

Life Safety Insulation

UP TO **90%** POST-INDUSTRIAL
**RECYCLE
CONTENT**

Thermafiber Mineral Wool Products
Contribute to LEED Green Building Credits

Mineral Wool
Born in Fire™



The Thermafiber Difference

Contrary to popular belief, insulation materials are not all alike. Sure, they all help to control temperature, and they all help to muffle sound, but Thermafiber Mineral Wool Insulation outperforms others when it comes to handling high heat exposure or stopping the spread of fire.

That's because Thermafiber Mineral Wool Insulation is **Born in Fire™**. The raw material for Thermafiber insulation is primarily blast furnace slag, a byproduct of steel manufacturing. Heated in a cupola furnace at temperatures above 2600°F, the molten lava is then spun out as fibers. The fibers are then formed into insulation batts, blankets, blowing wool, granules, or powder for use in a variety of specific applications.

Because mineral wool requires so much heat in its formation, it also resists an enormous amount of heat in use. While cellulose insulation pyrolyzes at 450°F and glass fiber melts at 1,050°F, Thermafiber Mineral Wool Insulation has withstood temperatures above 2,000°F for more than 5 hours in a test environment without failure.

The ability to withstand high temperatures does not seem like much until it is translated into time — the additional time it will take a fire to burn through a wall assembly, or the additional time it allows people to leave a building, or the additional time it allows for firefighters to strike a blaze before lives are lost and property is damaged.

Born in Fire™ means that Thermafiber insulation is denser than other insulations, giving it the ability to attenuate sound as well as absorb it. It means that Thermafiber insulation is more rigid than others, so that you can count on its thermal performance over a long period of time. And it means that Thermafiber mineral wool can be used successfully under extreme conditions for heat retention and energy conservation; as an additive for friction products; and as fiber reinforcement additives in plastics, paints and a number of other end uses.

Life Safety

Sound Control

Thermal Control

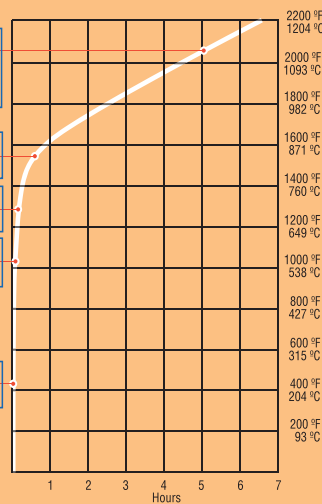
2080°F at 5hr.
Thermafiber Insulation
is still intact. Test
terminated without failure

1510°F (25 minutes)
Plate glass melts

1220°F (9 minutes)
Aluminum melts

1050°F (6 minutes)
Glass fiber insulation melts

450°F (2 minutes)
Cellulose pyrolyzes



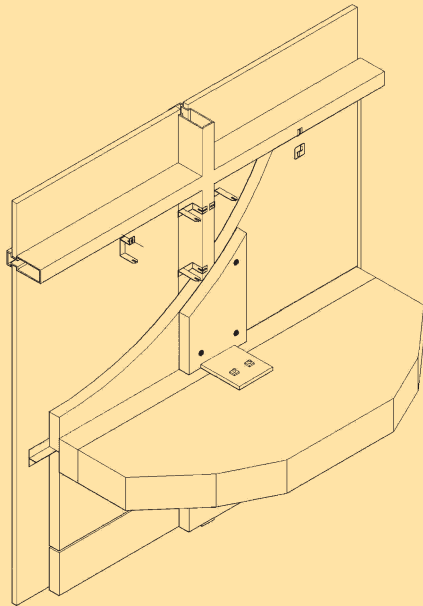
ASTM E119 Time Temperature Curve



OUR ONLY PRIORITY

Our first priority is to safeguard the lives of building occupants from the hazards of fire and the smoke that can be developed as a result of fire. The best way to accomplish that is to contain fire and smoke to the area of origin. The longer fire and smoke is contained, the more time building occupants have to exit the structure and the more time firefighters have to extinguish the blaze.

Thermafiber's wide variety of insulation materials and insulation systems play a prominent role in containing fire and protecting lives and property. Some of that protection is offered by some of the same insulation materials discussed earlier in this brochure. Still more protection is provided by specific systems outlined below. Either way, there simply is no better construction insulation available for fire protection than Thermafiber Mineral Wool Insulation.

