

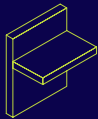
Tilt-Up Technical Manual

Concrete Construction Solutions Guide



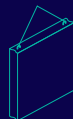
We imagine, model and make engineered products and innovative construction solutions that help turn architectural visions into reality and enable our construction partners to build better, safer, stronger and faster.

Our areas of expertise:



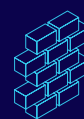
Structural Connections

Systems to form robust, efficient connections, and continuity of concrete reinforcement as necessary, between walls, slabs, columns, beams and balconies, providing structural integrity as well as enhanced thermal and acoustic performance.



Lifting & Bracing

Systems for the safe and efficient transportation, lifting and temporary bracing of cast concrete elements and tilt-up panels before permanent structural connections are made.



Façade Support & Restraint

Systems for the safe and thermally-efficient fixing of the external building envelope, including brick and natural stone, insulated sandwich panels, curtain walling and suspended concrete façades, and also the repair and strengthening of existing masonry installations.



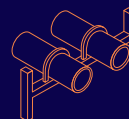
Anchoring & Fixing

Systems for fixing secondary fixtures to concrete, including anchor channels, bolts and inserts; also tension rod systems for roofs and canopies.



Formwork & Site Accessories

Non-structural accessories that complement our engineered solutions and help keep your construction environment operating safely and efficiently, including molds for casting standard and special concrete elements and construction essentials such as reinforcing bar spacers.



Industrial Technology

Mounting channels, pipe clamps and other versatile framing systems that provide safe fixing in a wide range of industrial applications.

Leviat product ranges:

Ancon | Aschwanden | Connolly | Halfen | Helifix | Isedio | Meadow Burke | Modersohn | Moment | Plaka | Scaldex | Thermomass

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Lifting:
MB Super Lift III



Lifting:
MB Super Lift III Ring Clutch



Connecting:
MB Super Lynk

Leviat is proud to be a sustaining member of the Tilt-Up Concrete Association

As a Sustaining Member of the Tilt-Up Concrete Association (TCA), Leviat is committed to the continual innovation and advancement of the global tilt-up community. We recognize that contributing to the good of the industry is a benefit to our company and our customers.



FORWARD

This Manual has been developed to provide a broad scope of technical information to the tilt-up Contractor/Erector. No publication, however comprehensive, is complete in every detail nor can one design for national use or account for local customs and practices. Consequently, when using this manual there is an absolute obligation to verify understandings or impressions with more experienced sales people, managers, engineering or other technical sources.

NOTICE

DO NOT SUBSTITUTE PRODUCTS OR INTERCHANGE COMPONENTS FROM OTHER MANUFACTURERS. All of the Meadow Burke inserts and products have been fully tested for mechanical capabilities. In addition, the inserts have been cast in concrete to test the actual pull-out capacities. Full size production braces have been tested in tension and compression to determine their failure loads. It is these loads, and not theoretical values determined from various equations that are published in this manual. Contact Meadow Burke Engineering for assistance in determining loads not listed.

Meadow Burke products must be properly used and maintained. Do not use any products that are worn, excessively corroded, deformed or altered. See the product maintenance manual for proper maintenance and inspection of rental hardware.



General Information



The Tilt-up Advantage

DEFINITION

Tilt-up is a method of casting walls horizontally on the floor slab area or on casting beds at the jobsite. Panels are erected using a mobile crane and temporarily held in place by steel braces. Panels are connected to the steel structure at the footing, slab and roof line to complete the building structure.

HISTORICALLY

Tilt-up began in the early 1900s with a few projects that relied on tilting tables and other means to erect walls. Tilt-up did not become a viable system until the early 1950s when transit ready-mix trucks and heavy-duty mobile cranes became available to speed and economize the method.

INNOVATIONS

Meadow Burke and its predecessors pioneered the development of the first practical ground release lifting system. Meadow Burke Products also designed the first large diameter, thin-wall, fixed length pipe braces that have become standard in the industry today. These innovations eliminated excess labor and hardware, allowing faster and safer lifts.

TECHNICAL SUPPORT

Meadow Burke technical support assists customers not only in the proper use and application of tilt-up products, but also a number of other important areas. Meadow Burke manufacturing provides quality assurance on our manufactured goods through extensive testing. At the same time, Meadow Burke engineers invent and thoroughly test new products to keep our customers on the cutting edge of tilt-up technology. Over the years Meadow Burke engineers have helped design and erect over 4,000,000 tilt-up panels, some over 111'-9" high and weighing 400,000 lbs.

TILT-UP VS. OTHER CONSTRUCTION METHODS

Tilt-up has fewer types of operations requiring specialized crews. In most cases a tilt-up project uses semiskilled labor for most of the operations as compared to concrete block masonry.

- Tilt-up requires less time to construct. The average sized tilt-up building can usually be completed within 90 days.
- Tilt-up is less capital intensive. It requires less forming and placing equipment than other construction methods.
- Tilt-up when compared to precast requires only transportation of raw materials, not finished goods. In addition, tilt-up requires fewer panels and the ability to use larger panels than precast. Consequently, Tilt-up costs less than other hardwall systems.
- Tilt-up allows unlimited architectural treatment of color, texture, and shape.

ADVANTAGES OF MEADOW BURKE IN THE TILT-UP

The Product: For years Meadow Burke and its predecessors have been recognized for providing the latest state of the art engineered tilt-up systems. From product design through manufacturing and engineering, Meadow Burke leads the tilt-up industry. You can be confident that Meadow Burke designs, engineers, and manufactures with a total quality and safety emphasis.

Tilt-up Distributors: Meadow Burke has a strong exclusive product relationship with several of the major regional construction material suppliers in the country. These exclusive tilt-up distributors have extensive inventory investments in Meadow Burke tilt-up hardware and Super Braces. Each can provide you with trained technical personnel for the products you will need for tilt-up projects; from bar supports to structural connections. Please call Meadow Burke for the tilt-up distributor nearest you.

ADVANTAGES OF MEADOW BURKE ENGINEERING IN THE TILT-UP PROCESS

Meadow Burke's complete tilt-up package includes comprehensive engineering services to assure a successful tilt-up from design through erection. A computer analyzes all the flexural and shear stresses from horizontal to vertical which a panel undergoes upon lifting and placement. This computer analysis of each panel gives precisely located insert placement to safely distribute the load. The result is detailed panel drawings for accurate insert placement in the field. These easy-to-read drawings include strongbacks or additional steel reinforcement where needed. Meadow Burke Engineering also provides bracing design for each panel shape. Rigging diagrams minimize crane time and assure safety.

The speed and accuracy of Leviat's superior engineering service assures prompt delivery of essential information to the project. On complicated jobs, Leviat engineers work closely with architects, engineers and contractors in the design, planning and construction stages.

