

THERMALSAFE®
FIRE RESISTANT
INSULATED PANEL
INSTALLATION GUIDE



PIONEERING INSULATED METAL PANEL TECHNOLOGY

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CONTENTS

- INTRODUCTION. 2

- RESPONSIBILITIES**
 - 1. Customer’s Responsibility. 3
 - 2. Disclaimers. 3

- INSTALLATION**
 - 1. Safe Installation. 4
 - 2. Installation Drawings 4
 - 3. Verifying the Structure 5
 - 4. Wall Framing Alignment. 5
 - 5. Fire Protection. 6
 - 6. Thermal Deflection. 6
 - 7. Stress Relief Cuts. 7

- RECEIVING & HANDLING MATERIALS**
 - 1. Wet Weather Protection 7
 - 2. Vapor Seal Requirements. 8
 - 3. Proper Equipment and Tools 9
 - 4. Receiving Materials. 9
 - 5. Appearance and Surface Damage. 10
 - 6. Preventing Corrosion. 11
 - 7. Panel Replacement. 11

- INSTALLATION BASICS**
 - 1. Sealant Application 11-12
 - 2. Fastener Application. 13-14
 - 3. Field Cutting. 15
 - 4. Unspecified Materials. 15
 - 5. Inspection During Installation. 16

- INSTALLATION DETAILS**
 - 1. Installation Details. 16
 - 2. Detail Index. 17
 - 3. Detail Drawings. 18-44

- APPENDIX**
 - 1. Fire Resistance Certifications. 45
 - 2. Wall Penetration Fire Stop – UL Systems. 46

INTRODUCTION

The ThermalSafe® panels utilize the proven thermal, structural and weather resistance performance of Metl-Span's composite panel technology. Combined with the superior fire resistance performance of its non-combustible mineral fiber core, the ThermalSafe panels are the most effective fire resistance rated composite wall panels available today.

To further enhance the effectiveness of ThermalSafe wall panels, penetration fire stop systems and hollow metal door and window systems are available, and the ThermalSafe panels may also be used as ceiling panels. These systems are all specifically designed and fire resistance rated to complement the fire resistance performance of the wall panels.

When using ThermalSafe panels, you are assured that the panels have been computer designed and precision fabricated to meet the specified panel design requirements and provide for efficient field installation. However, the in place performance of the panel is critically dependent upon the complete and accurate installation.

This installation guide provides technical information and suggested installation procedures to help you understand and successfully install your ThermalSafe panels.

This installation guide is intended to be used in conjunction with the project's installation drawings. The installation guide will help you lay out the wall assembly, establish the installation sequence, demonstrate suggested panel handling and installation procedures and point out conditions requiring special emphasis or caution.

Note: *The information in this guide is based on the application of standard ThermalSafe panels for typical building conditions. Specific building design and construction conditions shown on the installation drawings may vary from the information in this guide. In case of conflict between this guide and the project's installation drawings, the installation drawings will govern.*

Clarification concerning the ThermalSafe panel installation should be directed to the Metl-Span Technical Service Manager. Contact the Metl-Span office:

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CUSTOMER'S RESPONSIBILITY

For the following information, the term “customer” refers to the project’s owner and/or his representatives, such as the project’s architect, design engineer and general contractor.

Concerning the application of ThermalSafe panels for a specific project, the customer is responsible for assuring the following:

- The ThermalSafe panels are suitable for the purpose which they are to be used.
- The project’s structural framing and panel attachments are properly designed and in satisfactory condition to accept the erection and design loads imposed by the ThermalSafe panels, and are properly designed for the applicable service considerations, such as expansion/contraction and vibration, etc.
- The fire resistance protection of the wall support framing and other adjacent construction is properly designed and integrated with the ThermalSafe panels.
- The application of exterior and/or interior panel joint seals and perimeter seals are properly specified for the project’s moisture and vapor control requirements.
- The selection of a competent installer who is qualified and experienced in the proper installation of composite panels and related fire resistant construction.
- The customer must assure that the installer takes time to study and understand the project’s installation drawings and adapts or modifies the information in this installation guide as necessary to meet the project’s specific requirements.
- The ThermalSafe panels and related components are installed in compliance with the applicable codes, regulations, and good engineering and construction practices, and in accordance with the project’s installation drawings and the applicable portions of this installation guide.

DISCLAIMERS

Metl-Span does not guarantee and is not liable for the quality of installation, and is not responsible for defects that may be attributed to improper installation or the negligence of other parties.

Unless specified in writing, Metl-Span makes no expressed or implied warranties pertaining to the fitness of the ThermalSafe panel or its components for any particular purpose by the owner, and shall not be responsible for any indirect or consequential damages, such as to building contents, nor for any further loss of any kind to the owner or contractor.

Unless specified in writing, Metl-Span does not warrant any product or material as meeting the ordinances, laws or regulations of any particular state or local municipality, and Metl-Span is not responsible for conformance by the owner or contractor to such ordinances, laws or regulations.

SAFE INSTALLATION

The owner is responsible to provide a safe job site and safe working conditions. The owner and installer are responsible for the safe execution of the panel installation.

The information in this installation guide is not intended to prescribe comprehensive safety procedures. If the installer cannot safely install the ThermalSafe panels in accordance with these instructions, it is the responsibility of the installer to determine appropriate alternate installation procedures.

In the U.S. the federal Occupational Safety and Health Act (OSHA) has developed regulations with the objective of protecting workers from injury or accident. Part 1926, Safety and Health Regulations for Construction are applicable to the ThermalSafe wall panel erection.

In Canada, Occupational Safety and Health (OSH) regulation is under the jurisdiction of the local provinces and territories. Federal employees and Crown agencies may be subject to federal OSH jurisdiction.

The OSHA & OSH regulations must be recognized as job site requirements and fully complied with. Safe installation practices may be further defined and made mandatory by state or local ordinances.

INSTALLATION DRAWINGS

Depending upon the project's contract conditions, the installation drawings for the ThermalSafe panel installation may or may not be provided by Metl-Span. In either case, it is the owner's responsibility to assure that comprehensive and complete installation drawings are provided to the erector.

It must be verified that the installation drawings are the latest issue with the latest revisions and additions.

The latest issue of the installation drawings must be readily available at the job site during the preparation, installation and inspection of the wall support framing, wall panels, flashing and other related construction.

The installation drawings must be reviewed for differences with the actual job conditions. Any differences must be resolved with the customer before proceeding with the installation of the panels.

The installation drawings must be reviewed for differences with this installation guide, and the information herein adapted or modified in accordance with the project conditions specified in the installation drawings.

VERIFYING THE STRUCTURE

It must be verified that the structure is designed to accommodate the wall panels and their connections and accept the erection and design loads imposed by the wall panels.

Before starting the panel installation, it must be verified that the structure is complete with all structural connections and bracing in place and secured, and the necessary wall framing members, such as the base, eave and rake structural and intermediate support members, are in place and properly aligned.

WALL FRAMING ALIGNMENT

For purposes of this installation guide, the plane of the wall panel's interior surface (or the plane of the wall framing's exterior surfaces) is referred to as the "steel line".

The proper alignment of the wall framing members to the specified steel line is necessary to assure the proper fit-up of the overall construction. The alignment between adjacent wall framing members is most critical to the panel installation and performance.

When the wall panels are installed over intermediate wall framing members, any misalignment between adjacent members will cause deflection (bending) of the panels as they are connected to the misaligned members. This will cause installation difficulty when attempting to join a straight panel to the deflected installed panel. The deflected panels are also subjected to bending stress which may cause panel face rippling or buckling when combined with conditions of thermal stress and wind stress.

Before starting the panel installation, the wall framing must be checked for straightness and alignment, and must be checked to verify that the wall panels can be installed without interference.

In most cases, the recommended alignment tolerance for wall columns and base and head wall framing members is L/300 maximum deviation from the plane of the specified "steel line". Intermediate wall framing members will require more critical alignment tolerances.

For general wall framing alignment requirements and intermediate framing alignment tolerances, reference the "Checking Framing Alignment" detail in this guide, page 31. Reference the project's installation drawings or design specifications for any specific requirements.

Caution: All wall framing alignment error and interference must be corrected before panel installation can begin. If it is decided that the framing alignment errors or interference cannot be corrected, then modified or alternate panel installation details may have to be developed and may require additional installation time, additional materials or modified parts (with additional cost and delivery time). Metl-Span is not responsible for the additional cost of such modifications and cannot assure the performance of such modifications unless authorized by Metl-Span in writing.

FIRE PROTECTION

Wall Panels: The fire resistance function of the ThermalSafe wall panel is to serve as a barrier against the passage of flame and heat from one side of the wall to the other and to remain in place and resist the pressure of fire fighter's hose spray in the event of a fire.

The wall panels are rated for 1 hr., 2 hr. or 3 hr. fire resistance in accordance with the panel thickness. For specific fire resistance ratings and required panel thickness, refer to the "Fire Resistance Certifications" in the appendix of this guide, page 45.

To meet the requirements of the fire resistance certifications, the panels must be installed in accordance with the specifications in this installation guide and the projects' installation drawings.

Through penetrations for pipes, conduit and ducting must be adequately fire protected. For a listing of the ThermalSafe certified penetration fire stop systems, refer to the "Wall Penetration Fire Stops" in the appendix of this guide, page 46.

Door and window openings must also be fire protected. For details and installation instructions for the ThermalSafe certified hollow metal door and window installation systems, refer to the Hollow Metal Door /Window System - Technical Bulletin available from Metl-Span.

To assure that the wall continues to remain in place and provide the intended fire resistance performance during exposure to a fire, the supporting structure and adjacent construction may require fire protection, as specified by the applicable building codes or regulations. The fire protection is typically provided by encasing exposed structural members in a fire resistant material.

The customer is responsible for specifying the appropriate fire protection of the structure and other construction. Reference the project's installation drawings or the project's specifications for the specified fire protection requirements.

THERMAL DEFLECTION

During the panel installation, when the construction conditions cause significant temperature differences between the opposing sides of the panels, the resulting differential expansion/contraction of the faces will cause bowing (thermal deflection) of the panel. The warm side of the panel will bow outward.

Bowed panels can cause difficult installation when trying to fit the edge of the bowed panels to the straight edge of the installed panels.

It is important to avoid conditions that may cause one side of the panel to be significantly warmer than the other side prior to setting the panel in place. When installing panels under conditions of direct sun exposure, it may be necessary to stage the panels in the shade or turn the panels to warm both sides equally prior to installation.

STRESS RELIEF CUTS

On installed panels, when the project's design and operating conditions cause temperature differences between the exterior and interior sides of the wall, the resulting difference in expansion/contraction of the panel faces will cause the panel to try to bow (thermal deflection).

When the panel bowing is restrained by the panel's connection to intermediate wall framing members, stress is developed in the panels. When the panels are subjected to excessive stress, the panel faces will ripple or buckle.

For longer panel lengths with intermediate supports, the project's design and operating conditions may subject the panel faces to excessive stress. In such cases, stress relief is provided by field cutting the interior panel face along the line of the intermediate support.

When a stress relief cut is required, the panel's interior face must be secured above and below the cut. The flange of the framing member may have to be widened, or a sheeting angle may be added to the framing member, to provide for the required connections.

Caution: To avoid having to lift panels weakened by the stress relief cuts, cut the panels after they are in place and then install the sheeting angle and connection fasteners.

Reference the project's installation drawings or design specifications to determine if stress relief cuts are required.

WET WEATHER PROTECTION

The mineral fibers of the ThermalSafe panel's core are moisture resistant. However, moisture can migrate between the fibers if allowed to enter the exposed core at the panel's ends and edges. Freezing of moisture within the panel's core and long-term accumulation of moisture within the core can cause deterioration and structural damage to the panel.

During transit and job site storage, the bundle's factory wrapping will protect the panels from wet weather. If the wrapping is damaged, or if the wrapping has been removed, the panels will have to be protected by indoor storage or a suitable covering. The panels must be raised above standing water and accumulated snow or ice.

Exterior wall panels (and interior wall panels without roof cover) must not be installed during wet weather. The top ends of the panels will be exposed to the moisture until the eave or rake flashing is in place. The edges of the panels will be exposed to the moisture until the adjacent panels or flashing are installed.

While the wall panels are being installed, before finishing each day's work, or before stopping for pending wet weather, as much as possible of the eave or rake flashing should be installed over any erected wall panels. All remaining exposed panel top ends and exposed panel edges must be protected with a suitable temporary covering.

VAPOR SEAL REQUIREMENTS

Although the mineral fibers of the ThermalSafe panel's core are moisture resistant, water vapor and moisture can migrate through the core's fiber structure. If water vapor is allowed to infiltrate into the panel's core, the condensation and resulting accumulation of moisture within the core will reduce the panel's thermal insulating efficiency. Long term exposure to moisture within the core can cause corrosion of the panel faces and deterioration of the face to the core bond. Freezing of moisture within the core can cause breakdown of the core's physical structure.

The proper application of sealants at the panel joints and perimeter flashing is necessary to prevent the entry of water vapor into the panel's core. Depending on the project's climatic and operating conditions, water vapor may try to infiltrate into the panel joints and perimeter assemblies from the exterior or from the interior.

For certain cold storage applications, such as freezer rooms and some cooler rooms, the sealants may be required only at the warm side (exterior) and not at the cold side (interior) of the wall assemblies. In such cases, it is expected that water vapor within the room and within the wall construction will be removed by the air circulation and moisture removing capability of the refrigeration equipment. On projects with multiple functions, the sealant requirements may vary between different rooms or areas.

The building's designer is responsible for understanding the project's climatic and operating conditions and to specify the appropriate sealant applications as necessary to prevent moisture damage within the wall panels and perimeter assemblies. Refer to the installation drawings or the project's specifications for the specified sealants and locations.

Panel Joint Sealants - water vapor infiltration through the wall panel joints is prevented by the application of sealant in the metal tongue-and-groove edges of the exterior and/or interior panel faces. To provide the high temperature resistance required for the panel's fire resistance ratings, silicone sealants are specified for the panel joints.

Perimeter Sealants - water vapor migration through the perimeter of the wall assembly, such as at the base, eave, rake, corners and doorways, etc., is prevented by the application of sealant between the panel faces and the exterior and/or interior perimeter flashing. Depending upon the specific application, the perimeter sealants may be specified as gun grade or tape sealants.

For some applications, the wall-framing members may function as the interior flashing. In most cases, the exterior perimeter sealants serve the dual purpose of the weather seal and exterior vapor seal.

PROPER EQUIPMENT AND TOOLS

Before receiving the materials and before starting the panel installation, assure that the proper equipment and tools are on hand.

Unloading panel bundles will require a suitable fork lift or crane. The equipment must be capable of handling the weight and multiple point pick up requirements of the panel bundles and have sufficient mobility for the job site's travel requirements. For specific equipment requirements, reference the "Unloading Panel Bundles" detail in this guide, page 26.

The equipment for handling the individual panels must be capable of carrying the panel's weight and be capable of the project's reach and travel requirements. For specific equipment requirements, reference the "Lifting and Setting Panels" details in this guide, page 27.

The following chart shows suggested panel length limitations based on typical lifting methods. The panel weights shown are based on panels with 24 gauge faces, both sides.

Panel Thickness	Panel Wt. (per lin.ft.)	Vertical Lifting With Clamps	Vacuum Lifting*	
			Vertical Orientation	Horizontal Orientation
4"	17.64 lb.	34 max. length	45' max. length	36' max.length
5"	20.12 lb.	32 max. length	45' max. length	36' max.length
6"	22.60 lb.	26 max. length	45' max. length	36' max.length
7"	25.08 lb.	26 max. length	45' max. length	36' max.length
8"	27.56 lb.	24 max. length	45' max. length	36' max.length

**Length limit may vary with specific lift equipment. Always confirm the length and weight capacity of the vacuum unit with the equipment manufacturer or rental agency.*

All equipment and tools must be in good operating condition and the operators must adhere to safety precautions at all times. Worn out or improperly operating tools, too few tools, inadequate power source, or other equipment deficiencies slow down the installation process. The cost of inefficient working conditions is usually greater than the cost of providing good equipment.

In all cases, reference the equipment manufacturer's instruction to assure proper and safe operation.

RECEIVING MATERIALS

Your material is carefully inspected and crated before leaving the plant. The material is accepted by the transportation company as being complete and in satisfactory condition. It is the transportation company's responsibility to deliver the shipment intact and in satisfactory condition. It is the consignee's responsibility to inspect the shipment for damage and shortages when it is delivered.

Conducting a material inventory at the time of delivery is essential. By conducting the inventory, the installer is able to identify any material shortage or damage and minimize later erection delays caused by the need to reorder the missing or damaged materials.

APPEARANCE AND SURFACE DAMAGE

The embossed and premium painted finish of the ThermalSafe panel faces provides an exceptionally attractive appearance. It is most important that the panel surfaces are protected from damage during handling and installation.

Impact and Abrasion - because of their weight, composite panels have considerable inertia, which causes them to be susceptible to impact damage. Do not allow the panels to be struck by, or be swung into, other construction, materials or equipment while moving the panels.

Always cushion the panel surfaces from direct contact with temporary supports or lifting slings and clamps, etc. Because of the panel's weight, even resting on a sharp edge or irregular object can cause creasing or denting of the panel face. Do not slide the panels across hard or abrasive surfaces.

Bending & Crushing - to prevent bending or crushing damage, assure that the panels are uniformly supported at adequate spacing. Do not handle the panels in a manner that can cause buckling of the faces or separation of the faces from the core. For support spacing requirements, reference the "Panel Handling and Lifting" details in this guide, pages 27-29.

Surface Contamination - be careful not to drip or smear sealant onto the exposed panel surfaces, and check that the panel joints do not have excessive sealant that spills onto the exposed panel surfaces after the joints are engaged.