**High-Rise Curtain Wall Fire Containment**

Curtain walls on high-rise buildings can create a particularly hazardous situation at the perimeter of a building, since these curtain walls are suspended from the floor slab edge. Often, there are several inches of space between the slab edge and the curtain wall assembly. A 3" void at the perimeter of a 200 sq. ft. building is equivalent to a 10' x 20' opening in the floor.

At the curtain wall assembly, fire and smoke has three possible routes of travel – 1) Through the space between the slab edge and the curtain wall. 2) Through the window head mullion and then up through the cavity of the curtain wall. 3) Out through the broken vision glass and back in through the vision glass at the floor above (the leapfrog effect).

Should any of these paths be available, fire certainly will take it. Proper insulation will block any or all of these paths.



Perimeter Fire Containment

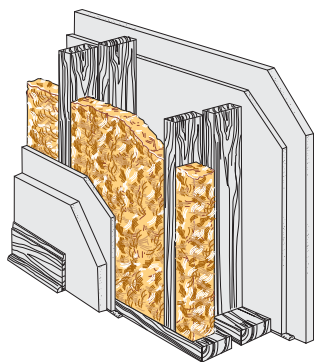


Partition Wall Containment Thermafiber SAFB

One part of the containment problem is the lateral spread of fire from room to room on the same floor through partition walls. Lateral fire spread can be especially problematic in mid-rise and high-rise structures, where it can ultimately reach ventilation or elevator shafts.

While gypsum wallboard alone provides some fire-containment capacity, insulating partition wall stud cavities with Thermafiber Sound Attenuation Fire Blankets (SAFB) adds another layer of fire-resistant material while boosting the sound attenuation performance of the wall. This high temperature resistant insulation protects studs and other structural components even if the gypsum panels have been compromised. Sealing partition walls at the top and bottom plates as well as around openings for electrical boxes, air handling ports, etc., also helps stop the horizontal spread of fire and smoke.

Thermafiber Sound Attenuation Fire Blankets are available in 1" to 6" thicknesses and may be ordered 16", 17", 24" or 25" wide. Surface burning characteristics are flame spread 0, smoke developed 0.



Floor/Ceiling Containment FS-25 Commercial Blankets

An even greater part of the containment problem is containment of fire and smoke at the floor/ceiling assembly. That's because fire is more likely to spread vertically than horizontally. There are several characteristics of fire that need to be observed in this regard.

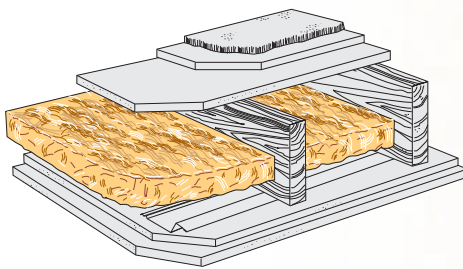
First, heat rises. So any combustibles that are above the initial flames will be prime targets for ignition.

Second, fire seeks a flue. Any opening in the floor/ceiling assembly can act as a flue or chimney as heated air finds an avenue of escape. As the floor/ceiling itself heats up, openings in the assembly draw air through them, inviting the fire to the floor above.

Third, fire tends to follow any existing thermal path. Just as the smoke from a campfire is drawn to the warmest body in its vicinity, flames in a building will seek the path of warm air when spreading upward.

In low- to mid-rise buildings, floor-to-floor fire protection often can be aided by simply installing either Thermafiber SAFB or Thermafiber FS-25 Commercial Blankets between joists in the floor-ceiling assembly. This layer of protection insulates joists and the floor assembly above. Application of FS-25 Commercial blankets between floor joists requires the support of wire mesh, woven tie wire or flexible metal rods.

In buildings with pipe, conduit and duct penetrations through the floor slab, such penetrations must be packed with Thermafiber Safing Insulation and sealed with an approved smoke sealant (by others) for inhibiting fire and smoke per a listed assembly.