Concrete Floor Slab & Casting Bed Construction



Concrete Floor Slab and Casting Bed Construction

QUALITY CONSTRUCTION BEGINS AT GROUND LEVEL

“Everything is built from the ground up”. Nowhere is this simple adage more accurate than in tilt-up construction. The very essence of tilt-up construction is contained in the procedure by which wall panels are cast on the floor before the building is raised. Because a tilt-up structure’s floor must also serve as a casting surface, it must be constructed with great care. Any fault in the floor surface will be literally “reflected” on the wall panels.

THE SUBGRADE

The fabrication of an excellent floor slab and casting surface starts with the subgrade. The subgrade must provide non-sagging support for the concrete slab. Because the floor slab must bear the weight of the heavy panels and the mobile crane, it is important that it be well supported at all points by a thoroughly compacted subgrade.

SLAB STRENGTH & THICKNESS

The compressive and flexural loading of trucks and mobile cranes requires that the floor be of adequate strength and thickness. Another consideration is that in order to safely resist the downward and upward vertical and lateral brace loads, the floor should be designed with sufficient strength and weight to resist the applied brace loads with a safety factor of at least 1.5. The type and location of floor slab joints, slab thickness, reinforcing and leave out strips should be considered when determining if the floor slab is an adequate anchorage for the brace loads.

A floor slab with a minimum concrete compressive strength of 2,500 psi and a minimum thickness of 5” or 6” is normally required in order to develop the strength of the floor brace anchors. Several other parameters also must be considered which may require a thicker and stronger floor.

Concrete Floor Slab and Casting Bed Construction

ISOLATION JOINTS

Even with uniformly compacted soil beneath a concrete floor slab, floor settlement is likely to differ from that of the abutting wall and column foundations. To accommodate such differential settlement, it is necessary to isolate the floor slab from the walls and columns that have separate foundations. These isolation joints must permit both horizontal and vertical movement. Isolation joints around columns should be circular or diamond shaped so that corners meet the control joints.

Once the building pad is completed, the contractor begins slab forming which can be done several ways:

EDGE FORMS

Consist of “two-by” lumber of the slab thickness used around the perimeter and held in place with wood or steel stakes.

CONTROL JOINTS

To accommodate concrete shrinkage, control joints should be provided to divide a large floor area into relatively small rectangular (preferably square) areas. In this way they create straight-line planes of weakness that open as the concrete shrinks and effectively prevent cracking. Control joints can be sealed and maintained more easily than random cracks.

SLAB CONSTRUCTION METHODS, REINFORCING AND FINISHES

INTERLOCKING SLAB SECTIONS

Many Contractors use a metal keyed cold joint form to divide the slab into separate, interlocking sections. A keyed cold joint product greatly speeds up the fabrication of floor slabs and once installed helps maintain a crack free floor surface for years to come. It also compensates for subsoil compacting or movement and provides stable load transfer during industrial use. Assemblies for steel dowels may be used instead of a metal keyway.

FORMED SLAB SECTIONS

Range in width from typically 15 to 25 feet. To avoid more expensive pumping, alternate lanes are poured from the concrete truck which travels next to the slab.

STRIP POURING

This creates “longitudinal joints” between long sections of concrete. To control shrinkage in long concrete sections, a transverse (perpendicular to longitudinal) joint is created by one of three methods:

1. Placing “zip strip” to $\frac{1}{4}$ ” the depth of the slab.
2. Saw cutting
3. Running a deep “V” groove across the slab “zip strip” ., a thin strip of plastic inserted in fresh concrete usually just behind the screed, is the fastest, surest method of transverse crack control.

FINISH

Care must be taken to produce the flattest and smoothest crackfree floor possible as tilt-up panels poured on the floor will mirror imperfections.

Concrete Floor Slab and Casting Bed Construction

WELDED DOWEL ASSEMBLY REINFORCEMENT

This is growing rapidly as an alternative method of slab reinforcement. Dowel assemblies greatly reduce cracking in surfaces by reducing corner load stresses. They also effectively distribute loads across the joints.

BRACE INSERTS:

Cast-in-place Slab Brace Inserts - If used, must be placed prior to pouring the slab. Some contractors drive rebar into the subgrade next to the insert and tie it with wire to avoid tipping during the pour. An alternate to the use of slab brace inserts are MB Brace Bolts and the Slam Anchor. All are for securing the brace shoe to the slab after erecting the panel.

Tilt-Up Panel Construction



Panel Erection Information

As a general practice, architects and engineers who design tilt-up buildings do not supply panel erection information. Erection drawings are normally required by the contractor. When a job is to be engineered, a complete set of architectural and structural plans are needed. It is important to remember that complete information is essential for Engineering to function smoothly.

ENGINEERING FOR PANEL ERECTION

In addition to tilt-up hardware, Meadow Burke Engineering services are an important part of the complete tilt-up package. The location of lifting inserts in a panel is critical for safe, quick erection. Meadow Burke Engineering produces erection drawings of panels illustrating their shape and the locations of openings such as doors and windows. Engineering calculations determine the center of gravity, panel weight, and stresses produced as the panel is lifted. Insert placement is calculated to minimize lifting stresses and ensure that the panel will hang plumb. The drawings will show temporary strongbacks bolted to the panel surface if required or where additional reinforcing steel is needed to increase strength where lifting stresses are excessive. The recommended method of rigging crane lines is detailed to ensure equal insert loading for fast, safe panel lifts. A panel layout sheet identifies each panel as it appears in the final design, if not supplied by the original plans. Brace design charts show allowable spacing and proper layout. The brace inserts are shown on panel details.

CRANE CONSIDERATIONS

Laying out panels requires careful planning by the contractor and crane company. One approach is to cut paper scale models of the panels and crane and arrange them on a scale version of the slab area. The layout is adjusted so that the crane can reach and set panels safely and still have room to operate. In general, crane capacity should be two to three times the weight of the heaviest panel. Another factor is the crane's reach. The further the reach the less weight it can handle. The crane company should be included in panel layout planning to ensure fast, safe building erection.

PANEL CASTING CONSIDERATIONS

PANEL SIZE

The weight of a panel is limited by the crane capacity, panel height by the available bracing, and panel width by the available rigging spreader bars.

PANEL LAYOUT

Panels are normally cast as close to their final position as possible. Adequate floor space must remain to allow reasonable freedom of movement for the crane and ease of access for the concrete truck or other placement equipment.

Special attention should be paid to the casting and placing of corner panels and the last panel. The last panel is often erected from outside the structure, unless the crane is to become a permanent part of the building. In some cases, stack casting or erection from outside the building will be the only answer to floor space restrictions.

CRANE CONSIDERATIONS

Modern tilt-up construction is nothing if not complex. Building codes, deadlines, drawings reviews, specifications - all requiring concerted coordination between vendors, customers, and scores of project partners. With so many moving parts, it's often easy to lose track of individual processes, often causing costly delays for everyone involved.

