty

### **1. General.**

(a) This document constitutes an offer by **TF Forming Systems, Inc.** ("TF Systems") to provide the products and/or services described herein (the "Products") to the buyer to which this offer is addressed ("Buyer"), subject to the terms, covenants and conditions contained herein. Buyer may not modify, change, renounce or waive any term, covenant or condition hereof or any of TF Systems' rights or remedies hereunder unless TF Systems consents thereto in writing. TF Systems agrees to provide the Products to Buyer only on the terms of this contract, notwithstanding any language in Buyer's purchase order, if one exists, or other writing or oral representation previously, simultaneously or hereafter received by TF Systems purporting to amend, modify or replace the terms, covenants and conditions of this contract with any different or additional terms, covenants or conditions or reciting that any action or inaction by TF Systems constitutes agreement or consent by TF Systems to such amendment, modification or replacement.

**TF SYSTEMS'S AGREEMENT TO PROVIDE THE PRODUCTS IS EXPRESSLY CONDITIONED ON BUYER'S ASSENT TO ALL OF THE TERMS AND CONDITIONS SET FORTH HEREIN.**

(b) TF Systems sales representatives are without authority to change, modify, or alter the terms of this contract.

(c) Buyer shall be deemed to have made an unqualified acceptance of this contract and the terms and conditions herein on the earliest of the following to occur: (i) TF Systems receipt of a copy of this contract signed by Buyer; (ii) Buyer's payment of any amounts due under this contract; (iii) Buyer's delivery to TF Systems of any material or specifications to be furnished by Buyer; (iv) Buyer's receipt of the Products; or (v) any other event constituting acceptance under applicable law.

(d) Written quotations are void unless accepted within 30 days from date of issue. Other TF Systems publications are maintained as sources of general information and are not quotations or offers to sell.

(e) This contract shall be governed by and construed according to the internal laws of the State of Wisconsin, including, without limitation, the Uniform Commercial Code as adopted in Wisconsin, but excluding those laws expressly limited by their terms to persons situated in Wisconsin. This contract and the purchase and sale hereunder shall not be governed by the United Nations Convention on Contracts for the International Sale of Goods. Any cause of action, claim, suit or demand by Buyer allegedly arising from or related to the terms of this contract or the relationship of the parties shall be brought in a court situated in the State of Wisconsin. Both parties hereby irrevocably admit themselves to and consent to the jurisdiction of said court. The provisions of this paragraph shall survive termination of this contract for any reason. Upon termination of this contract for any reason, TF Systems shall have all of the rights and remedies provided by law, including, without limitation, the rights of a secured party under Chapter 409, Wisconsin Statutes or any successor statute or similar statute in the jurisdiction where Buyer is located or stores the Products.

(f) The invalidity of any provision or clause of this contract shall not affect the validity of any other provision or clause hereof.

(g) TF Systems reserves the right to correct clerical or similar errors relating to price or any other term shown in this contract.

(h) Failure of either party to insist, in any one or more instances, upon performance of any term, covenant or condition of this contract shall not be construed as a waiver or relinquishment of any right granted hereunder or the future performance of such term, covenant or condition.

(i) Buyer may not assign this contract or any rights or obligations hereunder without TF Systems prior written consent.

(j) Buyer shall comply with all applicable laws during any installation and/or use of the Products.

### **2. Delivery, Title, and Risk of Loss.**

(a) Shipping dates given by TF Systems are based on prompt receipt of all necessary information and specifications regarding the order. TF Systems will use its reasonable business efforts to meet the scheduled dates shown on the face hereof. Failure by TF Systems to make any shipments by such dates does not constitute a cause for cancellation and/or for damages of any character.

(b) Any delay in delivery for any cause specified in the next paragraph or beyond TF Systems reasonable control or due to any priorities or allocations necessitated by governmental orders or regulations shall extend the term of delivery hereunder by a period equal to the length of such delay.

(c) In the event of delay in delivery requested by Buyer or caused by (i) Buyer's failure to supply adequate shipping instructions; (ii) Buyer's failure to supply or approve necessary data or specifications in a timely manner; (iii) any changes requested by Buyer; or (iv) Buyer's failure to provide documents required for TF Systems to effect shipment, TF Systems will store all Products at Buyer's risk and expense.