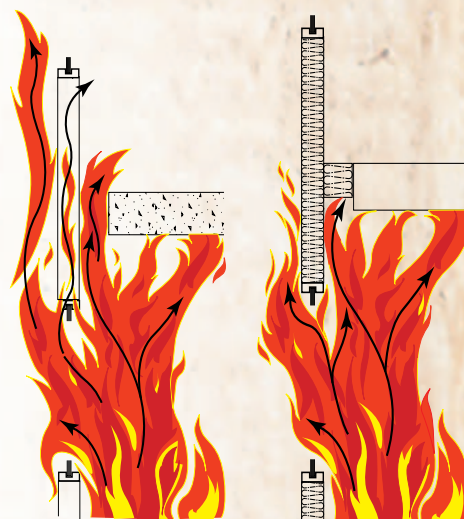
Perimeter Fire Containment

Protecting perimeter walls in low- to mid-rise construction from degradation or failure due to fire is typically done by installing Thermafiber FS-15 or FS-25 Commercial Blankets between exterior wall studs, stopping any route of passage to the outside and blocking any route of travel upward to other floors. Determining which blankets to use will be dependent on the nature of the construction and geographical weather conditions.

Exterior walls with vision glass are a major concern. The reason is that glass typically becomes the first point of failure for fire containment. Once flames spill outside the perimeter walls on one floor, they can heat and shatter the glass on the floor above, providing a new entry point for the fire to advance to higher floors.

Since any building fire is already heating the ceiling, any flame that has breached the exterior, such as through broken vision glass, will try to find its way back into the building at the floor above, so that it can follow the thermal path developed by the heated floor ceiling assembly.

The more distance created between the point of exit for the flames on one floor and the point of entry on another, the harder it is for fire to reenter the building. As a result, partial wall systems backed by Thermafiber FS-15 or FS-25 Commercial Blanket Insulation is recommended.



Curtain Wall Insulation

Curtain wall insulation is designed to protect all of the structural components of curtain wall assemblies, including spandrel panels of various compositions. It also eliminates any opportunity for fire to travel through the curtain wall spandrel area to the floor above.

Fitted into the spandrel cavities and mechanically attached to the framework of spandrel panels, curtain wall insulation stops flames and direct heat from reaching either the frame (steel or aluminum framing materials) or the panel facing (glass, aluminum, granite, concrete or steel).

Two different products permit **FireSpan** curtain wall insulations to be used in many different fire-containment assemblies of 1, 2, and 3-hr. ratings.

Thermafiber's **FireSpan 90** and **FireSpan 40** curtain wall insulation products are the industry's finest. Each has different product features and performance characteristics. The insulating material that is right for you will depend on the system application and performance requirements.

FireSpan curtain wall insulation products are available in a choice of three finishes.

The **Regular finish** is unfaced material, off white in color, that is commonly used behind opaque panels where no vapor retarder is needed. **Dark finish** is similar to regular finish, except that it is darker in color for use behind darker colored (perhaps translucent) panels to improve overall panel appearance.

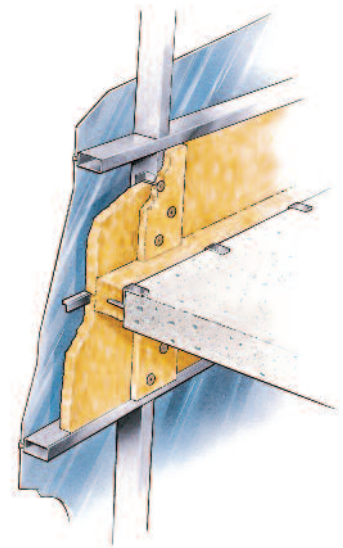
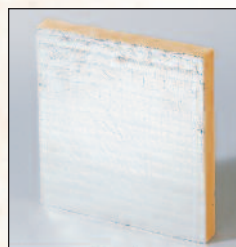
FSP finish is faced with a foil scrim

polyethylene vapor barrier added on either one side or two, which also improves durability for field installation and stops smoke passage in event of fire.

FireSpan 90 Curtain Wall Insulation and **FireSpan 40** Curtain Wall Insulation products have been incorporated into many manufactured curtain wall assemblies that have been tested and approved by both Underwriters Laboratories and Omega Point Laboratory (Intertek). Architects, building designers and general contractors will find those system designs in current fire-rated construction directories.