Looking for a solution, Leviat continually partners with a variety of industry partners to determine how we can optimize the insulated tilt-up construction process. Complete Tilt is the result of that collaboration and was created to improve efficiency and reduce cost across all aspects of the design, construction, and erection of insulated tilt-up panels.

This offering bundles the services and expertise of three respected brands – Meadow Burke, Thermomass, and Halfen - and their industry-leading lifting, bracing, anchoring, and insulation products to create one, single-source resource for concrete sandwich panels.

Panel Casting Considerations

STACK CASTING

The slab area of the building is often not large enough to permit all the panels to be poured on its surface. In these instances, it is necessary to stack the panels using the top side of one panel as the casting surface for the panel poured above. Stack casting is also used on jobs where the panels are poured outside of the perimeter of the floor slab. This is common where structural steel columns must be set prior to panel erection making it impossible for the crane to work on the floor slab. Temporary casting beds are poured outside the building. Stacking panels keeps the casting area to a minimum.

Edge forms for stacked panels require special attention. It is more difficult to form panels as they stack higher. When there are only two or three panels in a stack, plywood is often used to build the full height of the edge form. A pour strip or line is used to establish the proper thickness for each panel.

BRACE POINT LOCATION

Correct panel layout should ensure that as panels are erected the floor slab inserts are uncovered as needed. A down panel must not cover a brace point needed for a panel being erected. Any temporary solution to this problem is usually unsafe.

FORMING PANELS

After the floor slab is poured, the contractor begins building panel forms. The usual method is to snap chalk lines to determine the panel, layout and size. Forms are built using 2x lumber of the proper width for panel thickness and either wood braces or triangular metal brackets for support. Forms are placed and secured to the casting slab by one of the following methods:

1. Bolts can be drilled into the floor for anchorage.
2. Nails can be driven into the floor with power-actuated tools.
3. Edge forms on wood plates can be glued to the floor surface.
4. Edge forms can be braced against each other.
5. Glue down bracket systems.

PANEL CASTING METHODS

There are numerous considerations that can affect the decision of casting a panel face up or face down. Generally, panels are cast with the inside face up. A few helpful considerations:

BRACES

If bracing is to the inside, cast the inside face up so the braces can be installed before lifting the panel in order to lift the braces with the panel. If bracing is to the outside, consider casting the outside face up. Deadman brace anchors or MB Brace Badgers may be necessary.

ARCHITECTURAL APPEARANCE

For better architectural appearance, cast with the inside face up so that the lift and brace insert patches will not be visible from the outside.

FINISHES

If form liners are to be used on the outside, cast the inside face up to permit better flow into the liner.

Panel Casting Considerations

EXPOSED AGGREGATE

Exposed aggregate is usually cast down by using a sand bed or a retarder but it can be cast face up depending on the size and the technique to be used. Note: The use of Super-Lift Inserts will not allow more than a ½" diameter exposed aggregate on the surface cast up. Larger aggregate on the top surface prevents the Super-Lift Clutch from bearing properly on the concrete.

REVEALS

When reveals are required on the outside face, cast the panels with the inside face up so that the reveals can be lightly fastened to the floor to hold them during casting.

OFFSETS

If beams, columns or haunches are to be cast monolithic with the panel, cast them up to reduce forming cost and to provide a uniform rotational surface at the panel base.

CRANES

If the crane is to be positioned on the floor, the panels are usually cast with the inside face up and the base of the panels toward the crane. If the crane is to be positioned outside the building, the panels can be cast outside face up with the base of the panels toward the crane. It is possible to cast with the opposite position from the above description. In those cases the panel is usually cast with the top of the panel toward the crane so that the lift inserts cannot be seen by the crane operator during lifting.

LEDGERS

If the ledgers are to be placed prior to erection, cast them face up and "wet-set" the bolts or studs during the concrete placing operation. This saves the labor of trying to lift the ledgers up the wall.

MITERS

If the outside corners are to be mitered, cast the inside face up. If the inside corners are to be mitered, cast the outside face up. Failure to cast the correct face will require sliding the panel along the wall into the mitered corner. This may require transferring from face to edge lift inserts during erection.

BUILDING FRAME

If there is to be a steel or concrete frame in place at the time of lifting the panels, lifting rigging on the inside face may interfere with the frame. It may be necessary to lift with the outside face up or to lift with the inside face up and transfer to edge lift inserts during erection.

CURVED

Curved panels are normally cast with the concave side up to increase the area of panel base in contact with the floor during rotation. However small, radius panels may be cast concave downward to have the two ends down for contact with the floor during rotation.

Panel Casting Considerations

PANEL DETAILING AND TEXTURING: WOOD CHAMFER

After the perimeter forms are in place and door, window, and other openings are in place, the panel is ready for the next step. Normally $\frac{3}{4}$ " wood chamfer is placed along the vertical edges of the panel and at top and bottom for a clean edge finish. Chamfer helps prevent leakage of concrete paste which results in a rough edge. Wood chamfer is also used to form designs on panels and to create a clean line for color changes if the building is to be painted or stained. Wood chamfer is used around form liners to create a smooth transition from one texture to another. Chamfer and reveal strips are normally glued to the concrete slab with a high strength, waterproof spray adhesive and are nailed to edge forms with finish nails.