To prevent dirt and rust stains on the finished wall surfaces, thoroughly clean the panels of dirt, saw chips, grinding dust etc. before setting the panels in place.

Do not saw cut or torch cut materials in areas where the residue and sparks can be blown onto the bundled or installed wall panel surfaces. Do not paint, solvent wash or do other operations in areas where the overspray and residue can be blown onto the panel surfaces.

Joint Spacing - uniform joint spacing and plumb panels are critical to the appearance of the finished wall. Assure that each joint is uniformly engaged and assure that each panel is plumb.

Oil Canning - oil canning (rippling) of flat surfaces is a normal condition of metal faced panels and is not cause for rejection. However, rippling or buckling caused by misalignment or deflection of the wall framing members or interference by adjacent construction can result in objectionable appearance and must be avoided.

PREVENTING CORROSION

Surface Damage - damaged panel and flashing surfaces are subject to corrosion and may void the material warranties. Assure that the surfaces are not being subjected to abusive conditions or in contact with abrasive materials or residue.

Wet Conditions - assure that the panels and flashing are not being subjected to long term wet conditions such as: standing water, steam, spray or dripping water, wet debris, wet insulation or other moisture holding materials.

Corrosive Materials - assure that the panels and flashing are not subjected to direct contact or runoff from corrosive materials such as: copper pipes and flashing, uncured cement, treated lumber, anti-icing chemicals, strong solvents or other corrosive materials.

PANEL REPLACEMENT

Whenever a panel is damaged during installation, the erection should be stopped and the disposition of the damaged panel resolved. Do not continue with the installation of the damaged panel and risk having to replace the panel after the wall is finished, which can be difficult and costly.

Whenever possible, set the damaged panel aside to be used where the damaged area is cut out for door or corner panel conditions, or to be used where the appearance of the damage area is concealed or otherwise not objectionable.

As much as possible, avoid having to replace the panels. The panels are fabricated on a per order basis. A special run of replacement panels may require considerable lead time and specific face materials and colors may not be readily available.

SEALANT APPLICATION

It is the installer's responsibility to understand and assure that the specified sealants are used and are applied in the proper manner and condition. Always reference the sealant manufacturer's instructions for specific storage and use requirements.

Sealant Pigtails - pigtails are short beads of sealant, which are applied to the panel edge to serve as a bridge between the sealant within the panel's tongue-and-groove joint and the perimeter sealant on the surface of the panel. Pigtails are also used as a bridge between the flashing splice lap sealants and the perimeter sealants.

Caution: Because the pigtails are installed in concealed areas of the panel joint and flashing assemblies, they are easily forgotten. Omission of the pigtails will cause critical leaks in the wall's weather and vapor seals. Always verify the pigtails are in place as each panel is being installed.

SEALANT APPLICATION (cont.)

Temperature Effects - temperature extremes must be considered during installation of the panels due to the sensitivity of sealants. The suggested installation temperature range of the sealants is typically 40° to 100° F.

At cold temperatures, the sealant stiffens and may be difficult to apply with a loss of adhesion and compressibility. When temperatures fall below 40° F, the sealant should be stored in a heated room or chest so it will be warm enough to use effectively.

At hot temperatures, the sealant may set up too fast for practical handling. During hot weather, the sealant cartons should be stored in a cool and shaded area, and sealant tubes in use should be kept shaded until actually being used.

Contamination - to assure proper adhesion and sealing, the sealant must have complete contact with the adjoining surfaces. Contaminants such as water, oil, dirt and dust will prevent proper contact. Immediately before applying the sealant, the panel and flashing surfaces must be dry and thoroughly cleaned of all contaminants.

During humid weather, condensation or light mist can accumulate on the panel, flashing and sealant surfaces and not be readily noticed. It is important that the panel and flashing surfaces are wiped dry immediately before installation. A single wiping cloth will soon get saturated and become useless. It is critical that a sufficient supply of dry wiping cloths be made available during panel installation.

Set-up Time - the tack-free time of the sealants will vary in accordance with temperature and humidity conditions. If the sealant sets up before the panel joint or flashing assembly is completed, the hardened sealant may prevent proper assembly and sealing. To avoid premature set up, the sealant should not be applied until immediately before the installation of each panel and flashing.

Caution: When a panel installation requires fitting, always complete the fitting and test-fit the panel before installing the joint sealant.

FASTENER APPLICATION

The connections of the panels to the wall framing members is a most critical factor of the wall's load resistance performance and may be equally critical to the wall's weathertight performance. It is the installer's responsibility to assure that the specified fasteners are used and are installed in the proper manner. Reference the project's installation drawings for the specified fasteners and spacing.

Fastening Methods - the method of panel attachment is dependent upon the project's specific requirements. The project conditions may require that the panels be attached to the support framing with thru-panel screws, or may require that the panels be attached with screws or rivets into each panel face. Reference the "Typical Connections" details in this guide, page 39, for specific fastening method information.

Fastener Types - the fastener type is determined by the material of the wall framing members and the project's environment and operating conditions. While the details in this guide typically show self-drilling screws, other type fasteners such as self-tapping screws, rivets or masonry anchors may be required.

Carbon steel fasteners with corrosion resistant plating or coating are typically specified, but alloy headed fasteners may be specified if the fasteners are subject to exterior corrosive conditions. If the fasteners are subject to more severe corrosive or stress corrosion conditions, stainless steel bodied fasteners may be specified.

Caution: Thru-panel fasteners of the required length may not be readily available for some of the thicker wall panel applications. Before starting the panel installation, assure that the required fasteners are on hand.

Pilot Holes - self-tapping screws will require pilot holes. Providing the correct size pilot hole is most critical to the fastener's structural performance. See the following chart for the proper drill bit size required for the installation of #14 screws into the specific framing member thicknesses.

THICKNESS OF STEEL	SIZE OF DRILL	TYPE OF SCREW
18 GAGE	3/16" DRILL	B, BP, AB, A
16 GAGE	#9 DRILL	B, BP, AB, A
14 GAGE	#9 DRILL	B, BP, AB, A
12 GAGE	#3 DRILL	B, BP
11 GAGE	#2 DRILL	B, BP
OVER 11 GAGE THRU 3/8"	#1 DRILL	B, BP
OVER 3/8" THICKNESS	.234 DRILL	B, BP

FASTENER APPLICATION (cont.)

Screw Guns - use torque control screw guns for driving self-drilling and self-tapping screws. Variable speed (0 to 2000 rpm) and high amperage (5 to 7 AMP) guns are recommended to achieve the proper drilling speed and proper torque for secure fastening.

Sockets & Bits - use good quality sockets or bits. Good fitting sockets or bits reduce wobble and stripping of the screw heads, especially alloy heads. They also minimize objectionable paint chipping on colored screws and minimize damage to protective coatings on unpainted screws.

Installation - before starting the screw, the materials to be joined must be pressed firmly together to assure that there are no gaps between the materials. When using self-drilling screws, the materials must be held together until the screw has drilled through all the materials and the threads have engaged the far side material.

Most self-drilling screws require 20 pounds of pressure to maintain the drilling action and to start the thread cutting action. Also applying such pressure before starting the screw gun will usually prevent tip walking or wandering. If too little pressure is applied, the drill point may not cut into the metal and the spinning will cause the point to heat up and become dull. If the pressure is too heavy, the far side material may be deflected away causing a stand-off condition, or the drill tip may break or split.

Do not over-drive screws. Over-driving can strip the threads and/or damage the sealing washer and may cause depression (dimpling) of the panel or flashing surface.

Caution: Before starting the wall installation, pre-set and test the screw gun torque setting for the specific combination of fastener size and material thickness (and hole size for self-tapping screws).

Sealing Washers - for proper seating of the fasteners with sealing washers, the panel or flashing surface must be clean and drill shavings must be removed from under the washer before seating the fastener. The fastener must be installed perpendicular to the panel or flashing surface so that the washer can seat level without warping or cupping.

The fastener should be tightened to uniformly compress the washer, but not so tight that the washer splits or rolls out from under the metal backer, and not so tight that the panel face or flashing is dimpled. The recommended procedure is to tighten the fastener until the sealing washer just starts to visually bulge from under the metal backer.

Oversize Screws - as a good erection practice, whenever possible panel installers should carry approved oversized screws. Upon stripping or breaking a screw, the screw must be immediately removed and replaced with the appropriate oversized screw.

Caution: Do not defer replacing a stripped or broken screw to be remembered and fixed later. The majority of such screws will be forgotten until a problem is reported.

FIELD CUTTING

Cutting Panels - the panels are easily cut with circular saws or reciprocating saws using proper metal cutting blades. If the saw cannot cut through the entire panel thickness, or if shears are used, cut each panel face and use a knife or handsaw to cut through the remaining core.

Be sure to properly support the panel during the cutting operation to prevent separation of the face from the core or buckling of the panel. When necessary, pad the saw's shoe plate and guides so they do not scuff or scratch the exposed panel surfaces.

Caution: When cutting panels, always wear protective eye shields, gloves and long sleeve clothing to protect the eyes and skin from the sawing chips and dust.

Abrasive Saw Problems - abrasive saws (circular saws with friction disks) are not recommended for cutting panels or flashing. Abrasive saws create high heat that may burn away the protective cladding from the panel edges causing the edge to rust. Also abrasive sawing emits fine, hot steel particles that may be blown onto panel and flashing surfaces where they rust and can cause staining and rusting of those surfaces.

Cutting Flashing - it is recommended that flashing be cut with good quality sheet metal shears to provide a clean, undamaged cut. On shear cut edges, the protective cladding extends to the edge of the cut and is often wiped over the edge to further protect the base metal.

When field cutting complex shapes, it is usually easier to cut out a 1" wide strip using the left and right hand shears. The 1" cut-out provides the clearance to make smooth cuts and the clearance to work the shears around tight corners.

Caution: Whenever possible, fit the material so that the factory cut edge is exposed and the field cut edge is covered.

Layout and Marking - when marking the panels and flashing for cutting, avoid marking the panels in a manner which will leave visible marks or stains on the exposed surfaces. Use chalk or washable felt tip markers.

UNSPECIFIED MATERIALS

Use of wrong materials may cause installation and performance problems and may void the material warranties. All installed materials, especially sealants and fasteners, must be those which are specified on the project's installation drawings.

Metl-Span cannot be responsible for the performance of materials which are not provided, specified or approved by Metl-Span.

INSPECTION DURING INSTALLATION

During the wall panel installation, it is critical that all areas of the wall assembly are frequently inspected to assure that the panels and flashing are being installed in the proper manner and in accordance with the project's installation drawings and the applicable portions of this installation guide.

Failure to install the wall assembly correctly will result in wall performance problems which may require costly corrective work, material replacement, and performance and damage claims, etc. Also, incorrect installation may void the material warranties and any applicable performance warranties.

INSTALLATION DETAILS

The following section of this guide contains details that provide instructions and graphic illustrations of the suggested procedures for the preparation of the wall framing and the receiving, handling and installation of the wall panels and associated flashing.

The details are arranged in the order of typical wall erection and are shown for vertical and horizontal oriented panels. The general installation information is shown with the vertical panel installation details in the front portion of the section. The details for horizontal panel installation are shown in the back portion of this section.

The details are generic, showing typical wall framing and flashing conditions. Because of the many variations of applications and construction conditions, these generic details may vary from your project's actual conditions. Always reference the project's installation drawings for the specified requirements. If there are differences between the installation drawings and these installation guide details, the installation drawings will govern.

Before starting the panel installation, it is important to study the project's installation drawings to determine the project's specified conditions. Then select the installation details in this guide that are applicable to the project's conditions, and adapt or modify those details as necessary for the project's requirements.

INSTALLATION DETAIL INDEX

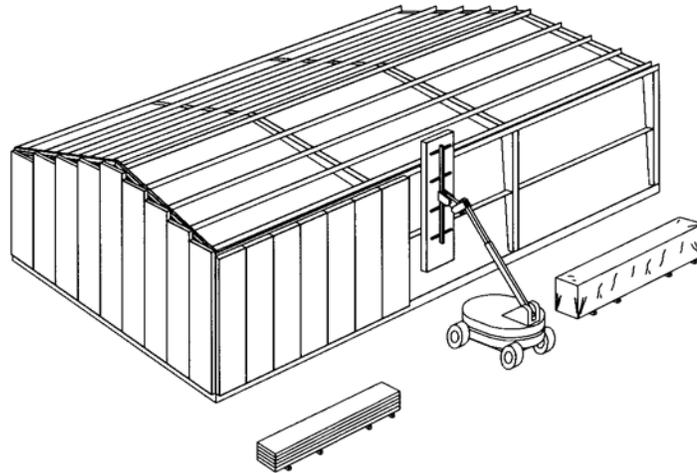
TITLE	PAGE NO.
Wall Panel Identification.....	18
Panel Description.....	19
Panel Joint Description.....	20
Typical Base Connections.....	21
Typical Head and Intermediate Connections.....	22
Installing Connection Fasteners.....	23
Panel Joint Sealants.....	24
Identification and Staging of Panel Bundles.....	25
Unloading Panel Bundles.....	26
Lifting and Setting Panels with Vacuum Lift.....	27
Lifting and Setting Panels with End Lift.....	28
Manual Handling of Panels.....	29
Prepare Wall Panel Layout.....	30
Checking Framing Alignment.....	31
Interior Flashing and Sealants.....	32
Corner Panel Erection.....	33
Panel Erection.....	34
Checking the Erected Panel.....	35
Completing the Panel Connections.....	36
Exterior Flashing and Sealants.....	37
Horizontal Panel – Prepare Wall Panel Layout.....	38
Horizontal Panel – Typical Connections.....	39
Horizontal Panel – Interior Flashing and Sealants.....	40
Horizontal Panel – Corner Panel Erection.....	41
Horizontal Panel – Panel Erection.....	42
Horizontal Panel – Exterior Sealant and Flashing.....	43
3 Hour Rated Panel – Joint Fastening.....	44
ThermalSafe [®] Fire Resistance Certifications.....	45
ThermalSafe [®] Wall Penetration Fire Stops – UL Systems	46

WALL PANEL IDENTIFICATION

PANEL ORIENTATION

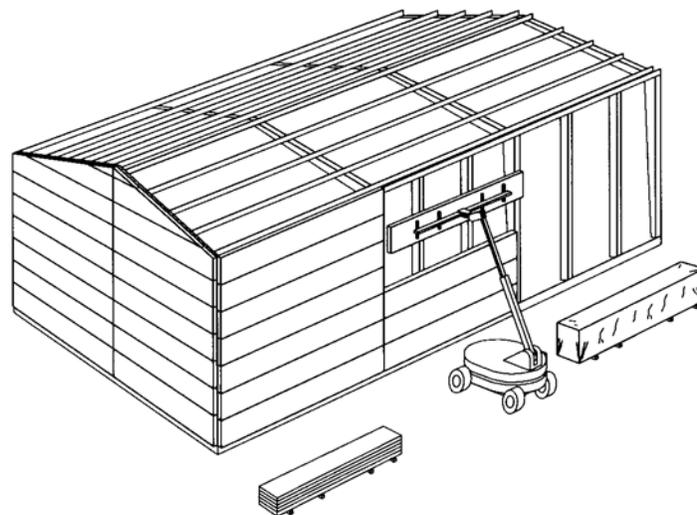
The ThermalSafe® panels are designed to be installed in either the vertical oriented position or the horizontal oriented position. Reference the project's erection drawings to determine the required panel orientation.

The following pages provide information for vertical and horizontal panel installation on typical building conditions. General information is shown with the vertical panel details in the front of this section. Specific information for horizontal panels is shown at the back of this section.



VERTICAL ORIENTED WALL PANELS

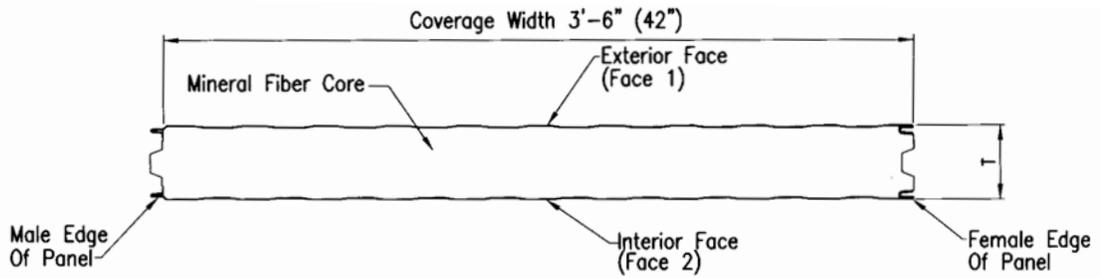
Vertical oriented panels are installed to span between the wall's top and bottom horizontal framing members and may also be supported by intermediate horizontal framing members. The adjacent panels are joined together by the vertical tongue-and-groove edge joints.