FireSpan 90 Curtain Wall Insulation is the premier product for protecting spandrel assemblies and structural components. This high-density material has improved thermal conductivity properties, enabling it to do the best possible job of diverting heat away from the components it is designed to protect. Also, its high density makes shrinkage and flame propagation less likely. FireSpan is available in thickness from 1" to 6" in 1/2" increments.

FireSpan 40 is less dense, but has proved its ability to meet protection requirements for a broad range of steel stud-framed assemblies and a variety of aluminum, glass and granite spandrels that often are designed to accommodate greater insulation thickness. FireSpan 40 ranges in thickness from 2" to 6" in 1/2" increments.



Thermafiber Perimeter Fire Containment System

Effective perimeter fire containment in high-rise, curtain wall clad buildings requires that all three of the routes of fire travel cited above be shut down at the same time. To do so, Thermafiber's engineers combined three types of materials – curtain wall insulation, safining insulation and a smoke resistant sealant – into a system that prohibits such fire travel.

While the initial Thermafiber Perimeter Fire Containment System performs well, as do many variations of that system, Thermafiber has since developed another system known as the IMPASSE Perimeter Fire Containment System. This system has additional components in its design, which help to assure superior performance while also streamlining the installation process. For most high-rise installations, this translates to lower in-place cost as well. (See sidebar for more information about IMPASSE.)

Sealant

To assure that the perimeter fire containment system does its job, fully stopping passage of smoke, all abutments of safining to both the floor slab and the curtain wall insulation must be sealed with a noncombustible, heat-resistant sealant (by others). Several sealants are available to accomplish this task. Recommended types include a trowel-applied mortar-type sealant, a spray-applied sealant or, if foil-faced safining is used, a caulk-type gun-applied sealant.

No matter what type of sealant is used, it must bond to the floor slab on one side and the foil-faced curtain wall insulation on the other.

Thermafiber Safing Insulation

Safing insulation is used primarily to fill any gap that exists between the floor slab edge and the insulated curtain wall components. Filling the gap blocks the passage of fire through that area, protecting the floor above.

Thermafiber Safing Insulation is typically available in 4" thick batts, either unfaced or foil faced. While unfaced insulation does an excellent job of inhibiting fire, it must be sealed to stop the passage of smoke.

Safing insulation installed in the gap between slab and curtain wall must be compression fitted to assure that there are no openings along the abutted material. It also must be secured to avoid falling out as a result of building movement or degradation of insulating material as fire progresses.