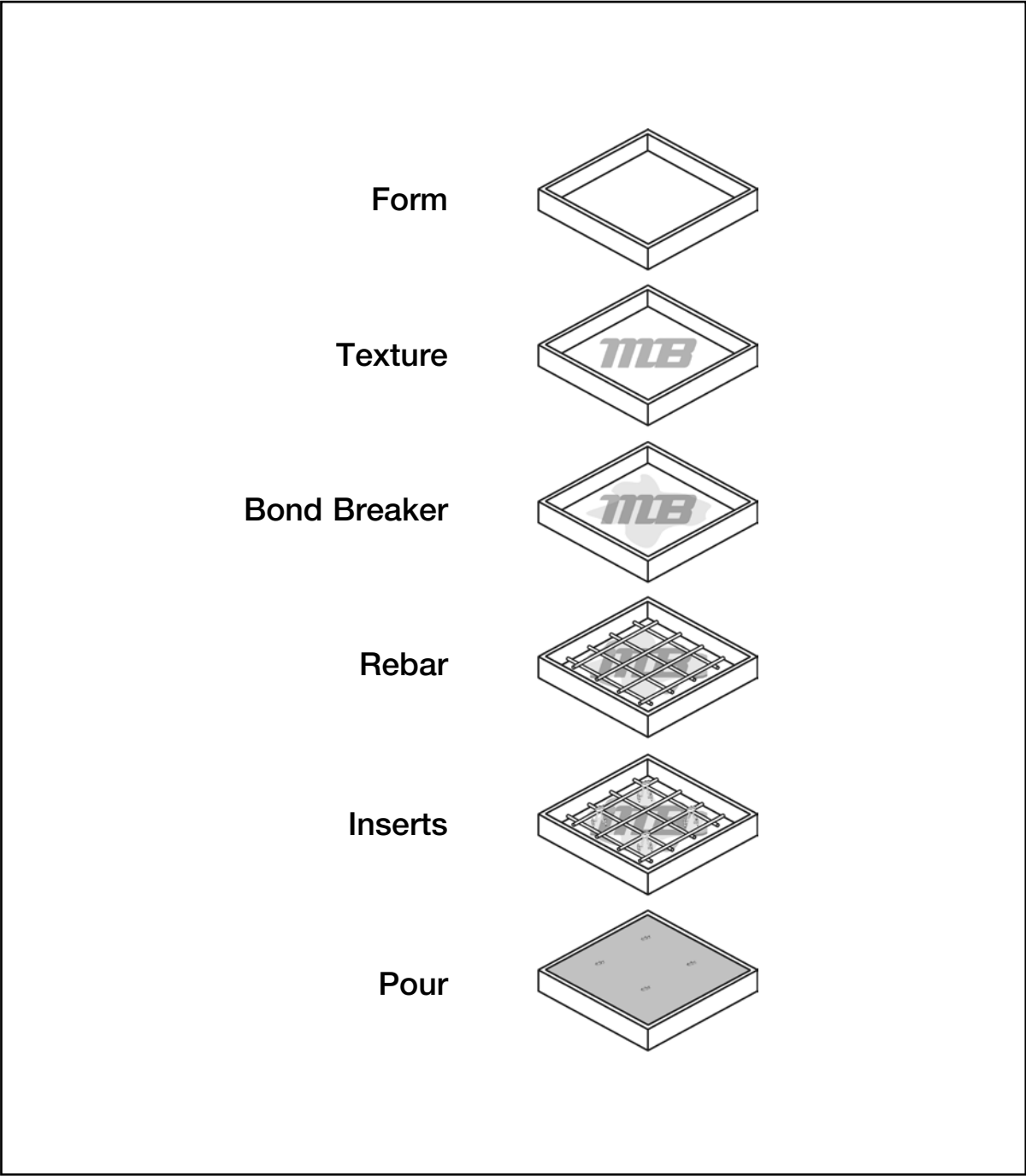
PANEL REINFORCEMENT

After panels are formed and bond breaker and other panel treatments are applied, rebar and inserts are placed. Typical building codes require that rebar occupy .0015 to .0025 of the overall area of the concrete in cross section. The placement of #4 rebar on 12" centers for an average 6" panel is common.

To insure proper strength, accurate placement of reinforcing is essential. Meadow Burke is a leader in manufacturing bar supports to facilitate the proper placement of reinforcement. Levia engineering drawings may call for necessary reinforcement around windows and door openings.

Inserts should be wired securely to rebar and the rebar fully supported around inserts. Location of the inserts in the panel should correspond exactly to their position on the engineering drawings. If for some reason they cannot be placed in their exact location, contact your Meadow Burke Distributor or the Engineering Department.

Typical Panel Sequence



Lifting Tilt-Up Panels



Pick-up Point Design Service

FACTORS INVOLVED

The choice of inserts and the analysis of their location must take into consideration all the design problems involved in erecting the panel. The success of tilt-up as a construction method is based on the safe and economical execution of the erection procedure. When lifting a panel from horizontal to vertical, it undergoes more stress in those few minutes than it will ever encounter as a structural unit. Those stresses can run as much as four times the expected structural stresses. The correct location of the inserts is the major factor determining whether a panel is raised perfectly unblemished or whether it is damaged by stress cracks.

PICK-UP POINTS

Meadow Burke engineers have refined the location of pick-up points into a science. It involves the delicate balancing of negative cantilever moments and the positive moments between pick-up points. This correct placement minimizes flexural stresses in the panel.

Selection of the proper insert location is complicated by the fact that the stresses within the panel vary continuously as the panel is rotated from horizontal to vertical. Meadow Burke's computerized mathematical rotation analysis has been derived from years of experience and consultation with nearly a dozen top flight engineers and mathematicians at four of the nation's leading universities.

The balancing of the bending moments requires the further consideration of the tensile and compressive strengths of the concrete. Because of this consideration, Meadow Burke bases its analysis on the modulus of rupture of concrete. The tensile strength of the concrete on one face and the compressive strength on the opposite face resist the creation of cracks in the concrete during erection. Depending on whether the bending moment is either positive or negative, the compressive and tensile stresses will alternate in different places on both faces of the panel. The effect of thermal reinforcing steel is usually discounted in the analysis of the lifting stresses. Because this reinforcing is placed in the center, the panel would develop serious cracks if raised prior to the concrete reaching the minimum tensile and compressive strengths. If the modulus of rupture is low, the panel will crack to the steel reinforcing during the erection procedure. This is, of course, unacceptable. The cracking could be minimized by placing curtains of steel on both the top and bottom faces of the panels. Not only would this be uneconomical, it would not entirely eliminate unwelcome cracks in the panels.

CONCRETE STRENGTHS

Leviat engineers have found, from over forty years of experience, a minimum compressive strength of 2500 psi (17.2 MPa) and a modulus of rupture of 500 psi (3.4 MPa) are required for crack-free erection of tilt-up panels. It is assumed that the allowable tensile strength will be 60% of the modulus of rupture. Leviat engineers recommend that a Test Beam Break (ASTM Designation: C 78) be undertaken, along with the more common concrete cylinder compression tests prior to erection.

Meadow Burke Engineering is the Contractor's Advantage

ADVANTAGES

By far, the most crucial phase of tilt-up construction is the erection of wall panels. It is during this important phase that the economics of tilt-up construction become most obvious.

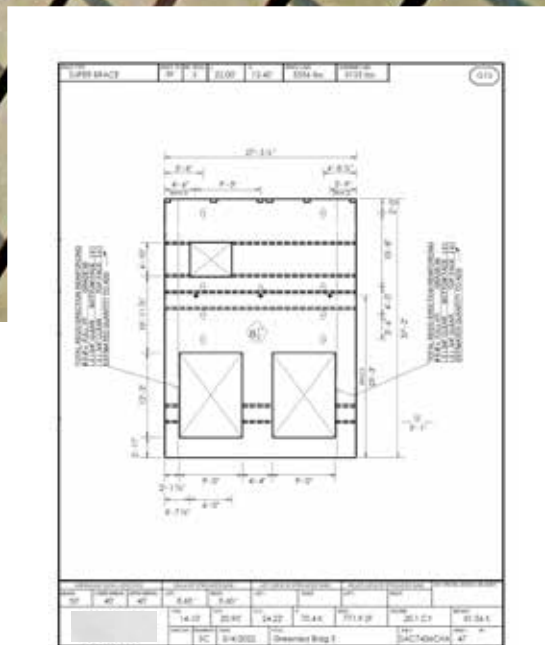
This critical lifting phase is in many ways a test of all the labor that led to the erection of the panels. If anything has been done incorrectly, it will probably show up during this phase. If the bond breaker is inadequate, the panels will stick to the surface. If the inserts have been incorrectly placed, the panel may crack and the inserts may be overloaded. It is at this point that a contractor appreciates the insert design of Leviat's Engineering Department and the use of reliable products.