HORIZONTAL ORIENTED WALL PANELS

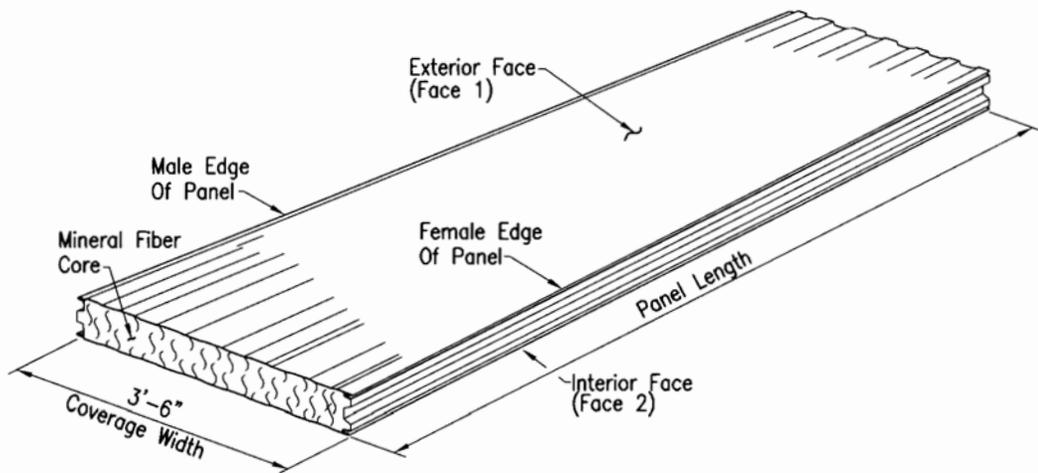
Horizontal oriented panels are installed to span between the wall's vertical framing members and may also be supported by intermediate vertical framing members. The stacked panels are joined together by the horizontal tongue-and-groove edge joints. The panel ends are butt joined and covered by a vertical flashing.

PANEL DESCRIPTION



PANEL CROSS SECTION

T = Thickness 4", 5", 6", 7" or 8"



PANEL VARIATIONS - The panels may be provided in different thicknesses, and the opposing panel faces (designated as face 1 & face 2) may be provided in different thickness, gage, finish and color.

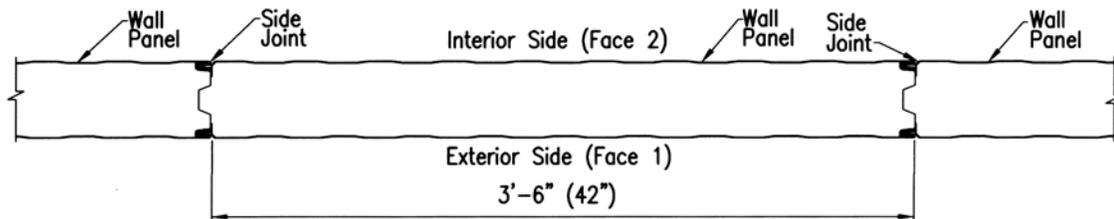
Reference the project's erection drawings for the specified location and face orientation of the panels.

PANEL WEIGHT - Proper equipment of sufficient capacity and sufficient manpower must be used when lifting, carrying and setting the panels.

Use the panel weight chart below to determine the necessary capacity of the lifting equipment and the manpower requirements.

PANEL WEIGHT PER LINEAL FT. OF PANEL LENGTH (lbs.)						
Face Gage		Panel Thickness				
Face 1	Face 2	4"	5"	6"	7"	8"
26	26	15.79	18.27	20.75	23.23	25.71
24	26	16.57	19.05	21.53	24.00	26.48
24	24	17.64	20.12	22.60	25.08	27.56

PANEL JOINT DESCRIPTION



WALL ASSEMBLY PLAN VIEW

Tongue-and-Groove Assembly - the edges of adjacent panels are joined together by tongue-and-groove engagement of the steel faces and the mineral fiber core.

Panel Module - the nominal panel coverage width is 3'-6". When panel joints are fully engaged, the actual coverage width may vary $-1/16"$ to $+1/8"$ due to panel tolerances and field tolerances.

Edge Orientation (Vertical Panels) - the panels can be installed in either direction. The direction of installation is determined by the job site and erection conditions.

Edge Orientation (Horizontal Panels) - the panels are installed by stacking the panels from the bottom up. The female edge of the upper panel sets onto the male edge of the lower panel. This provides a weather-shedding overlap of the panel faces.

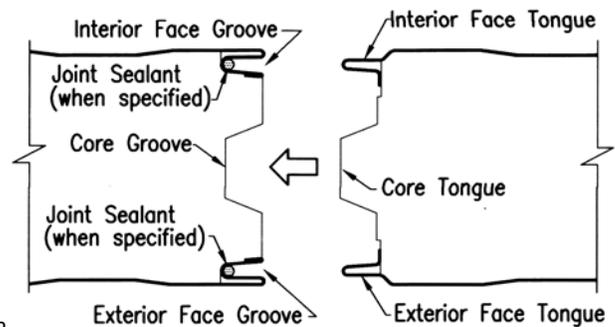
Assembly Stops - during joint assembly, metal to metal contact of the assembly stops provides a positive indicator of full joint engagement and prevents damage by over engagement of the joint.

Integral Spline - when the joint is fully engaged to the assembly stops, the tongue-and-groove joining of the mineral fiber core is a flush fit which may have a slight compression. This helps assure a seamless fire resistance function of the core.

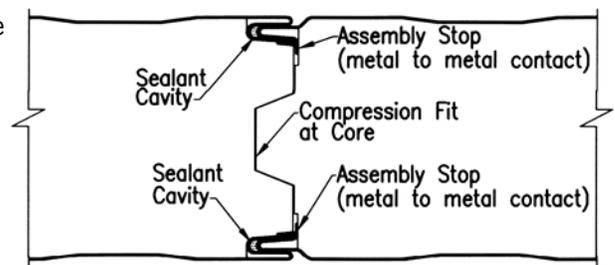
Sealant Cavities - when the joint is fully engaged, sealant cavities are left within the metal tongue-and-groove assemblies. The cavities help assure a functioning thickness of the joint sealant and minimize extruding of sealant out of the joints.

Joint Fastening (for 3 hr. rated panels only) -

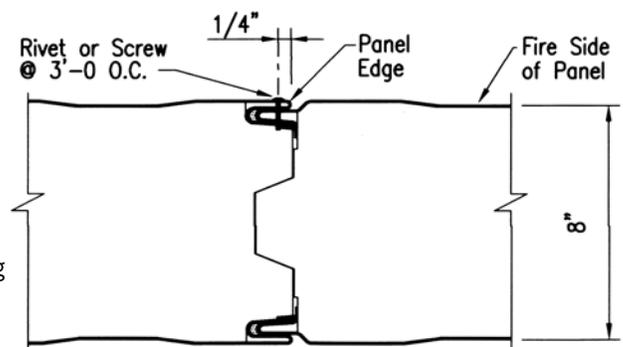
On 3 hr. fire resistance rated panels, on the fire side face only, the tongue-and-groove joint is fastened with rivets or screws at 3'0" spacing.



PANEL EDGES BEFORE ASSEMBLY



ASSEMBLED SIDE JOINT



PANEL JOINT FASTENING

Important: Required only on fire side of 3 hr. fire resistance rated (8" thick) panels

TYPICAL BASE CONNECTIONS

Connection Requirements - to conform to the requirements of the wall panel's fire resistance rating, both faces of the panel must be attached at the connections of the wall panel to the support framing.

To provide for the attachment of both panel faces, the connections may be designed to use thru-panel fasteners, or designed to use fasteners installed into each face. The details on this page show some typical base connections using these types of attachments.

Caution: The fasteners and spacing may vary from the typical connections shown on these details. Reference the project's installation drawings for the specified fasteners and fastener spacing.

Thru-Panel Fastened - this type of connection consists of a base angle on the interior side of the wall panels which is in place before the panels are installed.

The panels are attached by the thru-panel fasteners installed through the panels and into the base angle.

Base Channel - this type of connection consists of a base channel which is in place before the wall panels are installed.

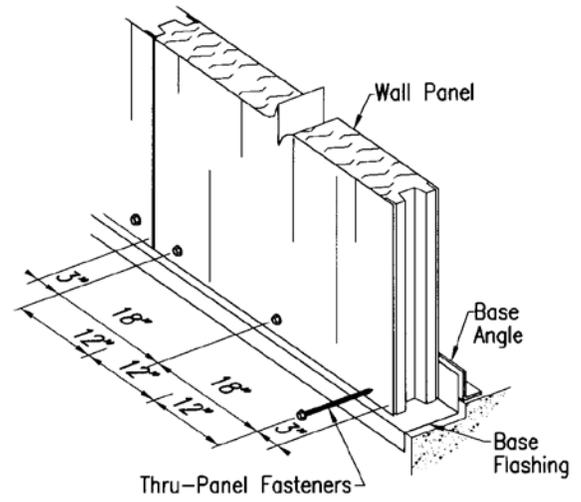
The panels are attached by the self-drilling fasteners installed through the channel's flanges and into the panel faces on both sides.

Isolated Base Angles - this type of connection consists of base angles on both sides of the wall panels. Typically, the interior base angle is in place before the panels are installed and the exterior angle is installed after the panels are in place.

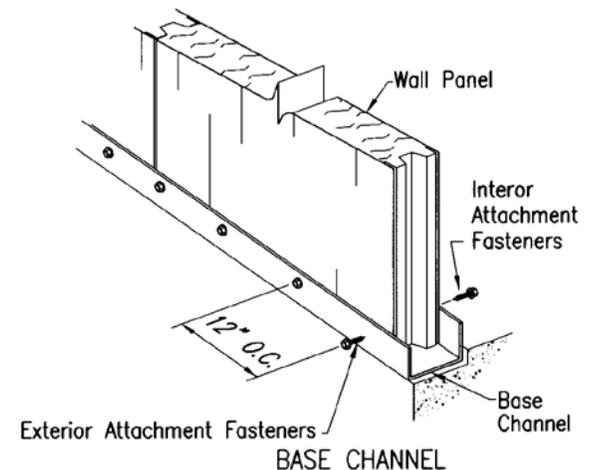
The panels are attached by the self-drilling fasteners installed through the base angles and into the panel faces on both sides.

Base Flashing Attachment - base flashing or base trim may be specified. In some cases, the base trim may be secured by the exterior panel attachment fasteners.

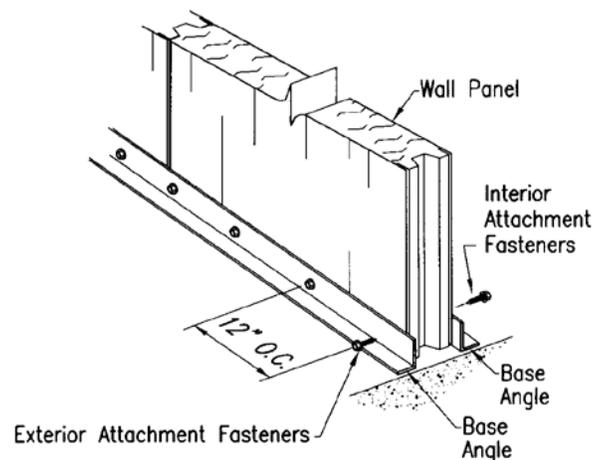
Caution - If the base trim is attached by the panel attachment fasteners, do not install those fasteners during the panel installation.



THRU-PANEL FASTENED
(refer to specified fastener pattern)



BASE CHANNEL



ISOLATED BASE ANGLES

TYPICAL HEAD & INTERMEDIATE CONNECTIONS

Connection Requirements - to conform to the requirements of the wall panel's fire resistance rating, both faces of the panel must be attached at the connections of the wall panel to the support framing.

To provide for the attachment of both panel faces, the connections may be designed to use thru-panel fasteners or be designed to use fasteners installed into each face. The details on this page show typical head and intermediate support connections using these types of attachments.

Caution: The fasteners and spacing may vary from the typical connections shown on these details. Reference the project's installation drawings for the specified fasteners and spacing.

Thru-Panel Fastening @ Head - this type of connection consists of a head structural on the interior side of the wall panels which is in place before the panels are installed.

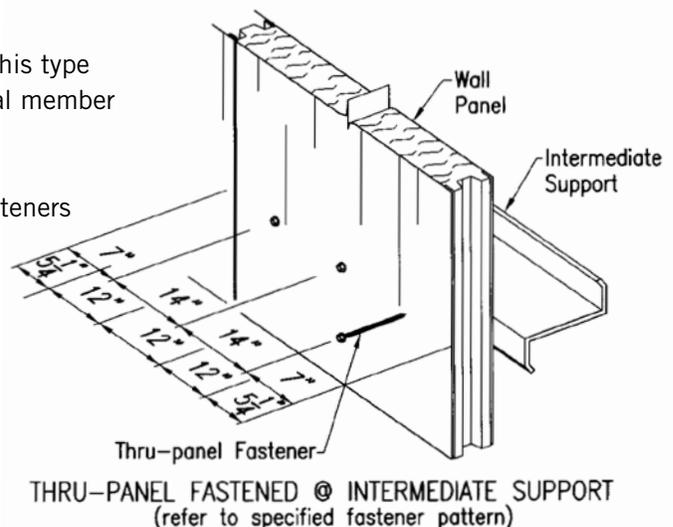
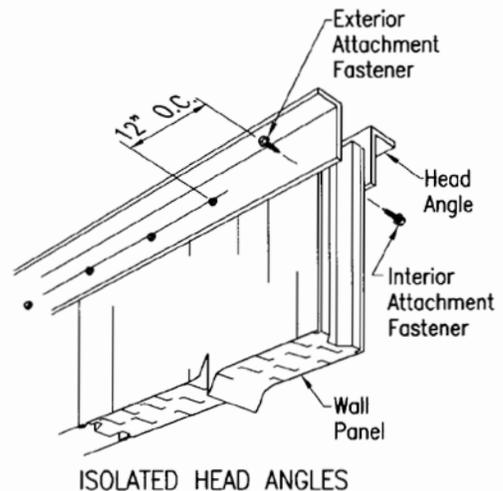
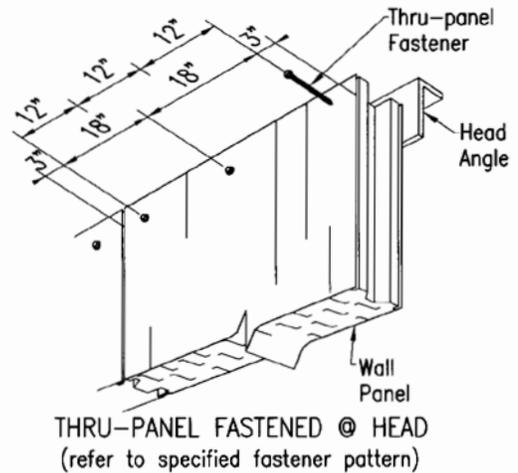
The wall panels are attached by the thru-panel fasteners installed through the panel and into the structural.

Isolated Head Angles - this type of connection consists of a structural member on both sides of the wall panels. The interior member is in place before the panels are installed and the exterior member is installed after the panels are in place.

The wall panel is attached by the self-drilling fasteners which are installed through the structural members and into the panel faces on both sides.

Thru-Panel Fastening @ Intermediate Structural - this type connection consists of an intermediate structural member on the interior side of the panel.

The wall panel is attached by the thru-panel fasteners installed through the panel and into the structural member.



INSTALLING CONNECTION FASTENERS

Fastener Types - For thru-panel fastened connections, the typical fasteners may be #14 or 1/4" self-drilling screws or self-tapping screws. The screws must be of the appropriate length for the panel thickness and must have a tip and thread type which is appropriate for the material and thickness of the structural member.

For face fastened connections, the typical fasteners are #12 self-drilling sheet metal screws.

In all cases, reference the project's installation drawings for the specified fasteners and spacing.

Pilot Holes - Self-tapping screws will require pre-drilling pilot holes. Reference the "Fastener Application" section, pages 13-14, in the front of this guide for suggested pilot hole sizes.

Pre-Assembly - Before installing the fasteners, the interior panel face must be set firmly and flush against the bearing surface of the interior structural member. Check and correct any cause of gaps between the panel face and the structural member.

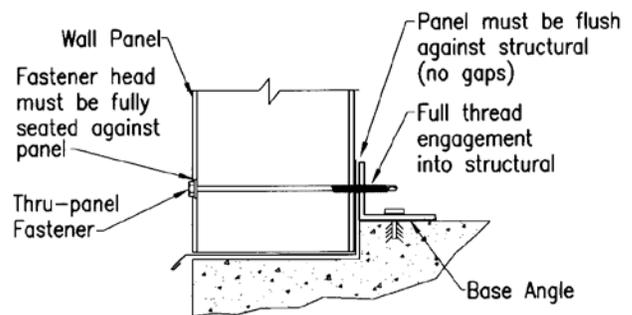
Do not attempt to use the fasteners to close gaps between the panel and structural member. This may cause damage to the panel and strip-out or breakage of the fastener.

Tightening Fasteners - The fasteners must be tightened as required to hold the panel firmly against the structural member, but must not be stripped by over tightening.

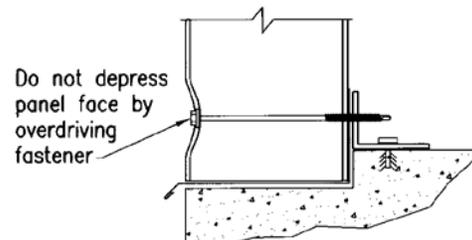
Overdriving thru-panel fasteners may cause objectionable dimpling of the panel face, crushing of the panel's core and damage to sealing washers.

Overdriving the exterior panel face fasteners may cause separation of the panel face from the core.

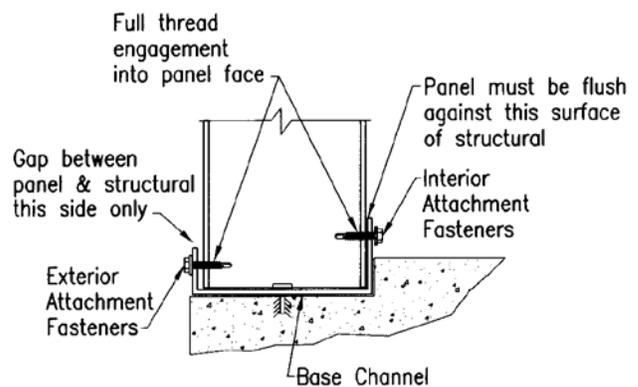
Caution: Use screw guns with a properly set torque or head depth control to assure that the fasteners are properly set and tightened.