Compression fit Safing insulation



IMPASSE Curtain Wall Insulation System

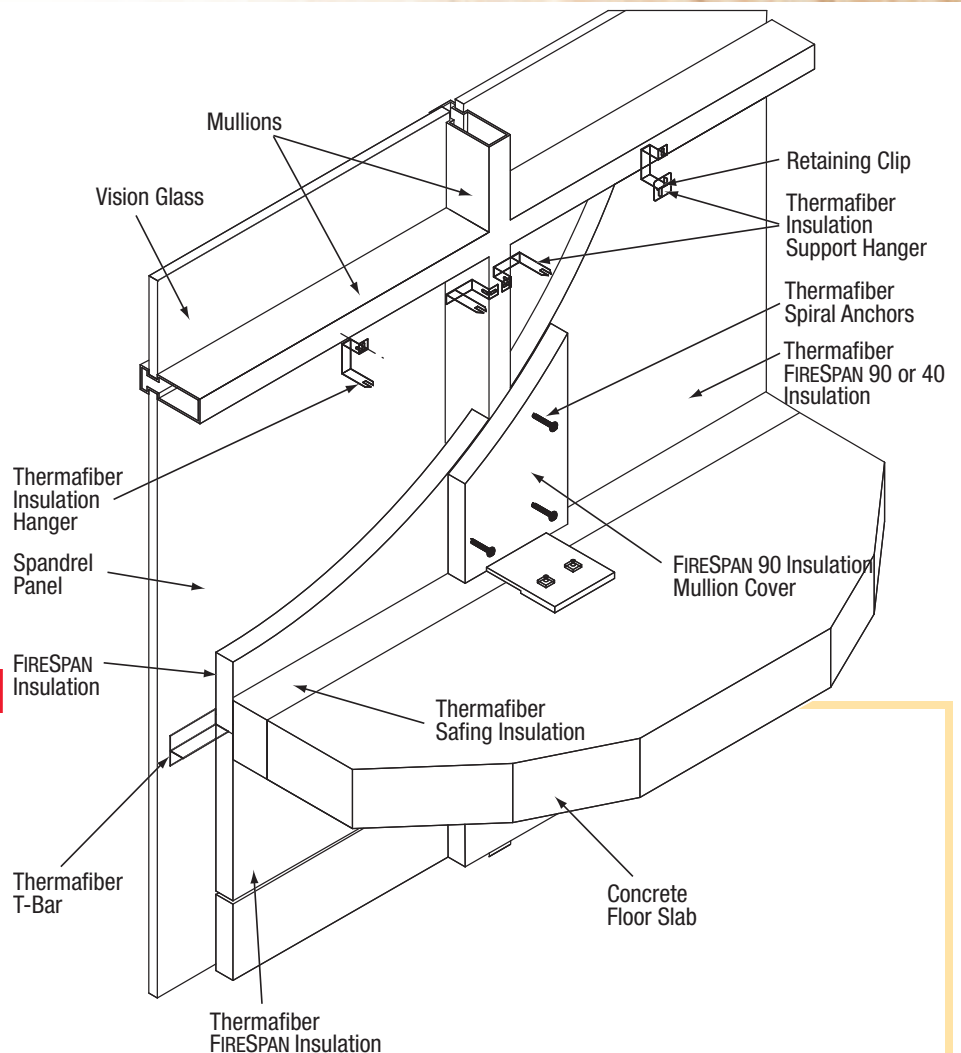
Our IMPASSE™ Curtain Wall Insulation System has an attitude that says to fire and smoke “You will not venture beyond this point!” Like other Thermafiber systems, IMPASSE provides a fire-protective barrier between the fire source and the curtain wall; as well as a barrier extension between the floor slab perimeter and the curtain wall assembly itself. But unlike all other curtain wall systems, IMPASSE employs a stepwise technique of installation that saves time and reduces in-place costs. IMPASSE speeds assembly with proprietary, screw-attached insulation support hangers which position the insulation blankets better and mount them faster than other insulation attachment devices. IMPASSE also employs a T-bar brace that maximizes the effectiveness of the barrier at the floor slab edge.

The IMPASSE Advantage

IMPASSE streamlines installation by employing some structural elements and changing the order of traditional installation steps so that components fit better, assemble faster and assure system performance. The system also takes full advantage of the fire-protective, sound control, thermal control, environmental protection and vapor barrier properties of Thermafiber FIRESPAN™ Curtain Wall Insulation and Thermafiber Safing Insulation. The IMPASSE system has already been tested and approved by Underwriters Laboratories, Inc. Ratings up to three hours are achievable with this system.

Unlike traditional curtain wall insulation systems, which call for the installation of impaling pins on spandrel panel frames prior to installing the insulation blankets, the IMPASSE system calls for blade-like insulation support hangers to be inserted into pre-cut FIRESPAN™ insulation blankets before attachment to framing. Following steps in this order makes it much easier for installers to position the insulation for maximum effectiveness, and simply requires that installers attach the insulation support hangers to the framing after the blanket is properly positioned. Screws used for attachment are then covered by another layer of FIRESPAN insulation to protect the fasteners and mullions from intense heat in the event of a fire.

While the IMPASSE method of installation can be used effectively with a number of tested and approved designs, the proprietary IMPASSE system uses a T-Bar backer to improve compression of Safing Insulation at the floor slab edge.



Installation Steps

1. Attach T-Bar brackets to curtain wall framing
2. Position and attach backer bar (T-Bar) with screw at one end and T-Bar clip at other end.
3. Impale horizontal and vertical hangers into the insulation board then install locking washer. Bend one fork tyne up and the other fork tyne down.
4. Position lower insulation board with top edge against backer bar.
5. Screw attach the horizontal hangers to the T-Bar. Then attach the vertical hangers to the face of the mullions.
6. Install top curtain wall insulation blanket, with insulation support hangers inserted in the same fashion as the lower blanket, and screw attach.
7. Compression fit safing between floor slab and FIRESPAN™ Curtain Wall Insulation at the T-Bar location.
8. Install mullion covers and secure with Thermafiber Spiral Anchors.
9. Apply approved smoke sealant.