The pull of gravity exerts unusually high stresses on the panel as it is slowly rotated into an upright position. At a time when the panel is not yet at full strength, it will be momentarily subjected to maximal stresses. At this critical point, the panel may receive as much as four times the stress it is likely to encounter as a structural unit.

As the panel is rotated from 0° to 90° the overall stress reaches its maximum at a number of critical angles. This will vary with the shape of the panel and the type of rigging used. Graphs A and B (see page 22), produced by Leviat Engineering, illustrate the changing, bending moments during panel rotation. They illustrate the effect of various rigging configurations on a rectangular panel.

Notice that the angles of maximum stress vary for the two rigging configurations. For "two-high rigging", the point of maximum stress occurs at approximately 40°. For "four-high rigging", the stresses peak between 45°- 60°. Cracking and failure are most likely to occur at these angles. As the panel is rotated, tension and shear loads will vary. Generally, tension loading will decrease while shear loading increases until the panel is vertical. Impact loading will occur throughout the lifting sequence and under normal conditions will be absorbed by the safety factor. But, if the panel drops and is suddenly caught by the crane, or if the panel hits the boom of the crane, unusually high impact loading will be exerted on the insert. Under these conditions of unusual stress, the quality of lifting equipment is paramount. Leviat matches its respected engineering service with a comprehensive line of lifting equipment, including a ground release system.

Tilt-Up Lift & Brace Engineering



Leviat's engineering services offer a host of benefits to ensure your tilt-up project is constructed as efficiently, economically, and as safely as possible.

Detailed Planning

Leviat's engineering team produces easy-to-read panel drawings with lift and brace locations correctly positioned and indicated to minimize the risk of concrete stress and cracking during erection and bracing.

Custom Solutions

Leveraging state-of-the-art design tools and decades of experience, our engineering and manufacturing teams can customize many of Leviat's designs to meet your project's specific requirements.

Unmatched Experience

Our team is the industry-leader in lift and brace design, with over 200 years of combined experience. We are also active participants in a variety of industry committees, including those for the Tilt-Up Concrete Association.

Contact projectengineering@leviat.us or visit <https://meadowburke.com/tilt-up-request/> to try the Leviat advantage on your next tilt-up project

We also offer:

- Preliminary material take-offs
- Bill of Materials
- Strongback design and location
- Additional rebar required for lifting purposes only
- PE seals for USA and Canada

Tilt-Up Shop Drawings



Leviat Shop Drawings help optimize tilt-up panel construction, allowing easy coordination between different plans.

More efficiently assemble your plans

Leviat shop drawings are your one-stop source for every detail you need to plan, cast, and erect your next tilt job.

More quickly form panels

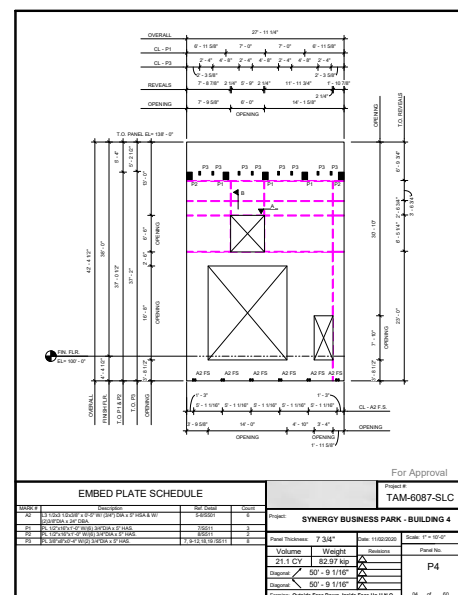
Overall panel geometry - including doors, windows, and other opening - are detailed on each drawing.

More accurately place components

Embeds, reveal strips, and other construction accessory locations are clearly dimensioned for quick and precise placement.

More confidently complete your project

Our team of experienced engineers and drafters are an invaluable resource, helping ensure that your architectural, structural, and accessory plans are all aligned for a successful pour.



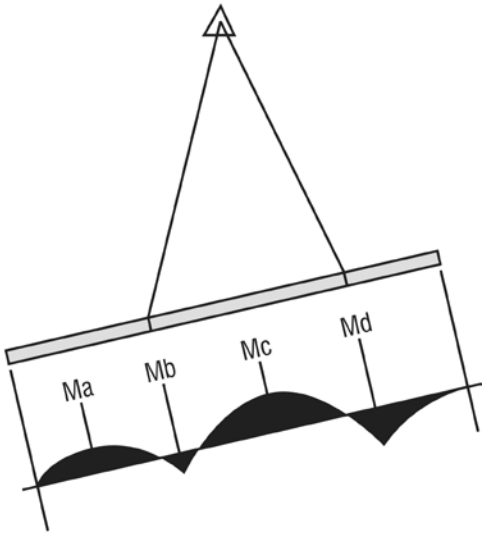
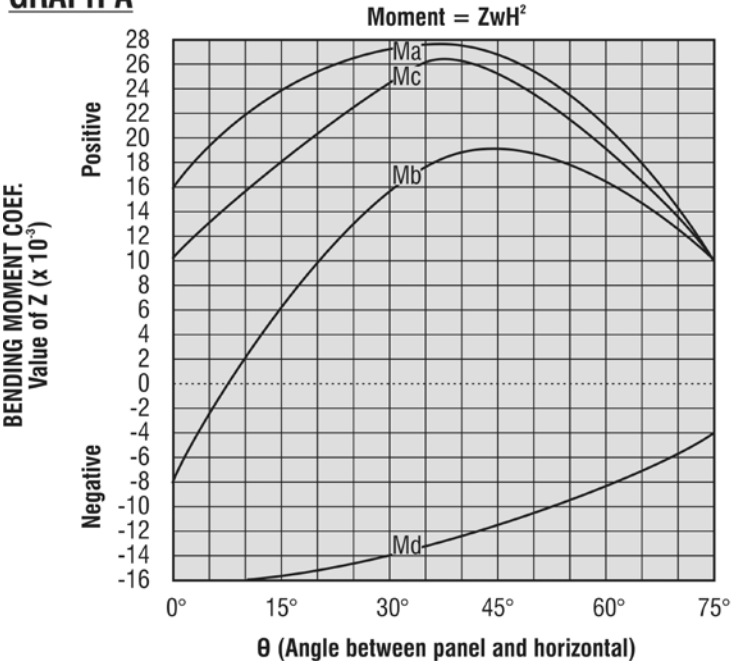
Tilt-Up Shop Drawing

We also offer:

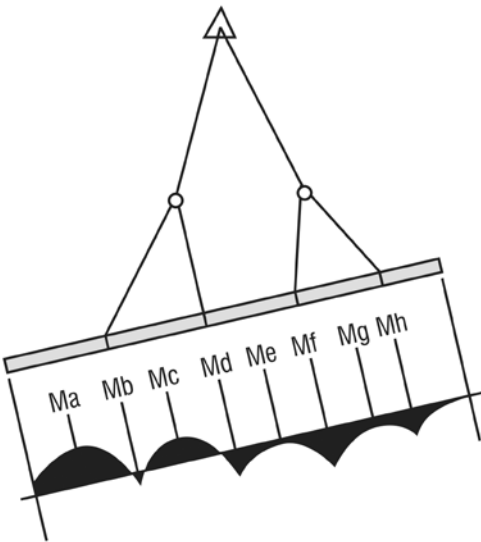
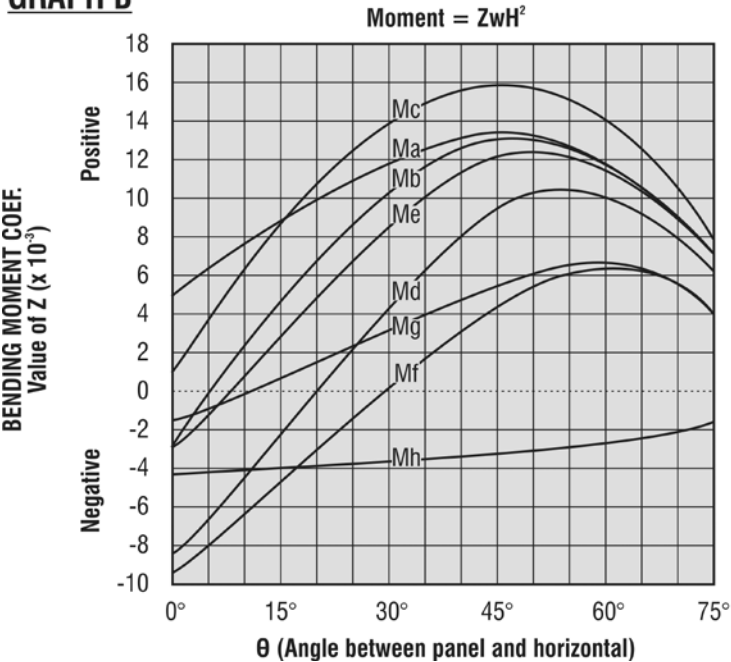
- Single or side-by-side formats
- Paper doll sets
- Panel casting layout plans
- Bracing layout plans
- 3D model views

Bending Moments During Rotation

GRAPH A



GRAPH B



Meadow Burke Analysis Program

ADVANTAGES

Meadow Burke's full-time programmers have developed an iterative and interactive tilt-up program to efficiently plot safe lift points and calculate the various flexural and shear stresses. Once the computer has calculated preliminary information such as the weight and center of gravity of the panel, it launches into a full rotation analysis. The "mind" of the computer simulates the lifting of the panel and calculates the shear stresses and bending moments at approximately every 3° of rotation. It follows the panel through all the critical stages of erection. Any potential weak point in the panel during erection will be spotted and the inserts moved to compensate. Though each calculation takes but a microsecond, it is executed with space age certainty. The computer will erect the building in its memory banks long before a single panel is ever poured. Once the optimal insert location is determined, the accurate scale drawings are produced for each panel on a laser printer. If supportive reinforcement or strongbacks are determined to be necessary, they will be specified.

BRACE ANALYSIS

Engineering can also provide an accurate analysis and location of the required bracing. Brace information can be located on the same erection drawing.

Leviat's Engineering staff aims at maximum certainty and the elimination of chance at the work site. It is for this reason that insert location for bracing and rigging details should be adhered to exactly. Any desired changes in the location and placement of inserts should be analyzed and cleared by Meadow Burke's Engineering staff before being carried out in the field. If a critical problem develops during the lifting sequence, Meadow Burke's Tilt-up Engineering can provide instantaneous computer analysis.

ENGINEERING RESPONSE

The fastest service from Meadow Burke Engineering can be obtained by submitting a complete set of plans, complete submittals and P.O. at the beginning of the project, rather than sending the information in pieces. Send the plans to your designated Engineering Office so they will not be delayed by transferring them to another location.

When calling to discuss a project once the engineering has been completed, have the job number available, as the details are filed by job number.

ENGINEERING SERVICE

All insert location design work is done according to the expressed preferences of the contractor unless these are impossible or unsafe. If this is the case, Leviat's Tilt-up Engineering Center will contact the contractor and suggest changes. Make full use of the Meadow Burke Distributor and Engineering staff. Their time will save you money. We urge you to contact our tilt-up specialists no matter what the stage or status of your project.

Notes

Super Lift System



Meadow Burke Super-Lift System

- SAFE
- SIMPLE
- SPEEDY
- SPALL-FREE

Meadow Burke has gotten down to basics and produced one of the safest and simplest lifting systems on the market today. Quick and efficient panel erection requires a lifting system that carries out its work in minimum time with very little fuss. Super-Lift continues Meadow Burke's pioneering work in ground release systems. Not only does the system provide quick release, but it also speeds up insert engagement.

Meadow Burke has reduced all that to one quick, simple motion. Just lower the bolt and you're ready to lift. The key is Super-Lift's rugged lifting unit.



Meadow Burke
Super-Lift III Ring Clutch



Meadow Burke Super-Lift II



Meadow Burke Super-Lift III



Meadow Burke
Super-Lift II Ring Clutch

Super Lift Shoe

How It Works:

For insulated panel applications, the Super Lift Shoe improves the positioning of all Super Lift Insert Anchors and protects insulation from damage caused by insert placement.

Features:

- Easily snaps onto existing feet of all Super Lift Inserts with no need for tools.
- Eliminates the need for shims to stabilize Super Lift Inserts.