(d) If actual delivery is delayed beyond the quoted delivery date for any reason specified in the preceding paragraph, TF Systems reserves the right to increase the price of the Products and change the payment terms for them. All storage costs and expenses are due as and when payment for the Products becomes due unless stated otherwise on the face hereof.

(e) Unless stated otherwise on the face hereof, TF Systems is not responsible for any loss, damage, or delay which may occur after Products have been accepted for shipment by a transportation company. Any claim relating thereto should be made to the carrier.

(f) Claims for shortages or other errors must be made in writing to TF Systems within 5 days after shipment. Failure to give such notice shall constitute unqualified acceptance and a waiver of all such claims by Buyer. Partial shipments shall be permitted.

(g) The price for the Products is as stated on the face hereof. TF Systems reserves the right to change prices in its sole discretion upon 30 days' prior written notice to Buyer. Any manufacturer's tax, retailer's occupation tax, use tax, sales tax, excise tax, value-added tax, duty, customs agent or broker fees, inspection or testing fee, freight costs, insurance, consular fees, or any other tax, fee or charge of any nature whatsoever imposed on, in connection with or measured by any transaction between TF Systems and the Buyer shall be paid by the Buyer in addition to the prices quoted or invoiced. Unless otherwise stated on the face hereof, prices are in U.S. Dollars.

(h) TF Systems shall deliver the Products F.O.B. the delivery point stated on the face hereof. Title to the Products shall pass from TF Systems to Buyer upon Buyer's payment in full for the Products. Unless stated otherwise on the face hereof, regardless of freight payment by Seller on Buyer's behalf (for which Buyer agrees to reimburse Seller), all risk of loss or damage in transit shall pass to Buyer when the Products are delivered as described in the first sentence of this section (h).

(i) TF Systems shall pack the Products for delivery in the manner TF Systems deems appropriate under the circumstances. If Buyer desires special packaging or delivery, Buyer must request same from TF Systems in writing at least five days prior to the scheduled delivery date. Any such special packaging or delivery shall be at Buyer's cost, and Buyer agrees to promptly reimburse TF Systems for any such costs paid by TF Systems on Buyer's behalf.

### **3. Terms of Payment.**

Buyer shall pay TF Systems in U.S. dollars pursuant to the payment form specified on the face hereof. Terms of payment on all orders are subject to the approval of TF Systems credit department. If Buyer does not pay TF Systems any amount due under this contract or any other agreement when such amount is due or if Buyer defaults in the performance of this contract, TF Systems may, without liability to Buyer and without prejudice to TF Systems other lawful remedies (i) terminate TF Systems obligations under this contract, (ii) declare immediately due and payable all Buyer's obligations to TF Systems, (iii) change credit terms with respect to any further work or (iv) suspend or discontinue any further work until Buyer pays all overdue amounts. Buyer agrees to reimburse TF Systems for all costs incurred by TF Systems in collecting any sums owed by Buyer to TF Systems including, without limitation, reasonable attorneys' fees. Buyer agrees to pay, at TF Systems discretion, a late payment charge of up to 1-1/2% per month on all amounts not paid in full when due. If at any time in TF Systems judgment Buyer may be or may become unwilling or unable to meet the terms specified herein, TF Systems may require satisfactory assurances from Buyer and/or full or partial payment for Products in advance or by other secured form of payment as a condition to commencing or continuing manufacture or delivering products and may, if delivery has commenced, recover the Products from the carrier, pending receipt of such assurances and/or payments.

In partial consideration for TF Systems sale of Products to Buyer, Buyer hereby grants to TF Systems and TF Systems hereby retains a security interest in all Products sold to Buyer and documents relating to such Products now or hereafter in the possession of or under the control of Buyer, regardless of mode of attachment to realty or other property, title to which might at any time be determined to have passed to Buyer, including, without limitation, all inventories of the Products or any other product bearing any trademark of TF Systems, returns or reposessions and the proceeds of all of the foregoing, to secure all of Buyer's obligations to TF Systems under this contract and all other obligations of Buyer to TF Systems. Buyer agrees to execute such financing statements, continuation statements and other documents and to take such actions as may be required by TF Systems to evidence or perfect the security interest granted herein and the interest of TF Systems as the owner of the Products. If Buyer fails to perform any of its duties set forth in this contract, TF Systems is authorized in Buyer's name or otherwise to take such actions including, without limitation, signing Buyer's name, and Buyer hereby appoints TF Systems as its attorney-in-fact for such purpose.