It's About Time!

That's what an investment in the IMPASSE® Curtain Wall Insulation System buys you.

- **FIRE PROTECTION TIME** - Built with FIRESPAN™ Mineral Wool, this curtain wall insulation system enjoys a rating up to 3 hours and has demonstrated superior perimeter fire and smoke containment. That's the time building occupants need to vacate the structure and time firefighters need to extinguish the blaze.
- **SUPERVISION and INSPECTION TIME** - This system improves the precision of the installation and virtually eliminates errors. No need to rework problem areas.
- **INSTALLATION TIME** - Most installers report a man-hour savings compared with other systems. This enables them to compensate for the added cost of specialized installation materials.

IMPASSE enables installers to position FIRESPAN™ blankets more precisely, mount them faster, and secure them better than any other curtain wall insulation system available. It saves time for everyone involved - especially building occupants and first responders.

Basic fire containment design criteria

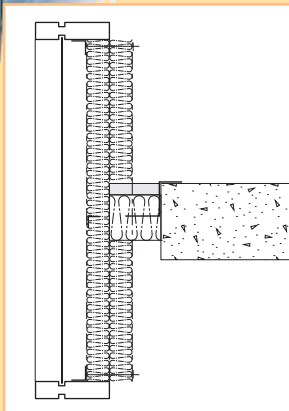
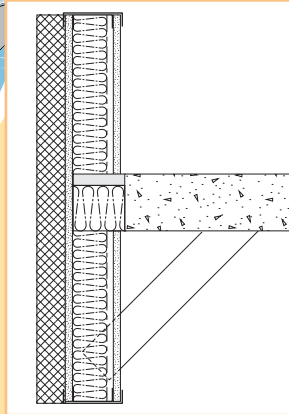
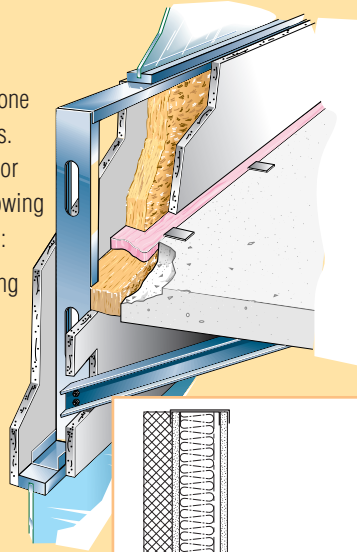
Perimeter fire containment is not restricted to just one system. Instead, there is a variety of design options. Nevertheless, several basic elements are required for perimeter fire containment to be effective. The following illustration points out required elements, including:

- Curtain wall insulation to protect spandrel framing and the face curtain wall spandrel panel
- Siding insulation that is compression fitted between the floor slab and the spandrel wall insulation
- Siding clips or other impaling device to secure the siding insulation
- Through penetrations or poke-through openings that are protected by siding insulation and topped with an approved smoke sealant
- Sufficient spandrel panel height to hold heat away from vision glass on the floor above and forestall the leapfrog effect of fire

Note: several design options are available, including aluminum-framed, steel stud-framed, aluminum spandrel, granite-faced, glass spandrel and gypsum sheathing systems. For details, physical descriptions, fire ratings and test data, consult our website, www.thermafiber.com, or contact the nearest sales office and ask for a copy of our most recent perimeter fire containment literature.

Perimeter Fire Containment Constructions

The following examples are only a few of many perimeter fire containment systems using Thermafiber FIRESPAN, Thermafiber Curtain Wall Insulation, Thermafiber Siding Insulation, and/or other Thermafiber insulation products and that have been tested and rated by recognized testing laboratories. Other designs, while not shown, have been identified by design number and may be referenced in documentation provided by the testing laboratory. For further information on any of these designs, contact your nearest Thermafiber distributor or representative, or turn to our website, www.thermafiber.com.