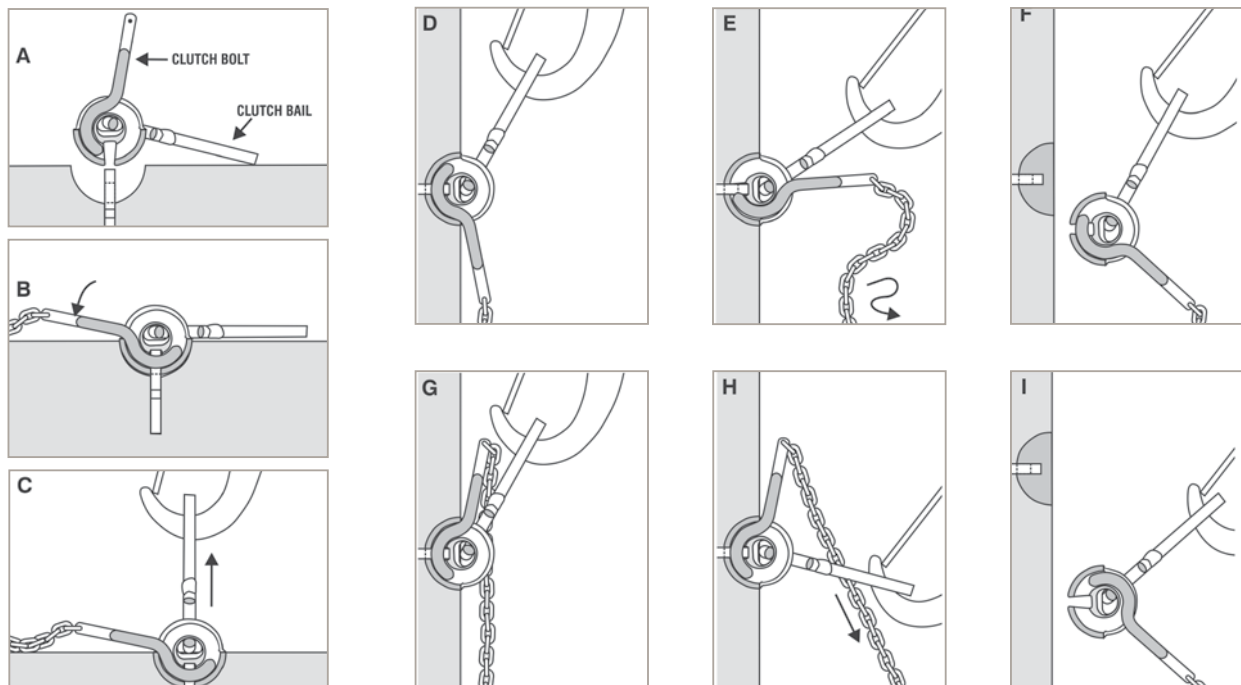
Solid Spall-Free Lifting Unit

Meadow Burke's Super-Lift unit has been working on jobsites in North America, South Africa, South America, and Guam for over three decades. Super-Lift is so simple it has only two moving parts; one sturdy Clutch Bail that follows the flow of the lift, and one sliding clutch bolt that creates a secure union between the lifting unit and the insert (A). Super-Lift's trouble-free operation allows you to simply lower the long unit into the recess and push the clutch bolt lever down towards the surface of the panel (B). The curve section of the clutch bolt passes through the eye of the anchor and locks the unit into place. A quick visual inspection of the long lever tells the crane crew immediately whether all lifting units are secure and ready to lift (C).

Here are some of the things you won't have to do:

- No adjustments
- No bolts to tighten
- No shimming or bearing pads to place under lifting unit

The panel is ready to be erected once the rigging is tightened. The ring clutch mechanism will not release the insert once the slings have been tightened to a minimum of 400 lbs. (181 kg). As soon as the panel erection begins, the friction lock makes the bolt virtually immovable. This security is backed up by the shackle which prevents the bolt from sliding back as the panel rises to 90°. There are two ways of rigging the ring clutch, handle down and handle up. Handle down is primarily used on taller panels because the worker doesn't have to get so far from the bottom of the panel. The crane hook is lowered a little and then the lanyard is "whipped" upward (E). This causes the chain to raise up and release the handle from the insert and pop the entire clutch out of the void (F). In the second or handle up release the rigging has to be completely slackened and lowered before it is possible to release the panel (H). Once the crane operator has lowered the rigging, a quick, even tug on the lifting unit rope will slide the bolt out of the eye of the insert and release the lifting unit from the panel (I). The lifting unit engages the insert without contacting the exposed surface of the panel. It's the perfect lifting unit for exposed aggregate surfaces. There's no bearing pad to lay down, and no chance of compression spalls caused by surface-bearing equipment. All contact is limited to the recess. The use of ½" (13 mm) or larger exposed aggregate on the top face is not recommended since it may interfere with the proper functioning of the ring clutch unit.



SUPER-LIFT III INSERT



SUPER-LIFT III SIMPLIFIES INSTALLATION, MINIMIZES LABOR TIME

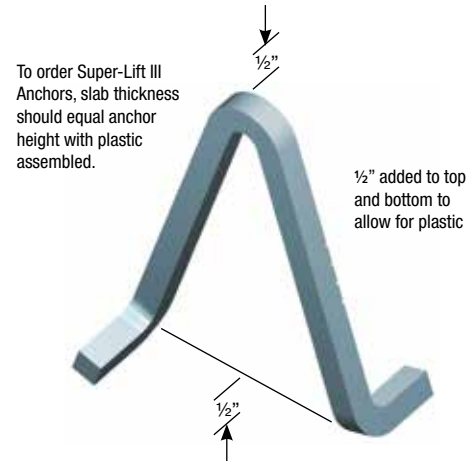
The Meadow Burke Super-Lift III insert module is a dependable combination of three economical parts: a two-part sturdy base, a high strength steel anchor and a two-part, snap-together recess former.

SUPER-LIFT III ANCHOR

Super-Lift III Anchor is made of high strength, low alloy steel. The shape of the anchor is engineered for maximum strength and economy. The head at the top of the anchor accepts the sliding clutch bolt of the lifting unit for a safe, secure engagement. Super-Lift III insert modules are manufactured in heights ranging from 5" (127 mm) to 12" (305 mm) in 1/2" (12.7 mm) increments. Also available upon request in 1/4" increments. Super-Lift III inserts are manufactured in 1/4" increments as standard not upon requests. As the anchor gets longer, its load capacity increases until the tensile strength of the material is reached. Do not weld the anchor to rebar. Welding may cause embrittlement.

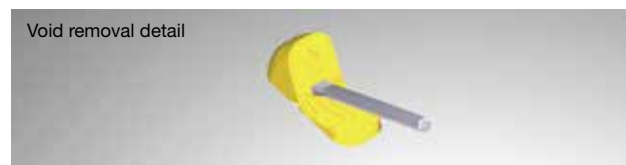
BASE

The Super-Lift III base gives stable support for sturdy anchor footing. Rebar slips easily over the extended legs. The Super-Lift III foot slips securely into the center of each base. The rugged plastic base has been engineered to resist bending and twisting if accidentally trampled by workers. The neutral colored leg tips will be virtually invisible on the surface of the erected panel. Base extensions are available for the use with form liners or to adjust for thicker panels.