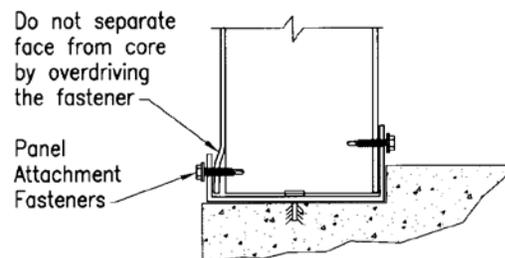
THRU-PANEL FASTENED
(Base Shown - Head Similar)



THRU-PANEL FASTENED
(Base Shown - Head Similar)



FACE FASTENED
(Base Shown - Head Similar)



FACE FASTENED
(Base Shown - Head Similar)

PANEL JOINT SEALANTS

Sealant Requirements - depending upon the project's requirements, sealants may be required in the panel joints on either or both the interior and exterior sides of the wall. On some projects, different wall areas may have different sealant requirements.

Caution: In all cases, reference the installation drawings or project specifications for the specified sealants and locations.

Sealant Installation - apply the sealant into the specified interior or exterior metal groove on the panel's female edge. The sealant should be applied continuously, as close as possible to the bottom of the groove.

The suggested sealant bead size is 3/16" to 1/4". Adjust the sealant bead size to assure there is sufficient sealant to fill the sealant cavity after the joint is assembled, but not so much that sealant is extruded out onto the panel face.

Nozzle Size - the ThermalSafe panel's tongue-and-groove joints are closely fitted to help assure the wall's fire resistance and weathertight performance.

For easier application of the sealant into the grooves, the sealant tubes may be provided with small diameter (glazer's) nozzles, or small diameter auxiliary nozzles may be provided for fitting onto larger diameter sealant tube nozzles.

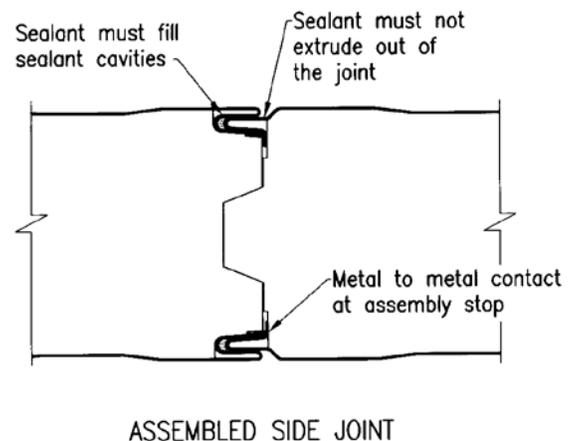
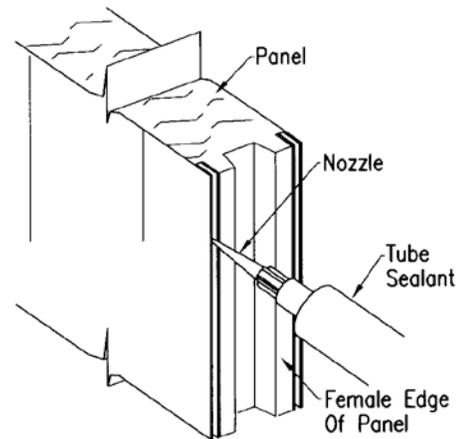
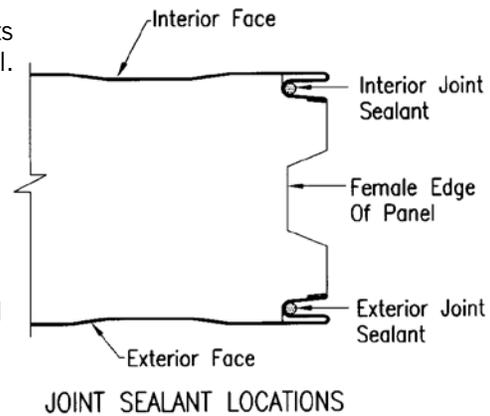
Set-up Time - if silicone sealant is specified for the panel joints, the panel installation sequence must be carefully planned for the faster set-up time of the silicone sealants.

To help assure that the joint sealant does not set-up and harden before the panel joints can be assembled, do not install the sealant until immediately before installing the panel. If the installation of the panel is stopped or delayed, any installed silicone sealant must be removed before it sets up and hardens.

Joint Assembly - slide the opposing panel edges together in a smooth, single motion to help assure uniform dispersion of the sealant within the joint cavity.

Do not assemble the panel joint in a manner that causes the joint to engage and then disengage. This may cause the sealant to be drawn out of the cavity, leaving the joint unsealed.

If the joint is assembled and then disassembled, the sealant must be checked and any displaced sealant must be replaced.



IDENTIFICATION & STAGING OF PANEL BUNDLES

Panel Bundles - the wall panels are shipped in stretch wrapped bundles. Each bundle consists of a single stack of panels in the flat position. The bundles are normally loaded on the truck trailer as two bundles wide and two bundles high.

Bundle Identification - a bundling report is provided with each shipment of panels. The report identifies each bundle with a number. The report identifies the panels within the bundle with an alpha/numeric code. The report also specifies the description, quantity and length of the panels in each bundle.

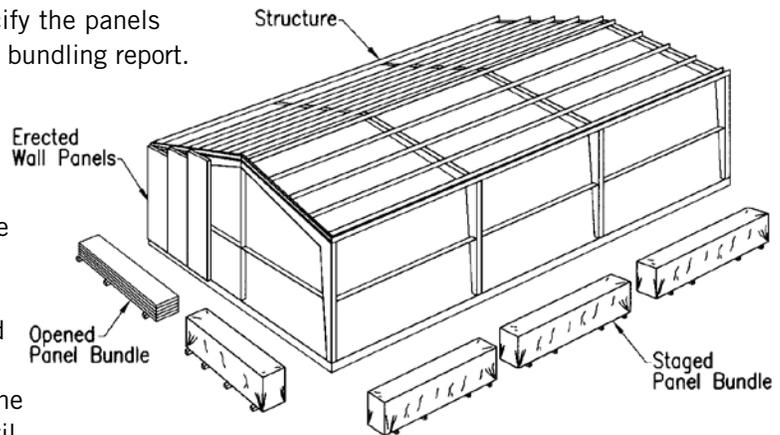
Bundling Report			
Bundle #	Total Qty.	Bill of Lading #	
1	15	137,854	
Item #	Item Desc.	Qty. in Bundle	Length
1	A1	4	27'-3"
2	A2	4	27'-6"
3	A3	7	27'-9"

Panel Identification Qty. Of Panels Panel Length

READING THE BUNDLING REPORT

Installation Drawings - the installation drawings will specify where the panels are located on the building. If Metl-Span is providing the project's installation drawings, the drawings will usually specify the panels with the same code that is shown on the bundling report.

Bundle Staging - using the bundling report to identify the panels within the bundles, the bundles can be positioned around the building in the order that the panels are to be used.



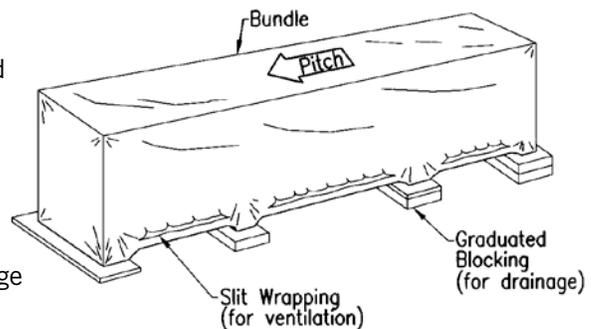
STAGING THE BUNDLES

Caution: The bundles must be protected against damage, water saturation and chemical contamination. If necessary, the bundles must be stored under cover until immediately before installation.

Bundle Orientation - position the staged bundles so that the panels can be readily lifted and set in place with the correct edge and face orientation.

Bundle Blocking - to assure the bundles have uniform support and are raised out of standing water, snow and mud, always set the bundles on blocking. Position the blocking under each of the bundle's bearing pads.

Bundle Drainage - shim the blocking as necessary for uniform support and graduate the blocking thickness so the bundle will be at a slight pitch to assure drainage of water between the panels.



BLOCKING AND VENTING THE BUNDLES

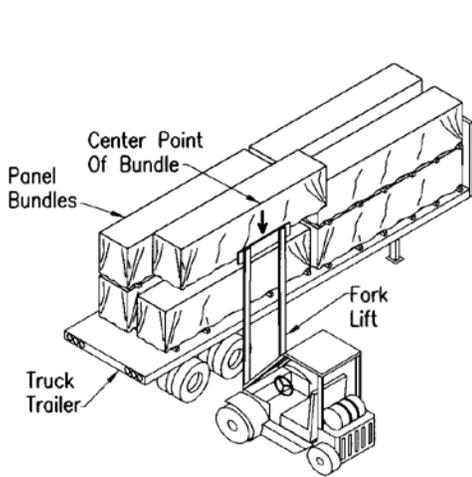
Bundle Ventilation - to provide for ventilation and evaporation of moisture within the bundles, slit the wrapping at intervals along each side at the bottom of the bundles.

UNLOADING PANEL BUNDLES

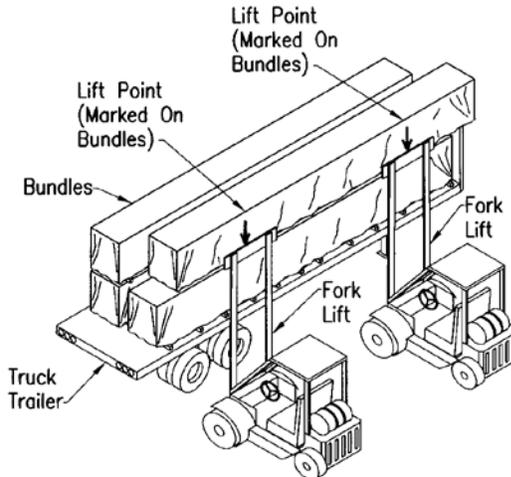
Unloading Bundles with Forklifts - shorter bundles can be lifted and moved with a single forklift. Longer bundles require lifting with two forklifts and are marked to indicate the lifting points.

The bundles have bearing pads which raise the bundle to allow insertion of the forklift blades.

Spread the forks as far as possible and assure that the forks are fully inserted to support the full width of the bundle. Check that the tips of the forks do not foul and damage the bundles on the opposite side of the truck. Pad the forklift masts to prevent damage to the panel edges.



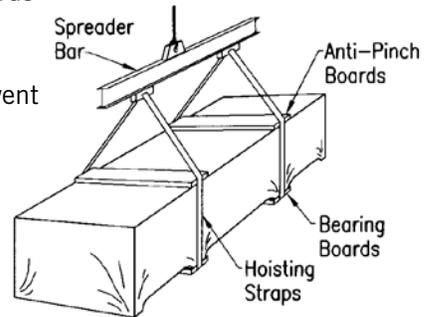
ONE POINT FORK LIFT



TWO POINT FORK LIFT

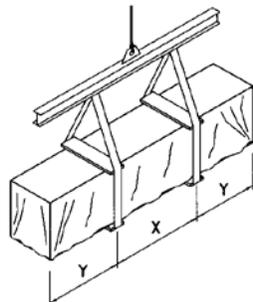
Unloading Bundles with a Crane - use top and bottom anti-pinch boards to prevent the lifting slings from crushing the sides of the bundle. Cut the boards to extend slightly beyond the width of the bundle. The bottom boards must be of sufficient width and strength to prevent crushing the bottom of the bundle.

A spreader bar must be used to provide the proper sling spacing and uniform support at lift points. Too few lift points or excessive lift point spacing can cause bending or crushing damage of the panels.



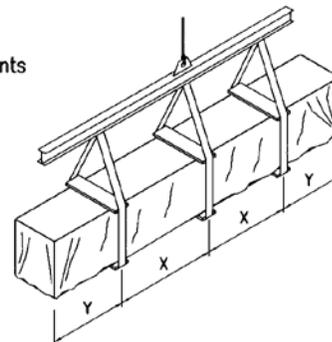
CRANE LIFT RIGGING

Caution: Before attempting to lift panel bundles, always confirm the actual bundle weight and the capacity of the lifting equipment.



TWO POINT CRANE LIFT

X=Max. Span Between Lift Points
Y=Max. Cantilever



THREE POINT CRANE LIFT

LIFTING & SETTING PANELS WITH VACUUM LIFT

Vacuum Lifting - improper handling of the panels can be hazardous to the workers and can cause damage to the panels and adjacent materials. Modern vacuum lift equipment provides a convenient and safe method of lifting and setting the panels.

When using vacuum lift equipment, there are no drilled holes or clamps to damage the panel and there is no equipment on the inside surface of the panel to foul the support framing during installation.

The multiple vacuum heads provide uniformly spaced pick up points to minimize bending of the panel as it is lifted from the bundle, carried and set into position.

Equipment Requirements - assure that the lifting equipment is of sufficient capacity for the panel weight and length, and is of sufficient mobility and reach for the construction conditions.

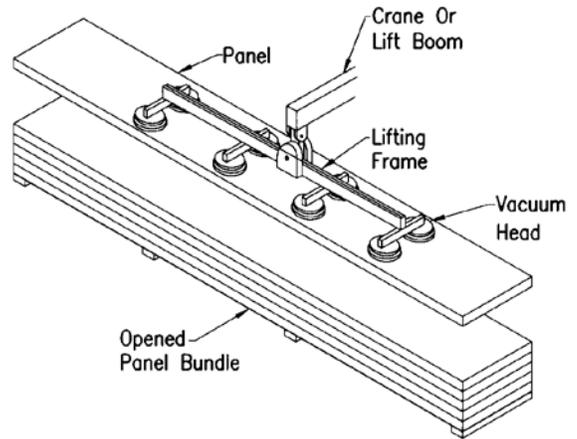
Assure that the vacuum heads are of suitable design and condition to safely lift the mesa profile and stucco embossed surfaces of the panels.

The panel's weight limits the panel span between vacuum heads that can be lifted without panel separation or bending damage. Assure that there are a sufficient number of vacuum heads and assure that the lifting frame is of sufficient length for the heads to be spaced as required for the panel's weight and length.

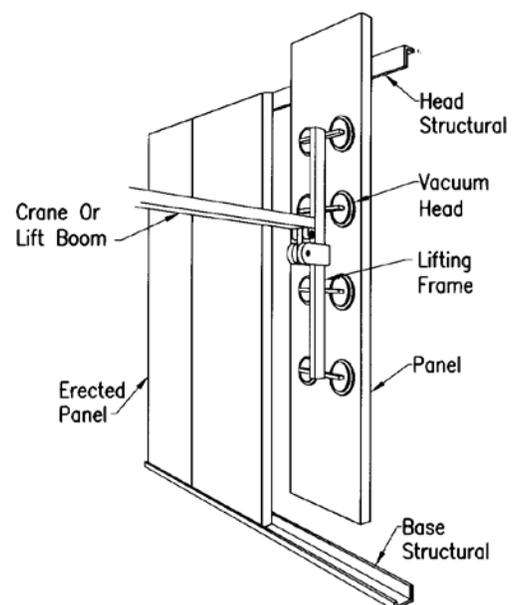
Caution: While the vacuum heads may safely lift a panel under static conditions, inertia loads caused by jerky boom operation and bouncy transit across rough terrain may exceed the lift's capacity or cause damage.

Lifting & Setting the Panels - set up the lifting equipment and vacuum heads to be in the proper position to:

1. Pick up the panel from the bundle.
2. Carry the panel from the bundle to the structure.
3. Swing the panel to the vertical (or horizontal) position.
4. Set the panel in place.
5. Move the panel laterally to engage the side joint.



LIFTING PANELS WITH VACUUM LIFT



SETTING PANELS WITH VACUUM LIFT

LIFTING & SETTING PANELS WITH END LIFT

End Lifting - improper handling of the panels can be hazardous to the workers and can cause damage to the panels and adjacent materials. A safe and secure method of lifting and setting the panels must be utilized.

When using the end lift method, clamp or hook devices are fitted to the top of the panel. The top end of the panel is then lifted to tilt the panel to the vertical position. The panel is then carried by its top end to its position on the structure.

Caution: This method subjects the panel to bending as it is being lifted to the vertical position. The top of the panel may be crushed by the clamps or torn through by the hooks.

Panel Length Limitations - the panel's weight limits the length of the panels that can be lifted by the end lift method without face buckling or panel bending damage. Before attempting to lift panels by the end lift method, assure that the specific panels can be end lifted without damage.

Equipment Requirements - verify that the lifting equipment is of sufficient capacity for the panel weight and length and has sufficient mobility and reach for the site conditions.

Assure that clamping or hook device is of suitable design and condition to safely lift the panel's weight without a failure of the lifting connection or damage to the panel.

Caution: While the lifting devices may safely lift a panel under static conditions, inertia loads caused by jerky boom operation and bouncy transit across rough terrain may exceed the lift's capacity or cause panel damage.

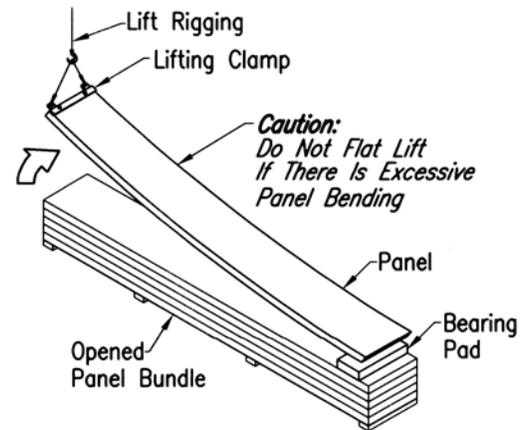
Bearing Block - provide a bearing block (such as soft wood or rigid foam) to cushion the panel's bottom edge from crushing damage as the panel is being lifted to the vertical position.