TopStop™ Pre-formed Head-of-Wall Insulation

Available in four configurations, TopStop™ Head-of-Wall insulation saves an enormous amount of installation time. Each TopStop insulation bar is three feet long, enabling the installer to conveniently stuff and cut (or cut and stuff, depending on preferred sequence) a series of voids at the wall to floor/ceiling intersection before moving the ladder or scaffold to the next section. Standard rectangular forming strips also are available for long open voids.



About Thermafiber

Thermafiber, Inc., headquartered in Wabash, Indiana, has been one of the nation's leading manufacturers of mineral wool insulation, sometimes called "rock wool", and processed mineral fibers since 1934.

The company's insulation products are used in commercial, industrial and residential construction where high degrees of fire protection, sound control and thermal retention are required. They also are used in power and process installations, and are incorporated as OEM components in a variety of thermal and sound related commercial products, industrial equipment and automotive applications.

Processed mineral fiber is a key component in friction products such as brake pads or shoes for the automotive industry, as a performance additive for many plastics, paints and other chemical formulations, and works well as a neutral soil amendment.

Thermafiber, Inc., has become widely known for quality mineral wool products. That's why we start every day with a clear focus on satisfying the needs of our customers.

Specifications

Part 1: General

1.1 Scope

Specify insulation products to meet project requirements

1.2 Qualifications

All insulation materials shall be supplied by Thermafiber, Inc. and shall be installed according to current printed instructions.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Design Conditions

Thermafiber (FS-15 Commercial Blankets) (FS-25 Commercial Blankets) (SAFB) (FIRESPAN Insulation) (Safing Insulation) shall be (1) (2) (3) –hr. fire tested within an assembly under simulated field conditions using ASTM E119 guidelines.

Part 2: Products Thermal Insulation

Thermafiber Commercial Blankets (1) (1-1/2) (2) (2-1/2) (3) (3-1/2) (4) (5-1/4) (6) inches thick, (15) (16) (23) (24) inches wide, 48 inches long, (FS-15, unfaced) (FS-25, foil faced), UL-labeled.

Thermafiber Sound Attenuation Fire Blankets (1) (1-1/2) (2) (2-1/2) (3) (3-1/2) (4) (6) inches thick, (15) (16) (23) (24) inches wide, 48 inches long, UL-labeled.

Thermafiber (FIRESPAN 90) (FIRESPAN 40) (1) (1-1/2) (2) (2-1/2) (3) (3-1/2) (4) (6) inches thick, 24 inches wide, 48 inches long, UL-labeled.

Thermafiber Safing Insulation 4 inches thick, 24 inches wide, 48 inches long, UL-labeled.

Part 3: Execution FS-15 Application

Position Thermafiber FS-15 Commercial Blanket vertically against wall surface. Hold in place with a Z-furring channel according to directions. Position next blanket so that it abuts attached furring member and hold in place with next furring channel.

FS-25 Application

Install Thermafiber FS-25 Commercial Blankets in stud cavities where specified. Compression fit securely between studs. Install insulation between floor joists and support blankets with wire mesh, cover tie wire or flexible metal rods. Butt ends of blankets closely together and fill all voids. For wall or floor penetrations, use only Thermafiber Safing Insulation in opening.

FIRESPAN Curtain Wall Insulation

Mechanically attach (regular) (dark) (unfaced) (foil faced) (FIRESPAN 90) (FIRESPAN 40) insulation to framing with (1") (2") thick (6") (8") wide blankets with approved fasteners. Adhesive attachments are not acceptable. Reinforce with backing member such as hat channel, "L" angle or "T" angle to prevent bowing near installed safing. Friction fit FIRESPAN Insulation between steel stud framing members.

Safing Insulation

Install Thermafiber Safing Insulation (of proper width, 2"-8" max opening, in safe-off area between Thermafiber FIRESPAN Curtain Wall Insulation and floor slabs), leaving no voids. Cut safing wider than opening to ensure compression fit. Compress or install on wire hangers, in all floor slab openings, to seal completely around telephone cables, ducts, piping or other utilities.

Penetration Sealant

Top off safing insulation in all floor penetrations with an approved smoke sealant to the manufacturer recommended thickness.

Sound Attenuation Fire Blankets

Install Thermafiber Sound Attenuation Fire Blankets in stud cavities of sound-rated partitions and where required to achieve fire-rated design. Friction fit securely between studs. Butt ends of blankets closely together and fill all voids.