### **4. Cancellations, Changes, and Returns.**

(a) **Cancellations:** All undelivered Products may be cancelled by Buyer at any time but only by written approval of an authorized representative of TF Systems. In the event of any cancellation of this order by Buyer, TF Systems reserves the right to charge Buyer TF Systems reasonable costs and expenses, plus TF Systems usual rate of profit for similar work.

(b) **Changes:** Buyer may not alter or modify its order or any part thereof without TF Systems prior written consent. TF Systems reserves the right to change the price, terms of payment, and delivery dates for any Products affected by any alterations or modification to which it consents. TF Systems reserves the right to improve or otherwise modify its Products from time to time in its sole discretion.

(c) **Returns:** No Products may be returned to TF Systems without its prior written authorization and Products may be returned only on the terms or conditions specified in such authorization. Returned Products must be of current manufacture, unused, in resalable condition, and securely packed to reach TF Systems without damage. Any cost incurred by TF Systems to put equipment in first class condition will be charged to Buyer.

### **5. Warranty and Damages.**

(a) **Warranty:** TF Systems warrants that its Products will be free from defects in workmanship and materials under normal use and service, for a period of 12 months from the date of their initial delivery. Any warranty is void in cases of damage in transit, negligence, abuse, abnormal usage or storage, misuse, accidents, or improper installation or maintenance or failure to use or maintain in accordance with TF Systems or any supplier's instructions or manuals. Any warranty is void if the Products are not covered in accordance with instructions or manuals to prevent sunlight degradation. TF Systems makes no warranty regarding installation services provided by subcontractors of TF Systems or any other party. Any defects arising from or relating to Buyer's specifications are not covered by TF Systems warranty. TF Systems makes no warranty regarding water infiltration and makes no warranty for applied coatings or other interior or exterior treatments. TF Systems makes no warranty regarding parts or products manufactured or supplied by third parties. Buyer shall be responsible for promptly notifying TF Systems of any warranty claims as described above.

**TF SYSTEMS MAKES NO WARRANTY REGARDING PRODUCT SOLD HEREUNDER IF ANY PORTION OF THE PRODUCT IS NOT MANUFACTURED BY TF SYSTEMS, UNLESS PURCHASED FROM A SUPPLIER APPROVED IN ADVANCE IN WRITING BY TF SYSTEMS. TF SYSTEMS'S SOLE OBLIGATION UNDER THIS WARRANTY SHALL BE, UPON PROMPT WRITTEN NOTICE BY BUYER OF ANY DEFECT, TO REPAIR AND/OR REPLACE WITHOUT CHARGE, F.O.B. TF SYSTEMS FACILITY, ANY DEFECTIVE PRODUCT EXPRESSLY WARRANTED HERE-IN AGAINST DEFECTS BY TF SYSTEMS OR, AT TF SYSTEMS'S OPTION, TO CREDIT BUYER'S ACCOUNT FOR THE PORTION OF THE PURCHASE PRICE RELATING TO THE DEFECTIVE PRODUCT. BUYER SHALL PAY ALL EXPENSES ASSOCIATED WITH THE REMOVAL, REINSTALLATION AND FREIGHT IN CONNECTION WITH THE FOREGOING REMEDY. TF SYSTEMS SHALL NOT BE LIABLE TO BUYER, OR ANYONE CLAIMING UNDER**



**BUYER, FOR ANY OTHER OBLIGATIONS OR LIABILITIES, INCLUDING, BUT NOT LIMITED TO, OBLIGATIONS OR LIABILITIES ARISING OUT OF BREACH OF CONTRACT OR WARRANTY, NEGLIGENCE OR OTHER TORT OR ANY THEORY OF STRICT LIABILITY, WITH RESPECT TO THE PRODUCTS, THEIR INSTALLATION, INSTRUCTIONS, DEFECTS FROM ANY CAUSE OR TF SYSTEMS'S REPRESENTATIONS, WARRANTIES, ACTS OR OMISSIONS.** This warranty covers only replacement or repair of defective Products at TF Systems main office and does not include field service travel and living expenses.