When lifting the panel directly from the panel bundle, assure that the bearing block is positioned to prevent crushing and scuffing damage to the panels still in the bundle.

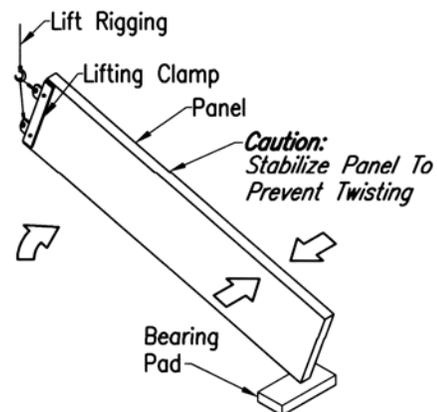
Lifting & Setting the Panels - set up the lifting equipment in the proper position to:

1. Tilt the panel to the vertical position
2. Carry the panel from the bundle to the structure
3. Set the panel in place
4. Move the panel laterally to engage the side joint

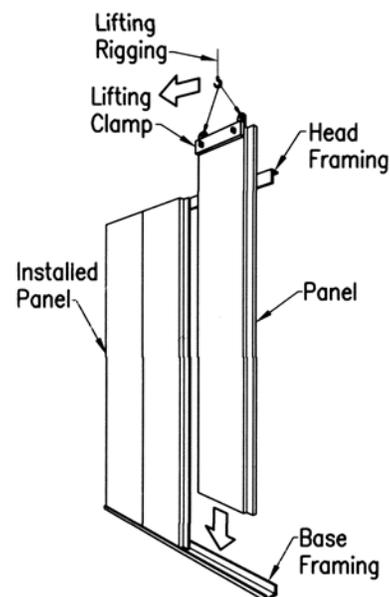
Note: After the panel is set on the foundation, the clamp or hook devices must be removed from the panel to allow the top of the panel to set against the head structural.



FLAT LIFTING PANELS



EDGE LIFTING PANEL



SETTING PANELS WITH END LIFT

MANUAL HANDLING OF PANELS

Manually Handling Panels - improper manual handling of the panels can be hazardous to the workers and can cause damage to the panels and adjacent materials.

It is recommended that the panels be handled with appropriate lifting equipment. However, when it is necessary to manually handle panels, use extreme caution and assure there is adequate manpower to safely lift and carry the panels.

The panels should be lifted by a sufficient number of workers equally spaced along each edge. The workers must lift only on the bottom face of the panel and must lift together to assure that the panel does not sag or twist.

Face Separation - do not try to lift the panel by the edges of the topside face. This will cause the panel's face to separate from the core.

Core Damage - do not try to lift the panel by the edges of the mineral fiber core. This will cause distortion or breakage of the core's critical tongue-and-groove profile.

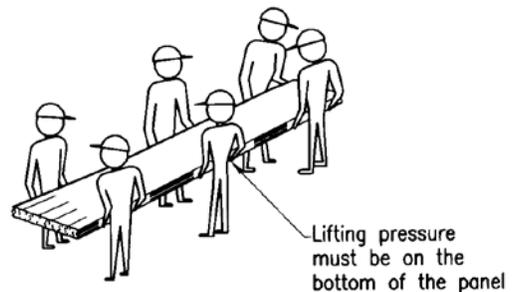
Turning Panels - when the panel must be rolled or tilted on its edge, roll the panel onto its female edge and place cushioning material under the edge to prevent crushing and finish damage.

Blocking - when the panels must be set on the ground, provide sufficient blocking to assure that the panel is cushioned against face damage and is uniformly supported.

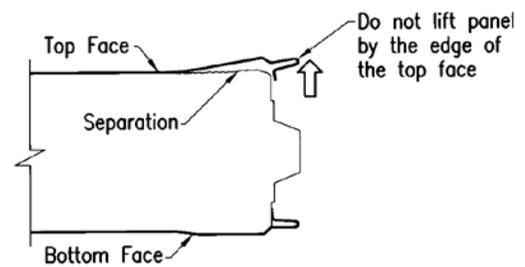
Thermal Bow - when one face of the panel is warmed, such as by exposure to sun radiation, the panel will bow towards the warm side. Such bowing may cause difficulty in engaging the panel's tongue-and-groove joint during the panel erection.

The top panel on the bundle is typically exposed to sun radiation prior to its erection. To prevent the panel's thermal bow, set the entire bundle under shade or set the next panel under shade to cool down before it is installed.

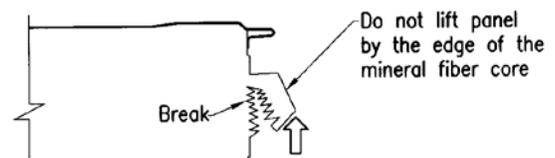
Another method of minimizing thermal bow is to turn the panel over to allow equal warming of the opposite face.



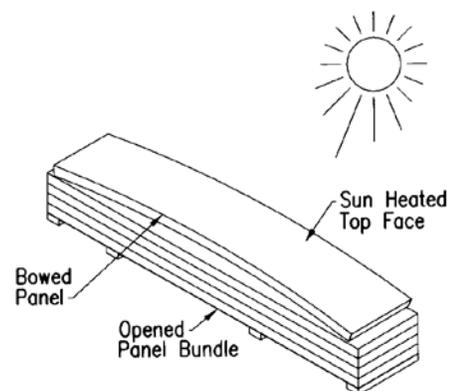
MANUALLY LIFTING PANEL



FACE SEPARATION

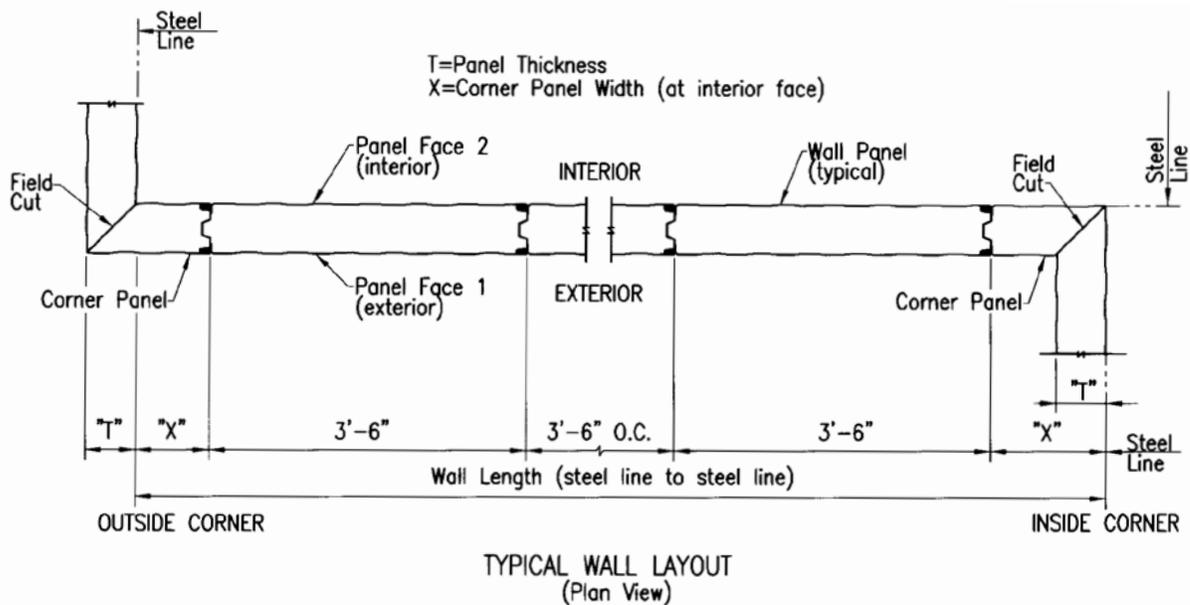


CORE DAMAGE



THERMAL BOWING

PREPARE WALL PANEL LAYOUT



Wall Panel Layout - before starting the wall panel installation, it is recommended that a wall panel layout be prepared to assist in determining the cutting dimensions for the corner panels and to assure the wall panels are correctly positioned for the actual building conditions.

Caution: If the installation drawings provide specific wall panel layouts, those layouts must be used. However, it is critical to conduct field measurements of the actual building conditions and adjust the layout accordingly.

Field Measurements - because of field tolerances and potential error, the wall panel layout must be based on the actual measured conditions of the wall framing members. These field measurements should always be made to the respective wall bearing surfaces of the framing member. For normal building conditions, the wall panel layout can be based on field measurements at the base conditions.

Field Cut Corner Panel - for most wall conditions, the start and finish corner panels are field cut to provide symmetrical corner panel widths at each end of the wall. The corners may be assembled with mitered cut panels, or may be assembled with square cut corners and filler insulation. Reference the installation erection drawings for the specified corner condition.

Calculate Corner Panel Width - to determine the starting corner panel width, divide the wall length (steel line to steel line) by $3'-6"$. Then divide the remainder by 2. The resulting dimension will be the width of the corner panels' interior face.

Note: If the resulting dimension is less than 21", add $3'-6"$ to the remainder and then divide by 2.

Caution: For mitered corner conditions using 45° cut panel ends, the overall width of the corner panel's exterior face must be increased by a dimension equal to the panel thickness.

Finish Panel Width - the above calculations can be used to determine the finish panel width. However, to allow for panel installation tolerances, it is recommended that the width of the finish panel be determined by measurement of the remaining space after the other panels have been installed.

CHECKING FRAMING ALIGNMENT

Steel Line - the nominal wall plane is usually specified as the vertical plane of the wall's interior surface, and is typically referenced as the "steel line". Reference the project's installation drawings to determine the specified locations of the wall steel lines.

Checking Alignment - before starting the panel installation, it is critical to assure that all wall bearing surfaces of the wall framing are correctly aligned to be on the vertical plane of the specified steel line.

Use field measurements to confirm the alignment of the wall framing members. Check the alignment at mid-span as well as at the columns.

Caution: Improper alignment of the framing members can cause difficult panel installation and can cause rippling or buckling of the panel faces. All misalignment of the wall framing must be corrected before starting the wall panel erection.

Base Alignment - assure that the condition of the foundation, or build up of structural and flashing materials, do not cause the bottom of the panels to be offset from the steel line.

Intermediate Structural Alignment - if the alignment of the intermediate framing members causes the wall panel to bow inward, the exterior panel face will be subjected to compression stresses which can cause rippling or buckling.

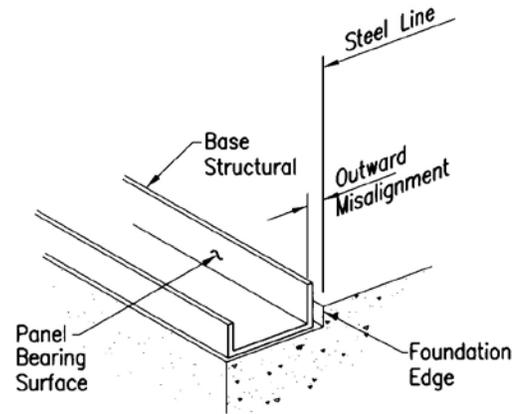
However, if the alignment causes the panel to bow outward, the exterior panel face is subjected to tension stresses which can minimize rippling and buckling.

Check and correct the position of the intermediate framing members as necessary to assure that they are not aligned inward of the nominal plane of the wall framing (steel line).

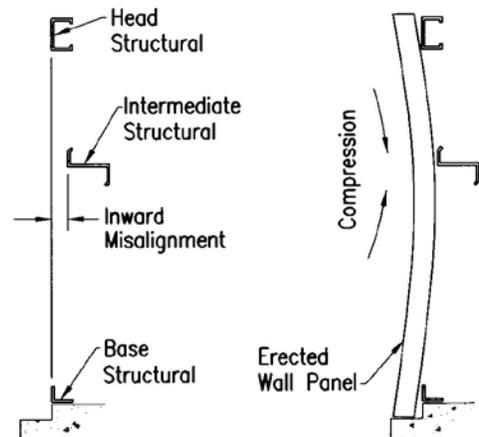
For intermediate member spacing 7' or greater, the recommended alignment tolerance is 0" to 1/4" outside of the steel line.

For intermediate member spacing less than 7', the recommended alignment tolerance is 0" to 1/8" outside of the steel line.

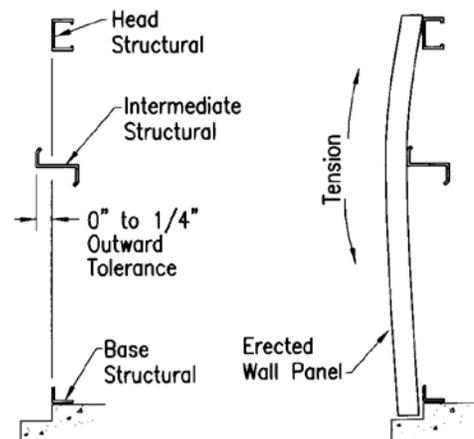
For intermediate member spacing less than 3'-6", recommended alignment tolerance is 0" to 1/16" outside of the steel line.



UNACCEPTABLE BASE ALIGNMENT



UNACCEPTABLE SUPPORT ALIGNMENT



ACCEPTABLE SUPPORT ALIGNMENT

INTERIOR FLASHING & SEALANTS

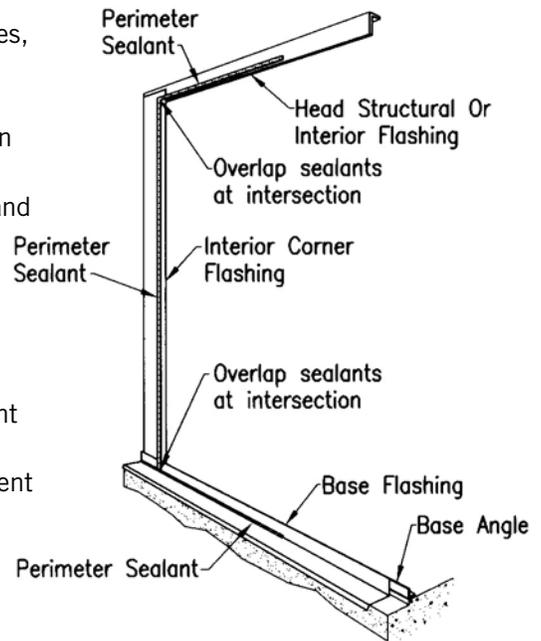
Interior Flashing and Sealant - the perimeter flashing and sealants close and seal the wall at the base, head, corners, openings and transitions to other construction. In some cases, a structural member may function as the interior flashing.

Caution: Some cold storage applications may require omission of the interior perimeter sealants. Reference the project's installation drawings for the specified flashing and sealants and their locations.

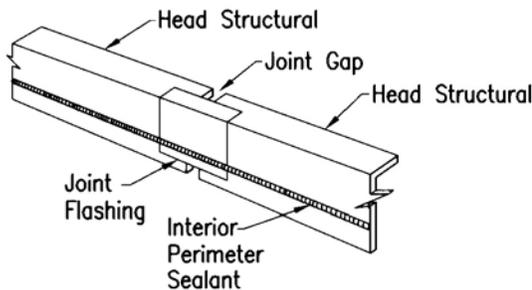
Sealant Installation - the interior flashing and sealants must be in place before installing the wall panels.

Immediately before installing the wall panel, apply the sealant continuously along the surface of the flashing or structural. Place the sealant along the centerline of the panel attachment fasteners, or between the fastener and the open edge of the flashing.

Apply sufficient sealant to seal the panel's mesa profile. For gun grade sealants, the suggested bead size is 1/4".



INTERIOR FLASHING AND PERIMETER SEALANTS



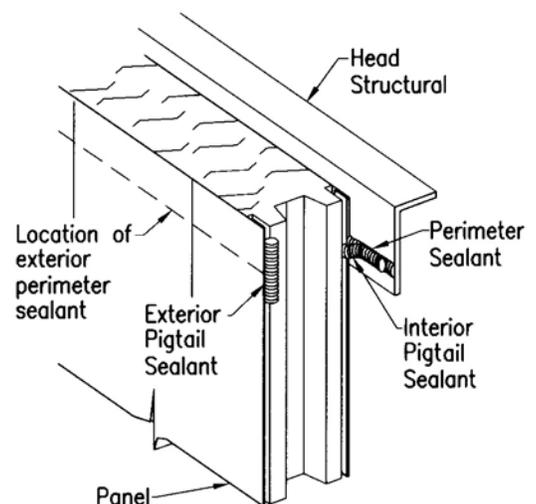
Structural Seals - when a structural member functions as the interior flashing, all open butt joints and open holes in the member must be sealed with a suitable flashing material.

PERIMETER SEALANT AT STRUCTURAL JOINTS

Sealant Pigtails - it is critical to assure continuity of the interior vapor seal at the intersections between the vertical panel joints and the horizontal base, eave & rake assemblies.

After each panel is installed, apply sealant pigtails around the panel's interior edge to provide a sealant bridge between the panel's joint sealant and the interior perimeter sealants.

At the panel's exterior face, determine where the exterior perimeter sealants will be located. Apply sealant pigtails along the panel edge to provide a sealant bridge between the panel's joint sealant and exterior perimeter sealants.