Creased Sound Attenuation Fire Blankets

Install Creased Thermafiber Sound Attenuation Fire Blankets after gypsum panels are applied to one side of a wall cavity and before panels are applied to the other side of the studs. Insert 25" wide blankets in 24" stud cavities of sound-rated partitions and adjust where required to achieve a fire-rated design.

Butt the blankets slightly to fit in the stud cavities. Make a 1" vertical slit along center of blankets with a sharp utility knife or hook-bill knife to ease the pressure of the blanket against the gypsum panels when they are installed. Butt ends of blankets closely together and fill all voids

System Design and Specifications

Tested systems are very specific regarding the products included in the design. It is imperative that the system specifications be followed to the letter. While manufacturers frequently name and number their products in a similar fashion, the densities of the insulation materials can vary significantly from one manufacturer to another. Product substitutions can produce a mismatch of product densities, compromising system performance.

For additional information about any of the products shown in this brochure, visit our web site at www.thermafiber.com or contact the Thermafiber distributor or sales office nearest you.

Standards Compliance

Thermafiber Commercial Blankets, Sound Attenuation Fire Blankets, FIRESPAN 90 Curtain Wall Insulation, FIRESPAN 40 Curtain Wall Insulation, and Safing Insulation all are rated noncombustible as defined by NFPA Standard 220 when tested according to ASTM E136, and absorb less than 1% moisture by weight and volume in accordance with ASTM C553.

In accordance with ASTM C665 and Federal Specification HH-I-521F, FS-15 Blankets and SAFB Blankets are rated Type I; FS-25 Blankets are rated Type III, Class A, Category 1; Safing and FIRESPAN Insulations are rated as Types I and III, Class A, Category 1 (0.02 perm, tested in accordance with ASTM E96 procedure).

In accordance with ASTM C612 and Federal Specification HH-I-558B, all FIRESPAN Curtain Wall Insulation is rated as Types 1A, 1B and 2; Safing Insulation as Types 1A, 1B and 2; SAFB as Type 1A.

Good Design Practices

Vapor Retarders – In air conditioned buildings in localities where high humidity and temperatures predominate, consideration should be given to placing the vapor retarder on the warm (outside) wall to prevent moisture condensation within the insulation.

Ceilings – Insulation should be carefully fitted around, not over, recessed light fixtures. Covering fixtures with insulation causes heat to build up, which could result in fire.

Exterior walls – Penetrations in exterior walls for windows, doors, outlets, HVAC, etc., must be sealed with sealant or tape.

Test Data – Thermafiber, Inc. will provide test data for published fire, sound and structural systems designed and constructed according to its published specifications. Tests are conducted on Thermafiber products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following any substitution of materials or compromise in assembly design cannot be certified and may result in failure under critical conditions.

Performance of a Thermafiber insulation product is predicated on proper installation, including mechanical attachment of the product, using impaling pins, screws or other positive mechanical attachment devices if required.

Fire containment in structures where floor slab perimeters are exposed will require proper and effective insulation of curtain wall components as well as friction filling the gap between the edge of the floor slab and the facing of the FIRESPAN curtain wall insulation with Thermafiber Safing Insulation, including the use of safing clips or other approved mechanical attachment devices. Compatibility of the safing and curtain wall insulations must also be assured to attain maximum performance.



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www.thermafiber.com



Made from recycled material • Proudly made in USA

Warranty

Thermafiber Insulation products are backed by a 3-year limited materials warranty.

Trademarks:

Thermafiber, FireSpan, and SAFB are trademarks of Thermafiber, Inc.

Note: Products described here may not be available in all geographic markets. Consult your Thermafiber sales representative for further information. All product and system information contained herein is believed to be accurate at the time of publication. Thermafiber, Inc., reserves the right to add, alter or discontinue products without notice. For the latest information on any product, consult your Thermafiber sales representative or visit our web site, www.thermafiber.com.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

Safety First! Follow good safety and industrial hygiene practices while handling and installing products and systems. Take necessary precautions and wear the appropriate personal protective equipment as needed. Read material safety data sheets and related literature on products before specification and/or installation.