On Products or parts thereof furnished by TF Systems, but manufactured by others, TF Systems makes **NO WARRANTY**. The written warranty of the manufacturer, if any, will be assigned to Buyer if assignment is reasonably practicable. However, TF Systems does not adopt or guarantee or represent that the manufacturer will comply with any of the terms of the warranty of such manufacturer. TF Systems will manage and coordinate warranty service for all parts and components of the Products, but TF Systems does not guarantee the warranty performance or service of the manufacturers or vendors TF Systems procures to provide such warranty service. TF Systems will not be liable for any loss, cost, expense or damages of any nature relating to the warranty performance and/or service of any such manufacturers or vendors.

TF Systems will not reimburse Buyer for any expenses incurred by Buyer in repairing or replacing any defective Products, except for those incurred with TF Systems prior written permission. TF Forming System shall have the right, but not the obligation to dispose of parts it replaces.

**(b) Damages: IN NO EVENT SHALL TF SYSTEMS BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT OR SIMILAR DAMAGES OR DAMAGES FROM LOSS OF USE, REVENUE OR PROFIT, OR FOR COST OF CAPITAL OR OF SUBSTITUTE USE OR PERFORMANCE, OR FOR ANY OTHER LOSS OR COST OF SIMILAR TYPE. TF SYSTEMS AGGREGATE LIABILITY WITH RESPECT TO DEFECTIVE PRODUCTS SHALL BE LIMITED TO THE MONIES PAID BY BUYER TO TF SYSTEMS FOR THE DEFECTIVE PRODUCTS MANUFACTURED BY TF SYSTEMS.**

TF Systems shall not, under any circumstances, be liable for default, negligence or the acts or omissions of the Buyer or Buyer's employees or Buyer's other contractors or suppliers and Buyer indemnifies TF Systems against and holds it harmless from any loss, damage, cost or expense (including without limitation reasonable attorneys' fees) resulting from or due to such acts or omissions. TF Systems shall not, under any circumstances, be liable for any errors or omissions contained in specifications or drawings provided by Buyer, and Buyer indemnifies TF Systems against and holds it harmless from any loss, damage, cost or expense (including without limitation reasonable attorney's fees) resulting from or due to such errors or omissions.

TF Systems, in its manufacture and sale of these Products, assumes no liability as to possible infringements of patents by virtue of the use of such Products in combination with other elements or structures and Buyer hereby indemnifies and holds harmless TF Systems against all damages sustained by TF Systems (including without limitation reasonable attorneys' fees) resulting from any action or threatened action against TF Systems related thereto.

**6. Disclaimer of Warranties.**

**TF SYSTEMS AND BUYER AGREE THAT THE WARRANTIES IN THE PRECEDING SECTION ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. TF SYSTEMS HEREBY DISCLAIMS AND EXCLUDES ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND ALL OTHER EXPRESS OR IMPLIED WARRANTIES.** Any oral or written description of the Products is for the sole purpose of identifying the Products and shall not be construed as an express warranty.

**7. Engineering Data.**

All engineering data, design information and engineering and shop drawings used in the completion of this order are and shall remain the property of TF Systems. Buyer shall not copy, reproduce, distribute, publish or communicate to any third party such data without the prior, written permission of a properly authorized representative of TF Systems. TF Systems hereby gives its permission to the Buyer to distribute Product data or operation and maintenance information to the end user.

**8. Patents.**

Orders manufactured to Buyer's drawings or descriptions are executed only with the understanding that Buyer hereby indemnifies and holds harmless TF Systems from any and all damages sustained by TF Systems, including, but not limited to, reasonable attorneys' fees, resulting from any action or threatened action against TF Systems for infringement of the patents or proprietary right of any other person.

**9. Final Written Expression.**

**THIS CONTRACT CONSTITUTES THE FINAL WRITTEN EXPRESSION OF THE TERMS BETWEEN TF SYSTEMS AND BUYER REGARDING THE PRODUCTS AND IS A COMPLETE AND EXCLUSIVE STATEMENT OF THOSE TERMS. ANY NEGOTIATIONS OR UNDERSTANDINGS BETWEEN TF SYSTEMS AND BUYER WHICH ARE NOT CONTAINED IN THIS CONTRACT SHALL HAVE NO FORCE OR EFFECT.**