PIGTAIL SEALANT AT PANEL JOINT
(Head Shown - Base Similar)

CORNER PANEL ERECTION

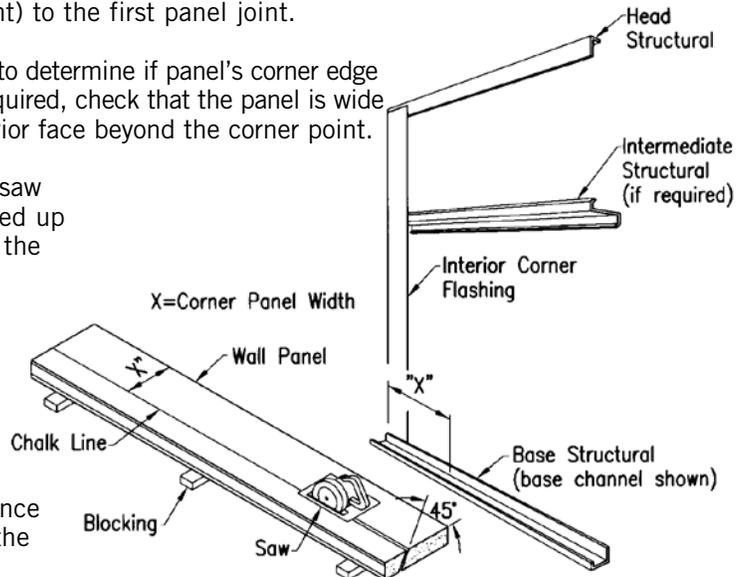
Corner Panel Layout - the corner panel width is the measurement from the intersection of the steel lines (corner point) to the first panel joint.

Reference the project's installation drawing to determine if panel's corner edge is to be 45° or square cut. If a 45° cut is required, check that the panel is wide enough to allow the projection of the exterior face beyond the corner point.

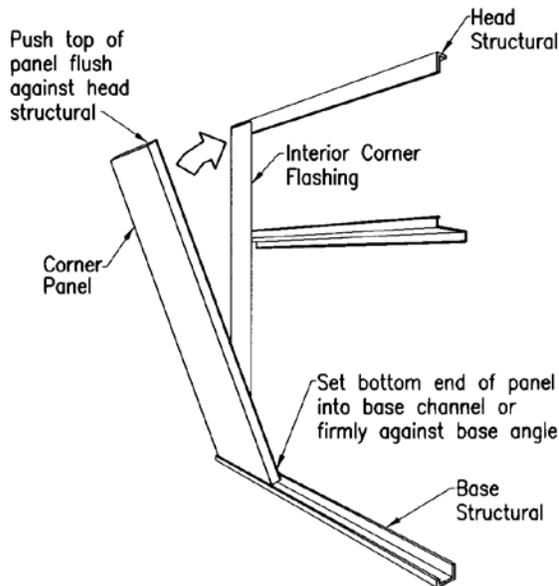
Lay the panel on appropriate blocking or saw horses with the interior face (side 2) turned up and the edges correctly oriented. Lay out the corner panel width on the panel's interior face and mark the cut with a chalk line.

Cutting the Corner Panel - if a 45° cut is required, set the saw angle so the exterior face will be wider than the interior face after the panel is cut.

Cut the panel along the chalk line (reference the "Field Cutting" section, page 15, in the front of this guide).



CUTTING THE CORNER PANEL

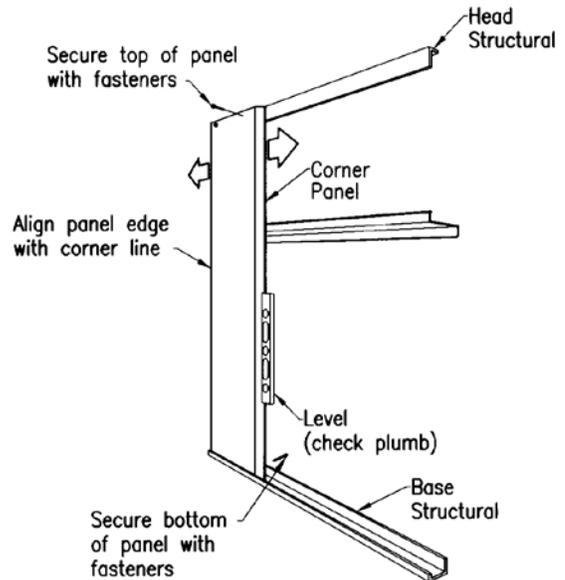


SETTING THE PANEL

Setting the Panel - check that the panel faces and edges are correctly oriented for installation. Align the cut edge of the panel with the corner point of the wall steel lines.

Set the bottom end of the panel into the base channel. If base channel is not used, set the bottom of the panel flush against the base angle.

Set the top end of the panel flush against the head structural.



PLUMBING AND FASTENING THE PANEL

Plumbing and Fastening the Panel - check that the panel is still aligned with corner point. If necessary, slide the bottom of the panel into the correct position.

Checking for plumb with a level set on the panel's uncut edge, adjust the top of the panel into the plumb position.

Secure the panel to the base and head structural with the specified panel attachment fasteners.

PANEL ERECTION

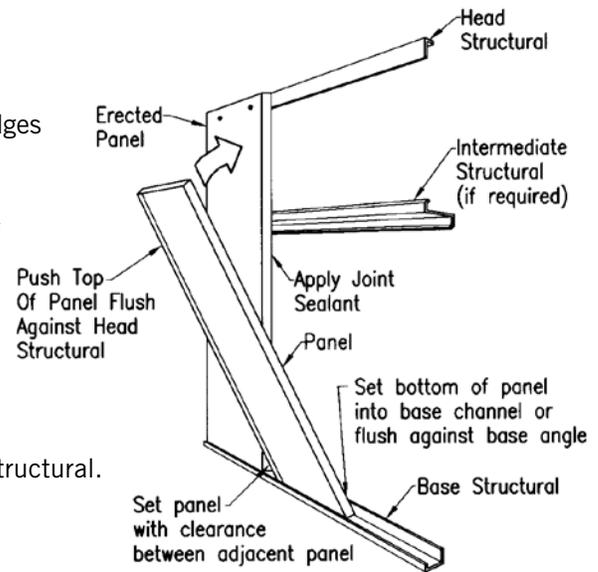
Joint Sealant - check that the joint sealant is properly applied along the exposed edge of the previously installed panel.

Setting the Panel - check that the panel faces and edges are correctly oriented to the building.

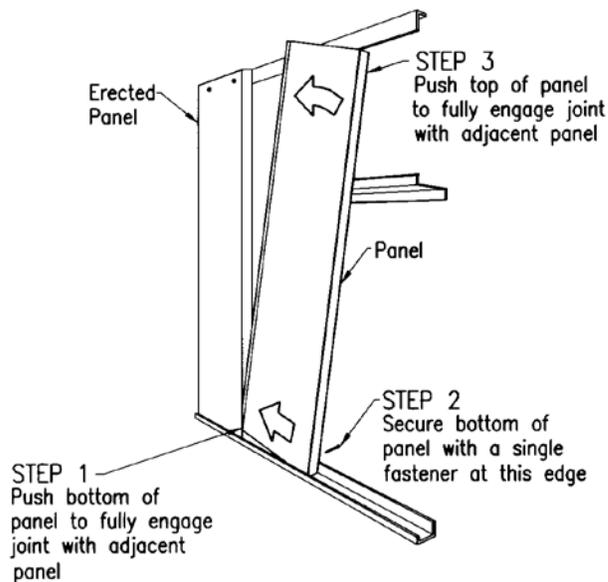
Assure that the panel edge will not snag the previously installed panel while being lifted and set into position.

Set the bottom end of the panel into the base channel. If base channel is not used, set the bottom of the panel flush against the base structural.

Set the top end of the panel flush against the head structural.



SETTING THE PANEL

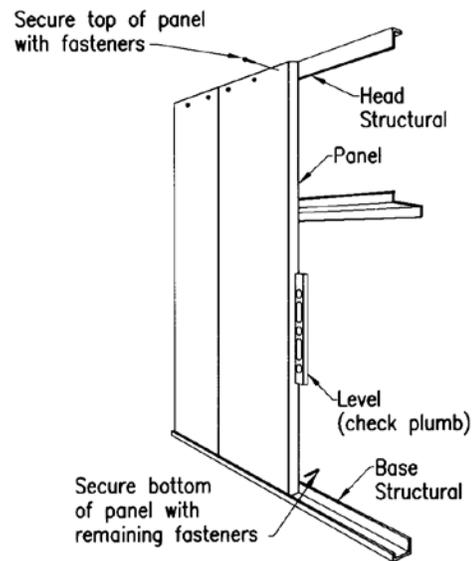


STARTING THE PANEL

Starting the Joint - slide the bottom of the panel to engage the joint with the previously installed panel.

Checking that the joint is fully engaged at the bottom of the panel, secure the bottom of the panel with a fastener at the opposite edge.

Push the top of the panel to fully engage the rest of the joint.



PLUMBING AND FASTENING THE PANEL

Plumbing and Fastening the Panel – check that the joint is fully engaged from top to bottom.

Checking with a level set on the panel's edge, adjust the panel to the plumb position.

Secure the panel to the base and head structural with the specified panel attachment fasteners.

CHECKING THE ERECTED PANEL

Check Each Installed Panel - after each panel is installed, check to assure it is in acceptable condition before installing the next panel.

Caution: It is much easier to correct a panel before the next panel is installed. Trying to correct or replace a panel after the wall is completed can be difficult and costly.

Structural Alignment - after the panel is plumbed and fastened to the head and base framing members, check for any misalignment between the panel and the intermediate framing members.

If there is a gap between the panel and an intermediate framing member, do not stress the panel by fastening it to the misaligned member. The member must first be repositioned to eliminate the misalignment.

Connections - at each connection, check that there are no gaps between the panel and the framing member, such as caused by obstructions or loose fasteners.

Panel Joint - check the full length of the panel side joint to assure that the panel is fully engaged into the previous panel.

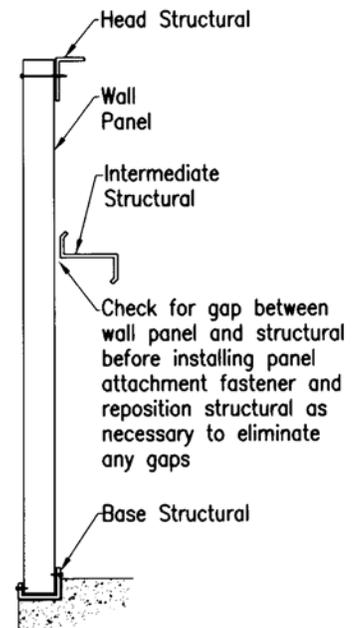
Looking at the panel ends from above, the interior condition of the panel joints can be inspected:

- Check that the mineral fiber tongue-and-groove joint is fully engaged.
- Check that the metal tongue-and-groove joints are fully engaged.
- Check that the sealant cavities are filled with the required sealants.

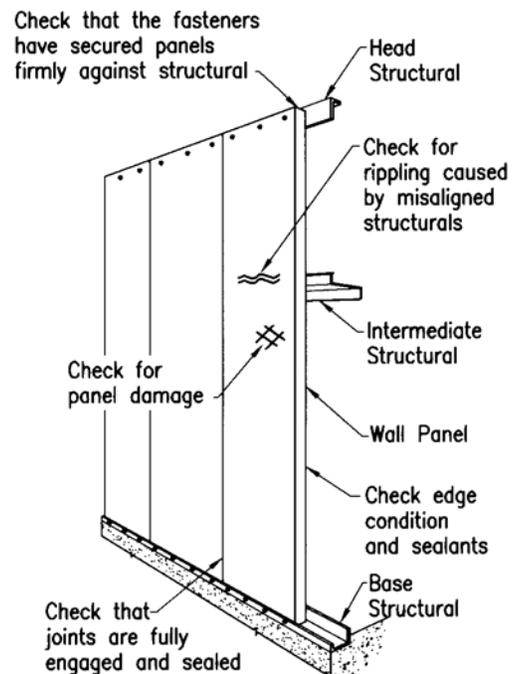
Panel Faces - check that the panel faces did not suffer dents, scratches or other damage during installation. Check that the faces are not rippling due to misaligned wall framing members structural.

Panel Edge - inspect the full length of the exposed panel edge. Check that the metal and mineral fiber grooves are undamaged and clear of obstructions.

Check that the required pigtail sealants are properly installed, undamaged and not contaminated by water or dirt.



INTERMEDIATE STRUCTURAL ALIGNMENT



CHECKING THE ERECTED PANEL

COMPLETING THE PANEL CONNECTIONS

Install Exterior Angles - if isolated angle connections are used at the base and/or head of the wall, the exterior angles must be installed after the panels are installed.

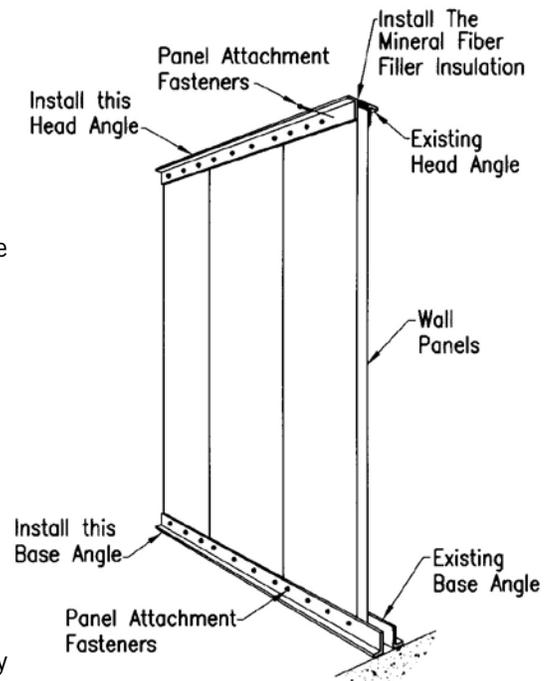
Set the exterior angles flush and firmly against the exterior panel face and attach the angles to the structure or foundation.

Install the specified panel attachment fasteners to secure the wall panels to the angles.

Filler Insulation - if mineral fiber filler insulation is specified for the head condition, the insulation must be installed before installing the exterior head angle or flashing.

Filler insulation is to be provided by the contractor and must have an approved flame spread or fire resistance rating.

Cut the filler insulation to the required width and height to fill the cavity and set the insulation strips continuously along the top of the wall panels.



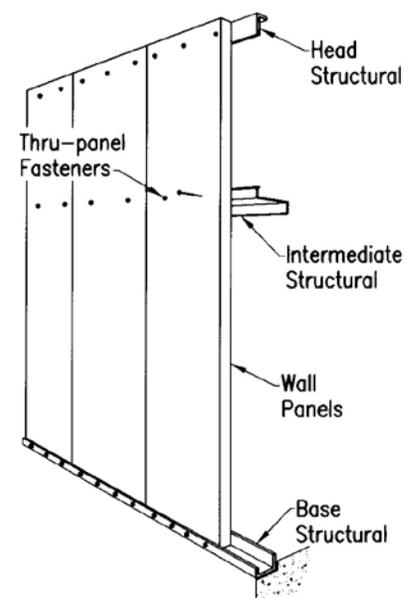
INSTALL HEAD AND BASE ANGLES
(isolated angle connection only)

Intermediate Connections - if the wall framing has intermediate structural members, the wall panels are secured to the intermediate members with thru-panel fasteners.

In some cases, the panels may be secured to the intermediate structural with rivets installed through the structural into the interior panel face.

Before installing the fasteners, check that the intermediate member is correctly aligned. Correct the member alignment as necessary.

Reference the installation drawings for the specified panel attachment fasteners and specified spacing.



FASTEN PANEL TO
INTERMEDIATE STRUCTURAL

EXTERIOR FLASHING & SEALANTS

Perimeter Flashing and Sealant - exterior perimeter flashing and sealants close and seal the wall junctions at the base, eave, rake, corners, openings and transitions to other construction.

Reference the project's installation drawings for the specified flashing and sealants and their locations.

Sealant Installation – before installing the exterior flashing, the perimeter sealant is applied along the exterior face of the wall panels, or it can be applied to the inside surface of the flashing.

The sealant must be positioned to seal the penetration of the flashing attachment fasteners. This means the sealant must be located along the centerline of the fasteners or between the fastener and the open edge of the flashing.

The perimeter sealant must also be positioned to intersect the panel joint pigtail sealants previously installed on the panel edges. If necessary, extend the pigtail with additional sealant to assure that it intersects the perimeter sealant.

If the sealant is installed on the panel face, a chalk line is recommended to assure the uniform positioning of the sealant.

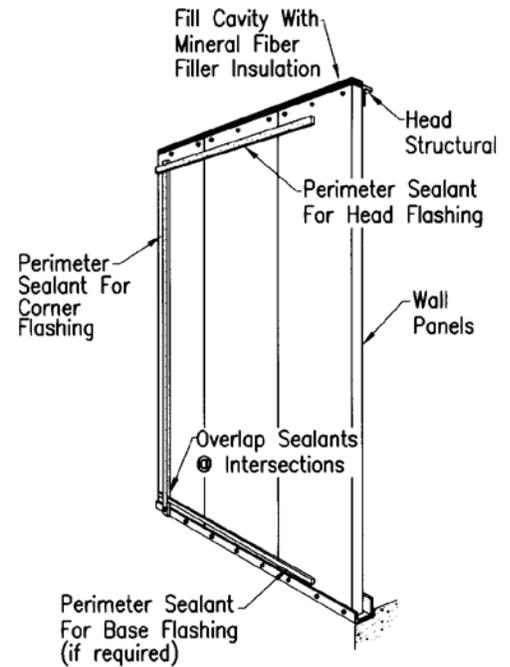
When gun grade sealant is specified, apply sufficient sealant to seal the panel's mesa profile. The suggested sealant bead size is 1/4" diameter.

Flashing Installation - the exterior flashing must be applied in a manner that will provide water shed at the flashing splices and intersections.

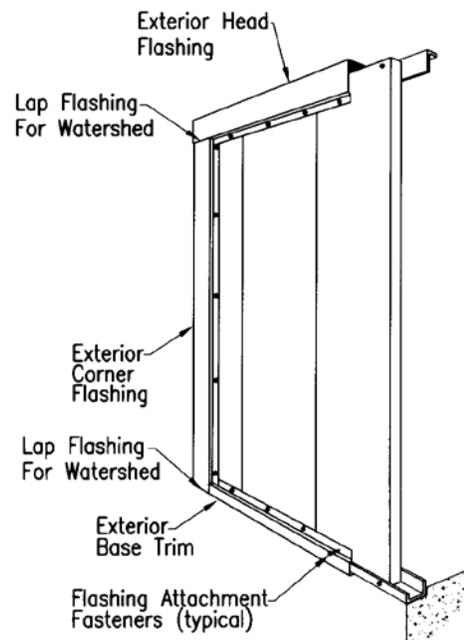
Consideration should be given to positioning the flashing so the open edges face away from the predominant viewing angle and prevailing wind.

The use of chalk lines is suggested to help assure the uniform and plumb or level positioning of the flashing.

Caution: When fitting the exterior flashing, the potential effects of thermal deflection and expansion or contraction must be considered.

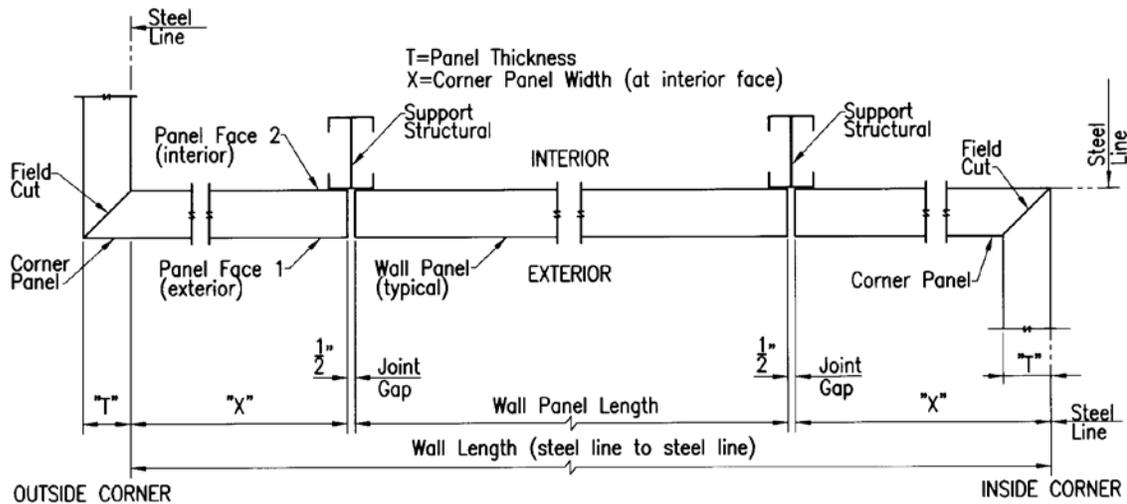


TYPICAL EXTERIOR SEALANTS



TYPICAL EXTERIOR FLASHING

HORIZONTAL PANEL - PREPARE WALL PANEL LAYOUT



TYPICAL WALL LAYOUT
(Plan View)

Wall Panel Layout - before starting the wall panel installation, it is recommended that a wall panel layout be prepared to help assure the wall panels are correctly positioned.

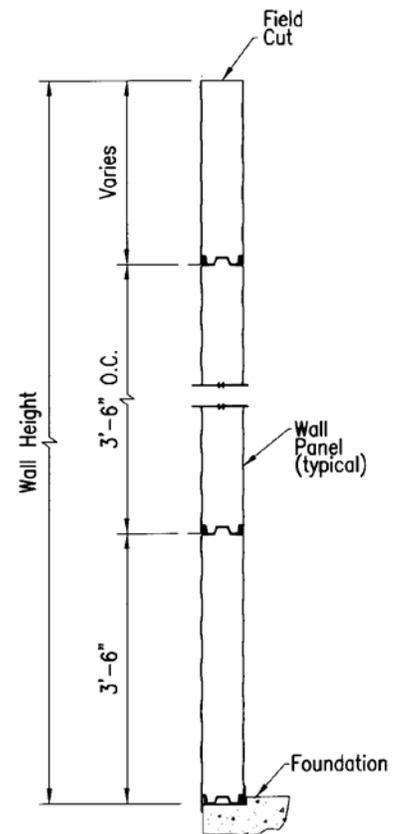
Caution: If the installation drawings provide specific wall panel layouts, those layouts must be used. However, it is critical to conduct field measurements of the actual building conditions and adjust the layout accordingly.

Field Measurements - because of field tolerances and potential error, the wall panel layout must be based on the actual measured conditions of the wall framing members.

These field measurements should always be made to the respective wall bearing surfaces of the framing member. For normal building conditions, the wall panel layout can be based on field measurements at the base conditions.

Panel End Joints - it is critical that the wall panel ends are correctly positioned to have sufficient bearing on the framing member. The standard minimum bearing width is 2" (reference the installation drawings for specific bearing width requirements).

Field Cut Header Panel - for some wall conditions, the top panels must be field cut to provide the required wall height. Assure that the panel layout provides for the field cut width of the top panels.



TYPICAL WALL LAYOUT
(Section View)

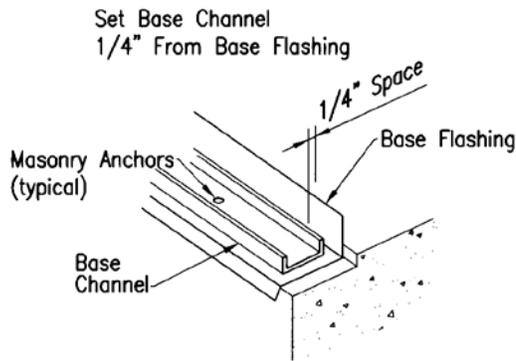
HORIZONTAL PANEL - TYPICAL CONNECTIONS

Connection Requirements - the wall panel's fire resistance rating requires that both faces of the panel must be attached at the connections to the wall framing.

To provide for the attachment of both panel faces, the connections are designed to use thru-panel fasteners. At the base of the wall, a base channel may be used to secure the bottom edge of the panel.

The details on this page show the typical connections for horizontal wall panels.

Caution: The fastener spacing may vary from the spacing shown on these details. Reference the project's installation drawings for the specified fasteners and fastener spacing.



BASE CHANNEL INSTALLATION

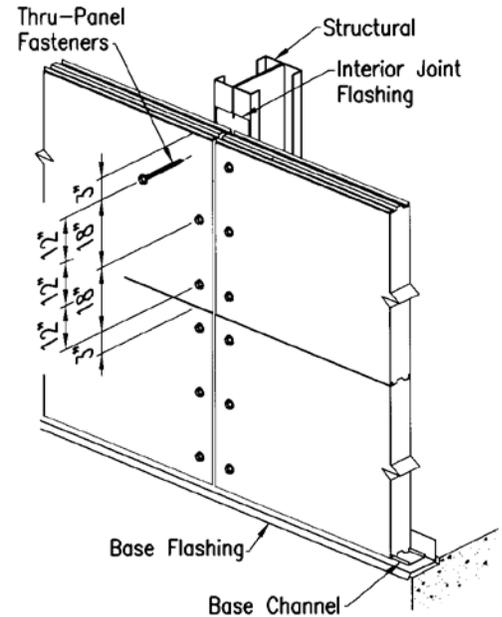
Base Channel - on this type of connection, the bottom edge of the bottom panel is secured by a continuous base channel which is in place before the wall panel erection.

The base channel's flanges fit into the joint grooves on the bottom edge of the wall panel. The base channel must be set 1/4" away from the base flashing to allow clearance for the interior female edge of the panel.

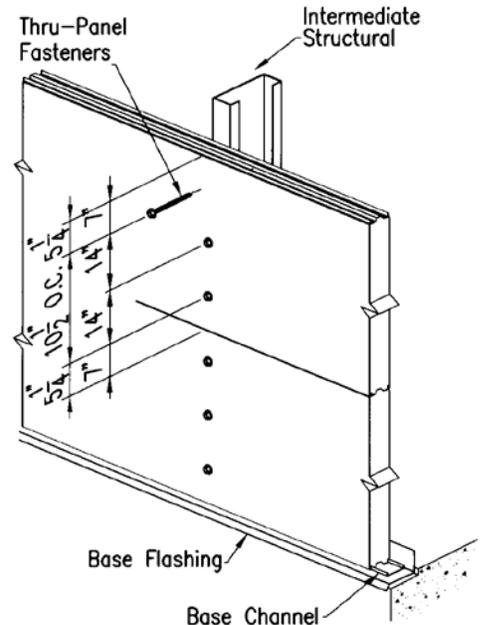
Thru-Panel Fastening - at the ends of the panels and at the intermediate supports, the panels are attached to the vertical structural with thru-panel fasteners.

At the top of the wall, the top edge of the panels is attached to the head structural with thru-panel fasteners.

At the base of the wall, if a base channel is not used, the bottom edge of the panel is attached to a base angle with thru-panel fasteners.



CONNECTIONS @ PANEL END JOINTS
(refer to specified fastener pattern)

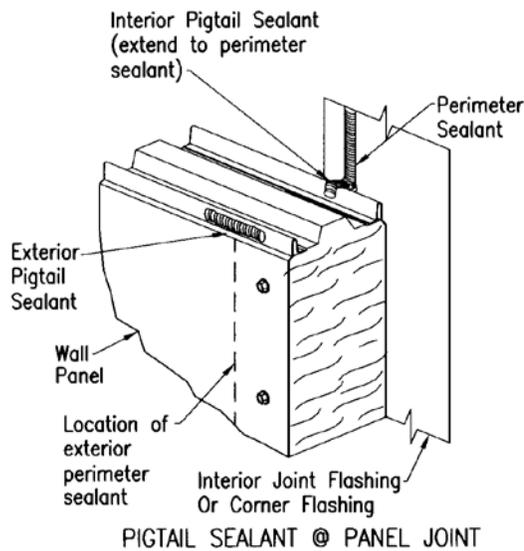


CONNECTIONS @ INTERMEDIATE STRUCTURAL
(refer to specified fastener pattern)

HORIZONTAL PANEL - INTERIOR FLASHING & SEALANTS

Interior Flashing and Sealant - the interior perimeter flashing and sealants close and seal the wall junctions at the base, head, panel end joints, corners, openings and transitions to other construction. For some conditions, a structural member may function as the interior flashing.

Caution: Some cold storage applications may require omission of the interior perimeter sealants. Reference the project's installation drawings for the specified flashing and sealants and their locations.



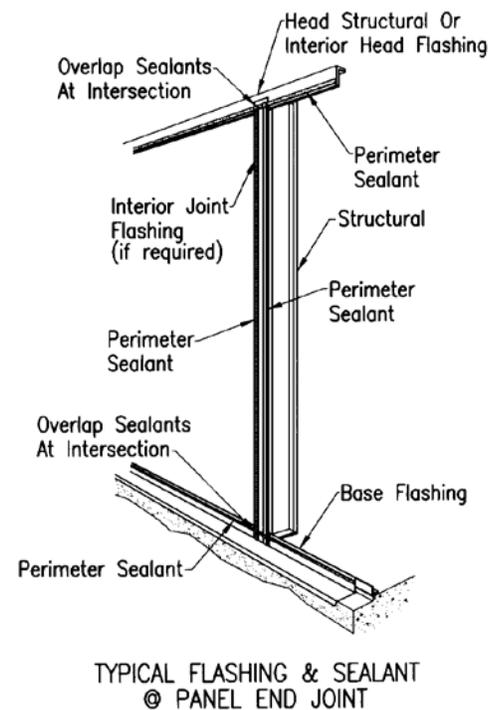
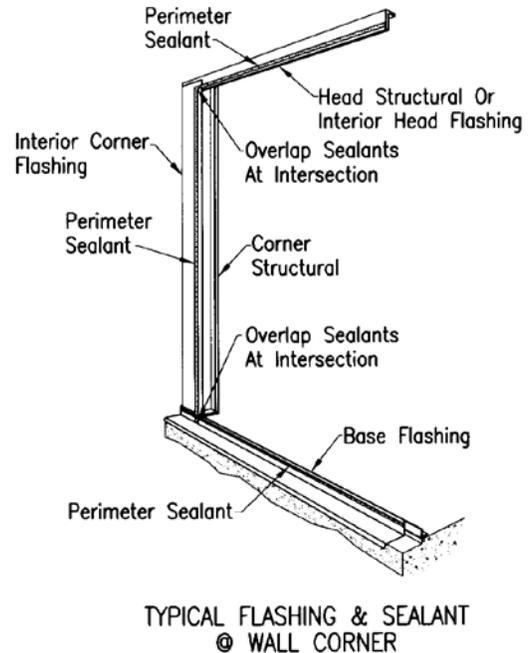
Sealant Installation - immediately before installing the wall panel, apply the perimeter sealant continuously along the surface of the flashing or structural. The sealant is located along the centerline of the panel attachment fasteners, or between the fastener and the open edge of the flashing.

Apply sufficient sealant to seal the panel's mesa profile. In the case of gun grade sealant, the suggested bead size is 1/4".

Sealant Pigtails - it is critical to assure continuity of the vapor seal at the intersections between the horizontal panel joints and the vertical panel end joints and corner assemblies.

After each panel is installed, apply sealant pigtails around the panel's interior edge to provide a sealant bridge between the panel's joint sealant and the interior perimeter sealants.

At the panel's exterior face, determine where the exterior perimeter sealants will be located. Apply sealant pigtails along the panel edge to provide a sealant bridge between the panel's joint sealant and exterior perimeter sealants.



HORIZONTAL PANEL - CORNER PANEL ERECTION

Corner Panel Layout - the corner panel length is the measurement from the intersection of the steel lines (corner point) to the first panel joint.

Reference the project's installation drawing to determine if the panel's corner end is to be 45° or square cut. If a 45° cut is required, check that the panel is long enough to allow the projection of the exterior face beyond the corner point.

Lay the panel on appropriate blocking or saw horses with the interior face (side 2) turned up and the edges correctly oriented. Lay out the corner panel length on the panel's interior face and mark the cut with a chalk line.

Cutting the Corner Panel - if a 45° cut is required, set the saw angle so the exterior face will be wider than the interior face after the panel is cut (reference the "Field Cutting Section", page 15, in the front of this guide).

Joint Sealant - check that the joint sealant is properly applied along the bottom edge of the wall panel.

Setting the Panel - check that the panel faces and edges are correctly oriented to the building.

Align the end of the panel to the steel line corner point. Align the other end for the proper end joint spacing.

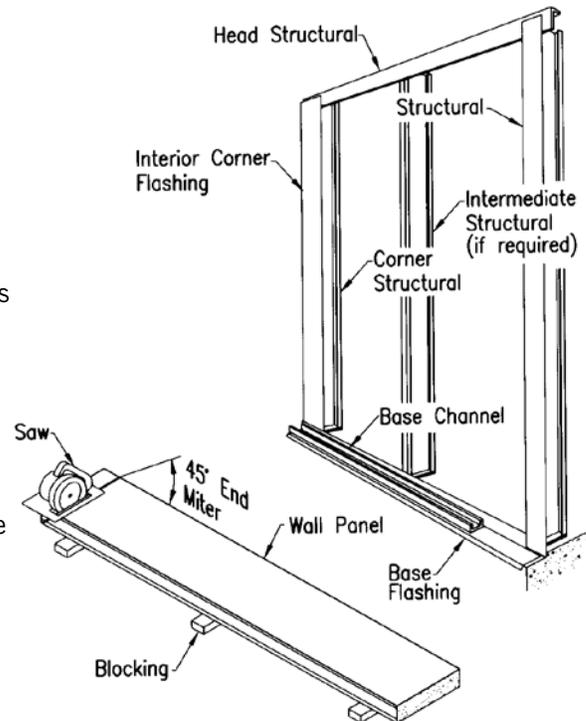
Set the bottom (female) edge of the panel onto the base channel. Check that the channel flanges fully engage the exterior and interior metal grooves of the panel edge.

Caution: Do not allow the bottom edge of the panel to be damaged during the panel installation.

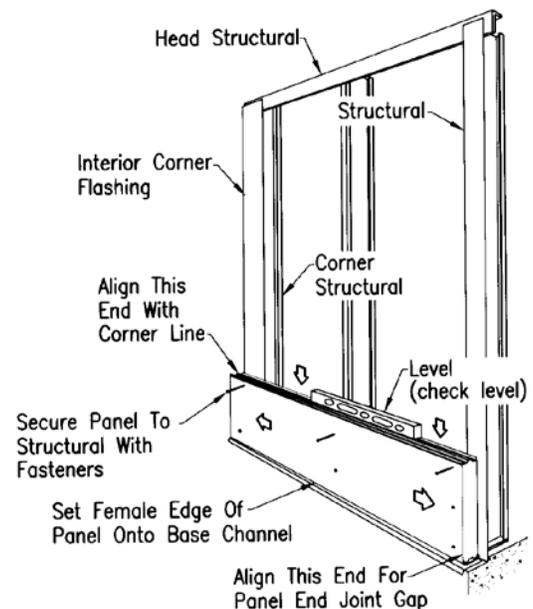
Plumbing and Fastening the Panel - check that the panel is aligned with the corner point. If necessary, slide the panel into the correct position.

Check the panel's horizontal alignment with a level set on the panel's top edge.

Secure the panel to the vertical structural members with the specified panel attachment fasteners.



CUTTING THE CORNER PANEL



SETTING THE PANELS

HORIZONTAL PANEL - PANEL ERECTION

Joint Sealant - check that the joint sealant is properly applied along the bottom edge of the wall panel.

Setting the Panel - check that the panel faces and edges are correctly oriented to the building. Align the ends of the panel for the proper end joint spacing.

Set the bottom (female) edge of the bottom panels onto the base channel. Set the bottom of edge of the upper panels onto the top (male) edge of the previously installed panel. Check that the panel joint is fully engaged.

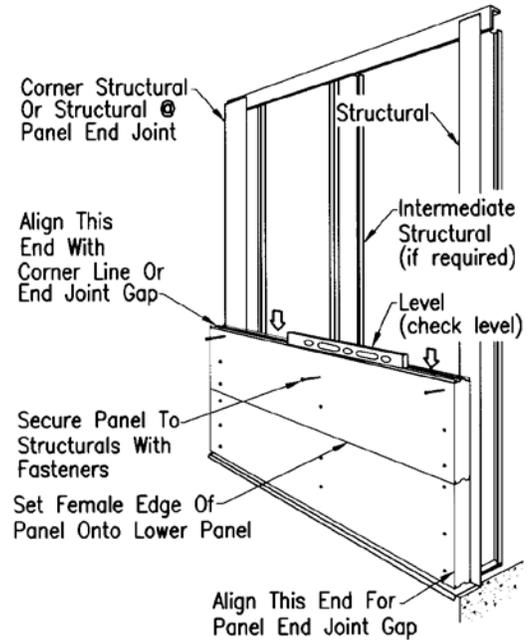
Check the panel's end alignment and horizontal alignment and secure the ends of the panels to the vertical structural members with the specified fasteners.

Setting the Top Panel - measure the required width of the top panel. Layout and cut the top panel to the required width.

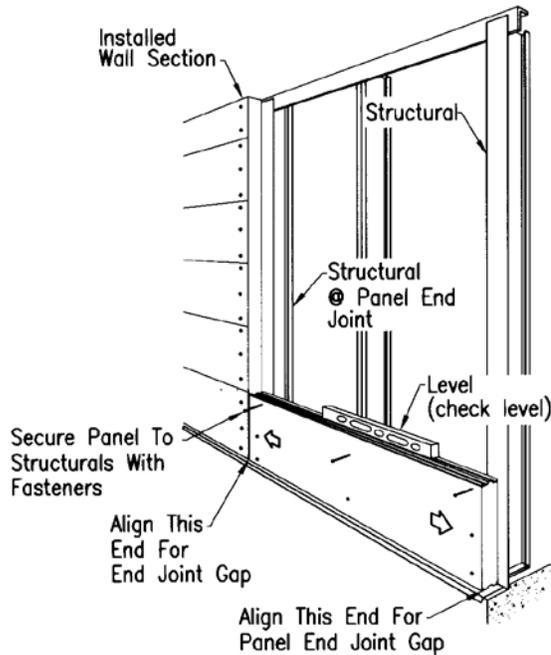
Set and plumb the top panel. Secure the panel ends and then secure the panel's top edge with the specified thru-panel fasteners.

Setting the Next Section - align the panel ends for the correct end joint spacing. Check that the panel ends lap the structural for the required bearing width. Secure the panels with the specified fasteners.

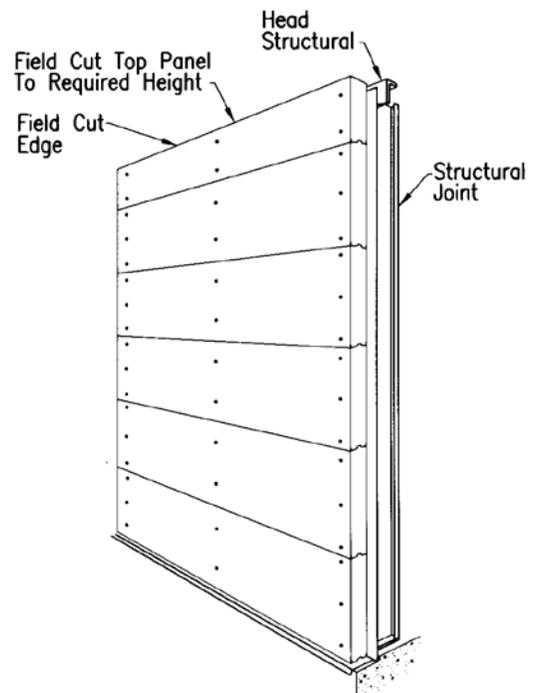
Continue the panel erection for the remainder of the wall.



SETTING THE PANELS



SETTING THE PANELS
For The Next Wall Section



SETTING THE TOP PANEL

HORIZONTAL PANEL - EXTERIOR SEALANT & FLASHING

Perimeter Flashing and Sealant - exterior perimeter flashing and sealants close and seal the wall junctions at the base, eave, rake, panel end joints, corners, openings and transitions to other construction.

Reference the project's installation drawings to determine the specified flashing and perimeter sealants.

Sealant Installation – before installing the exterior flashing, the perimeter sealant is applied along the exterior face of the wall panels, or it can be applied to the inside surface of the flashing.

The sealant must be positioned to seal the penetration of the flashing attachment fasteners. This means the sealant must be located along the centerline of the fasteners or between the fastener and the open edge of the flashing.

The perimeter sealant must also be positioned to intersect the panel joint pigtail sealants previously installed on the panel edges. If necessary, extend the pigtail with additional sealant to assure that it intersects the perimeter sealant.

If the sealant is installed on the panel face, a chalk line is recommended to assure the uniform positioning of the sealant.

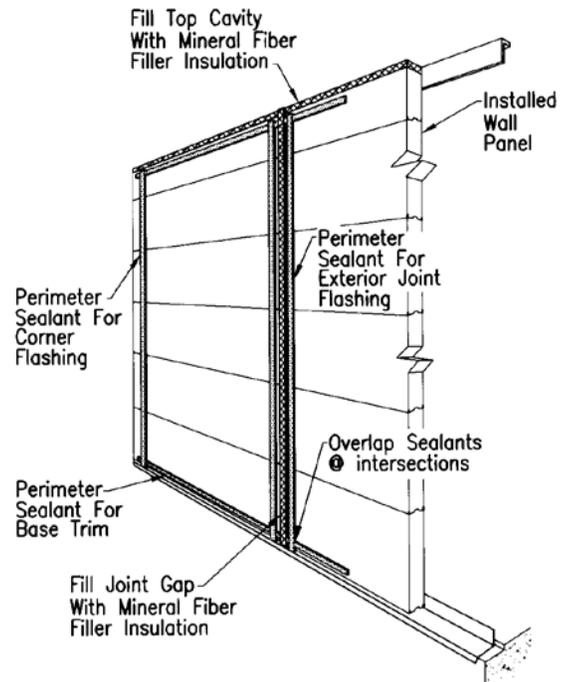
When gun grade sealant is specified, apply sufficient sealant to seal the panel's mesa profile. The suggested sealant bead size is 1/4" diameter.

Flashing Installation - the exterior flashing must be applied in a manner that will provide water shed at the flashing splices and intersections.

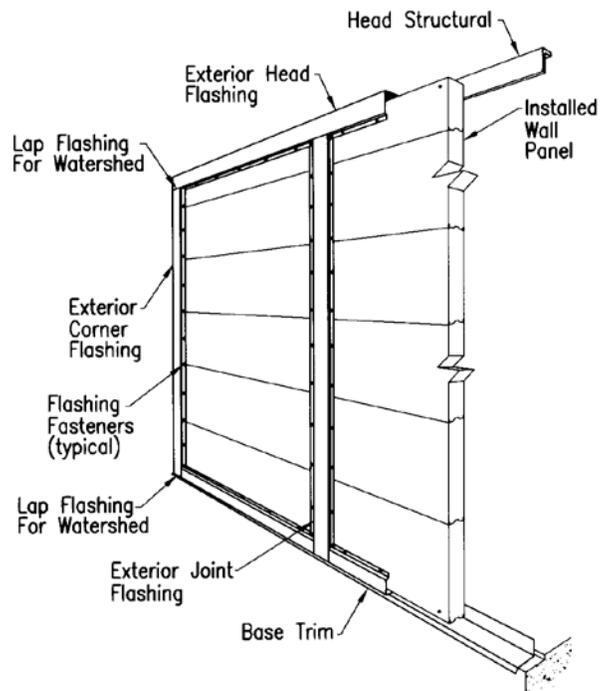
Consideration should be given to positioning the flashing so the open edges face away from the predominant viewing angle and prevailing wind.

The use of a chalk line is suggested to help assure the uniform and plumb or level positioning of the flashing.

Caution: When fitting the exterior flashing, the potential effects of thermal deflection and expansion or contraction must be considered.



EXTERIOR FLASHING SEALANTS



EXTERIOR FLASHING

3 HR. RATED PANEL - JOINT FASTENING

When Is Joint Fastening Required - fastening of the wall panel joints is necessary only on 8" thick panels which require a 3 hr. fire resistance rating.

Joint fastening is required only on the side of the wall specified as the fire exposure side. Joint fastening will be required on both sides of the wall only if both sides are specified as fire exposure sides.

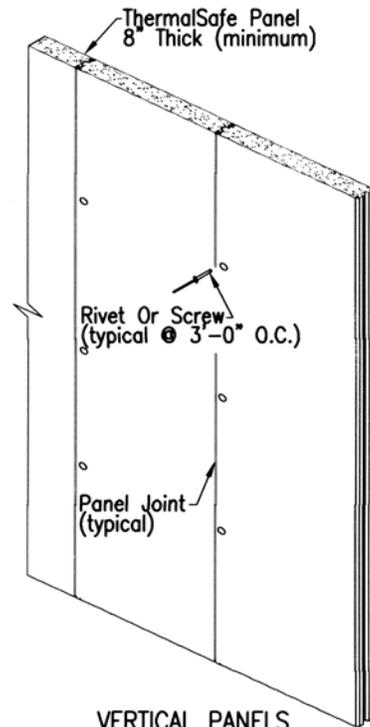
Caution: Before starting the panel installation, the fire resistance rating and fire exposure requirements must be confirmed.

Joint Fasteners - the joint fasteners may be rivets or screws. Rivets will be minimum 1/8" diameter x 3/8" length. Screws will be minimum #6-20 x 3/8" length.

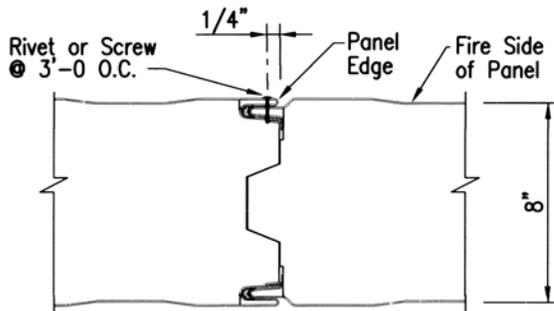
The rivets or screws will be carbon steel or stainless steel material and may be painted to match the wall panel color.

Joint Fastener Installation - the rivets or screws will be installed to secure the tongue-and-groove engagement of the panel faces at the joint.

The screws will be installed 1/4" from the female panel edge and at 3'-0" maximum spacing.

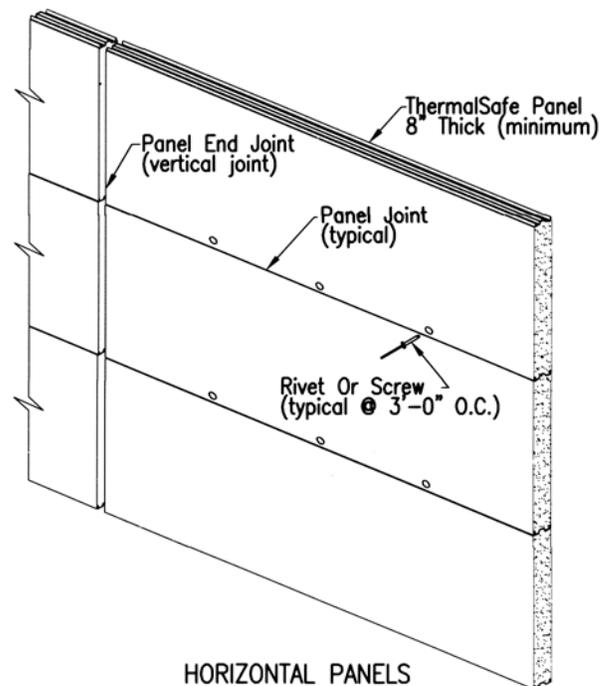


VERTICAL PANELS



PANEL JOINT FASTENING

Important: Required only on fire side of 3 hr. fire resistance rated (8" thick) panels



HORIZONTAL PANELS

THERMALSAFE® FIRE RESISTANCE CERTIFICATIONS

Wall - UL Design BXUV.U050

Tested and certified per ASTM E119, ANSI/UL 263, CAN/ULC-S101
ThermalSafe Wall Panel - 4" thick (min) - 1 hour rating
ThermalSafe Wall Panel - 7" thick (min) - 2 hour rating
ThermalSafe Wall Panel - 8" thick (min) - 3 hour rating

Wall - ULC Design BXUVC.W021

Tested and certified per CAN/ULC-S101
ThermalSafe Wall Panel - 4" thick (min) - 1 hour rating
ThermalSafe Wall Panel - 7" thick (min) - 2 hour rating
ThermalSafe Wall Panel - 8" thick (min) - 3 hour rating

Wall - WH Design MS/WA 60-1 (NBW 344)

Tested and certified per ASTM E119, CAN/ULC-S101
ThermalSafe Wall Panel - 4" thick (min) - 1 hour rating

Wall - WH Design MS/WA 120-1 (NBW 345)

Tested and certified per ASTM E119, CAN/ULC-S101
ThermalSafe Wall Panel - 6" thick (min) - 2 hour rating

Ceiling - MS-CA 90-01 (FC 200)

Tested and certified per ASTM-E119 & CAN/ULC-S101
ThermalSafe Ceiling Panel - 6" thick (min) - 1½ hour rating

Doors - UL Design GSNN.SP-2-001

Tested and certified per UL 10B, UL 10C & CAN4-S104
Hollow Metal Door System - for 1 hr rated wall - 1 hour rating
Hollow Metal Door System - for 2 hr rated wall - 1½ hr rating

Windows - UL Design GSNN.WA-2-001

Tested and certified per UL 9, CAN4-S106
Hollow Metal Window System - for 1 hr rated wall - 1 hour rating
Hollow Metal Window System - for 2 hr rated wall - 1½ hr rating

Penetrations - UL Designs XHEZ.W-N-1001 thru W-N-7001

Tested and certified per ASTM E814, ANSI/UL 1479, CAN/ULC-S115*
Penetration Fire Stop Systems - for 1 hr rated wall - 1 hour rating
Penetration Fire Stop Systems - for 2 hr rated wall - 2 hour rating

*UL DESIGNS XHEZ7.W-N-1001 thru W-N-7001 for Canada

UL = Underwriter's Laboratories Inc.

ULC = Underwriter's Laboratories of Canada, Inc.

WH = Warnock Hersey (Intertek)

THERMALSAFE® - WALL PENETRATION FIRE STOPS - UL SYSTEMS

Penetrant	Max. Size	Insulation	Fire Stop	"F" Rating	"T" Rating	UL System	UL File Number
Steel pipe Iron pipe Steel conduit Copper pipe Copper tube	18" dia. 18" dia. 6" dia. 6" dia. 6" dia.	None	Cover Plate	1 hr. & 2 hr.	0 hr. & ¼ hr.	W-N-1001	XHEZ. W-N-1001 XHEZ7. W-N-1001*
			Intumescent Caulk	1 hr. & 2 hr.	0 hr. & ¼ hr.	W-N-1002	XHEZ. W-N-1002 XHEZ7. W-N-1002*
Steel pipe Iron pipe Steel conduit Copper pipe Copper tube	8" dia. 8" dia. 6" dia. 6" dia. 6" dia.	2" Fiberglass Discontinuous	Cover Plate	1 hr. & 2 hr.	1 hr. & 2 hr.	W-N-5003	XHEZ. W-N-5003 XHEZ7. W-N-5003*
			Intumescent Caulk	1 hr. & 2 hr.	1 hr. & 2 hr.	W-N-5005	XHEZ. W-N-5005 XHEZ7. W-N-5005*
		2" Fiberglass Continuous	Intumescent Wrap Collar	1 hr. & 2 hr.	1 hr. & 2 hr.	W-N-5001	XHEZ. W-N-5001 XHEZ7. W-N-5001*
		1" Armaflex Continuous	Intumescent Wrap Collar	1 hr. & 2 hr.	0 hr. & ¾ hr.	W-N-5004	XHEZ. W-N-5004 XHEZ7. W-N-5004*
PVS pipe CPVC pipe ABS pipe FRPP pipe	6" dia. 6" dia. 6" dia. 4" dia.	None	Intumescent Wrap Collar	1 hr. & 2 hr.	1 hr. & 2 hr.	W-N-2001	XHEZ. W-N-2001 XHEZ7. W-N-2001*
PVC pipe CPVC pipe	6" dia. 6" dia.	2" Fiberglass Continuous	Intumescent Wrap Collar	1 hr. & 2 hr.	1 hr. & 2 hr.	W-N-5002	XHEZ. W-N-5002 XHEZ7. W-N-5002*
Steel Duct	23½" X 23½" & 23½" dia.	None	Retaining Angles & Intumescent Caulk	1 hr. & 2 hr.	0 hr. & 0 hr.	W-N-7001	XHEZ. W-N-7001 XHEZ7. W-N-7001*

Notes:

1. Reference the UL Fire Resistance Directory or internet site for each system's assembly details and materials.
2. The "T" and "F" ratings are for 4" & 7" thick wall panels, respectively.
3. Continuous insulation extends through the wall opening. Discontinuous insulation does not extend through the wall opening, but terminates against the wall face on both sides.
4. * For Canada Certifications reference UL file number category XHEZ7.

PIONEERING INSULATED METAL PANEL TECHNOLOGY





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