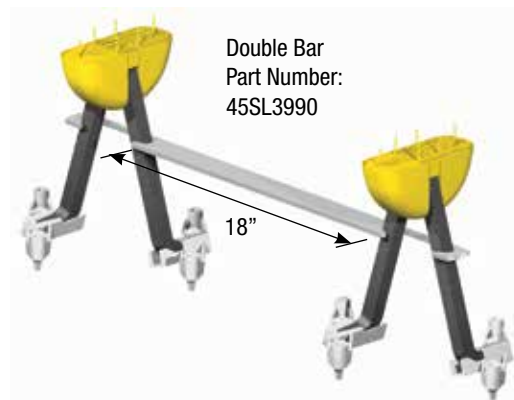
RECESS FORMER

The Super-Lift III Recess Former fits firmly over the head of the anchor to create a recess that accepts the lifting unit's ring clutch. The precise fit prevents concrete leaking into the recess. The patented latch prevents the recess former from dislodging or tipping as concrete is poured around it. The top of the recess former has an indicator arrow for proper alignment. Six locator antennae clearly signal the presence of the insert in concrete. The springy antennae will not interfere with screeding. Once the insert has been located, simply chip away the thin plane of concrete covering the top of the recess former. Drive a large chisel between the apex of the anchor and the edge of the hinge all the way to the bottom of the recess former. Using the insert as leverage, pry the chisel towards the center of the void. This will break the latch and begin to reverse hinge the void former. Once one half is free of the concrete, reverse the chisel direction to "pop" the remaining half out of the void. One simple operation leaves a smooth, clean recess for the lifting unit.



Meadow Burke Inserts: Load Data for Selected Panel Thicknesses

The minimum edge distance required to centerline of nearest insert void is 18" to obtain the listed loads. Reduce loads by the ratio of the concrete densities for lightweight concrete.



SUPER-LIFT III INSERT

WORKING LOADS IN LBS. IN 3000 PSI CONCRETE, 2.5:1 SAFETY FACTOR			
Item Number	Conc. Thick. in inches	Face Tension	Face Shear
MB45SL3050	5"	8,100	14,020
MB45SL3052	5-1/4"	8,680	14,200
MB45SL3055	5-1/2"	9,270	14,400
MB45SL3060	6"	10,450	14,780
MB45SL3062	6-1/4"	11,200	15,850
MB45SL3065	6-1/2"	11,960	16,910
MB45SL3070	7"	13,460	19,030
MB45SL3072	7-1/4"	13,960	19,750
MB45SL3075	7-1/2"	14,470	20,470
MB45SL3080	8"	15,490	21,900
MB45SL3085	8-1/2"	16,930	22,420
MB45SL3090	9"	18,390	22,420
MB45SL3092	9-1/4"	19,110	22,420
MB45SL3095	9-1/2"	19,830	22,420
MB45SL3100	10"	21,290	22,420
MB45SL3105	10-1/2"	22,420	22,420
MB45SL3110	11"	22,420	22,420
MB45SL3112	11-1/4"	22,420	22,420
MB45SL3115	11-1/2"	22,420	22,420
MB45SL3120	12"	22,420	22,420

2 SUPER-LIFT III INSERTS W/ DOUBLE BAR

WORKING LOADS IN LBS. IN 3000 PSI CONCRETE, 2.5:1 SAFETY FACTOR			
Item Number	Conc. Thick. in inches	Face Tension	Face Shear
MB45SL3050	5"	16,210	28,040
MB45SL3052	5-1/4"	17,370	28,410
MB45SL3055	5-1/2"	18,550	28,810
MB45SL3060	6"	20,900	29,570
MB45SL3062	6-1/4"	22,410	31,700
MB45SL3065	6-1/2"	23,920	32,000
MB45SL3070	7"	26,920	32,000
MB45SL3072	7-1/4"	27,930	32,000
MB45SL3075	7-1/2"	28,940	32,000
MB45SL3080	8"	30,970	32,000
MB45SL3085	8-1/2"	32,000	32,000
MB45SL3090	9"	32,000	32,000
MB45SL3092	9-1/4"	32,000	32,000
MB45SL3095	9-1/2"	32,000	32,000
MB45SL3100	10"	32,000	32,000
MB45SL3105	10-1/2"	32,000	32,000
MB45SL3110	11"	32,000	32,000
MB45SL3112	11-1/4"	32,000	32,000
MB45SL3115	11-1/2"	32,000	32,000
MB45SL3120	12"	32,000	32,000

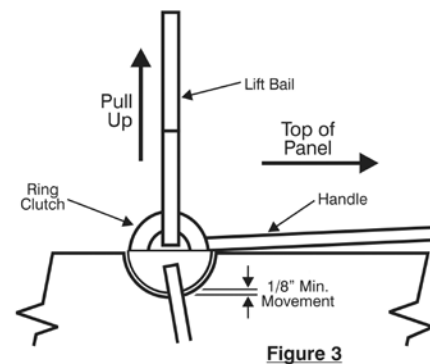
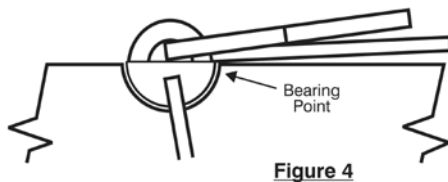
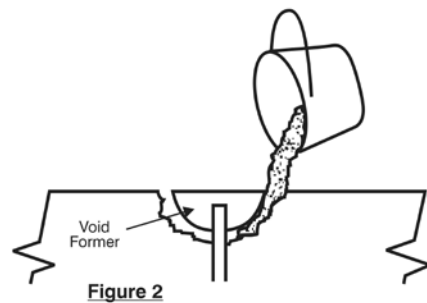
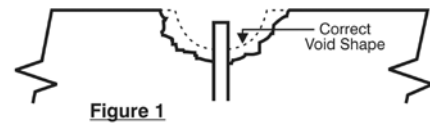
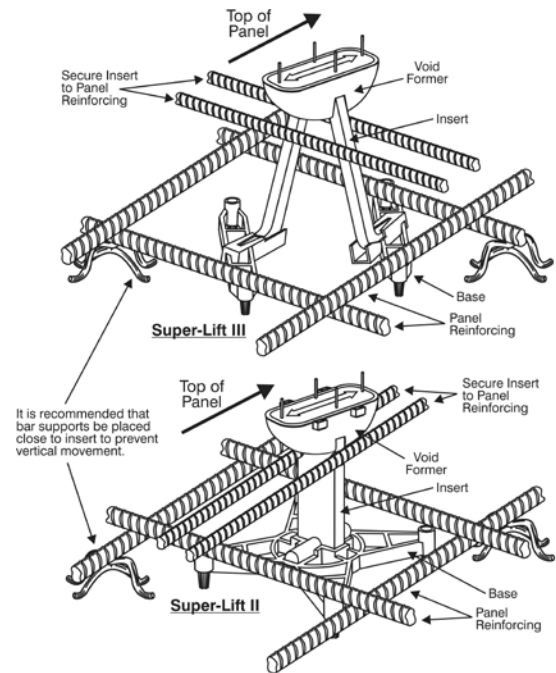
The safety factor to be applied to a particular product is a variable, depending on the degree of hazard or risk involved in the application of that product. In tilt-up construction various conditions can often increase the loadings as well as the degree of risk involved. Adhesion of the panel to the casting surface, jerking of the panel during lift, use of a crane not adequate for the job, bouncing of the wall panel after it has been lifted, handling the panel more than anticipated, transporting panel over rough surfaces, under or over booming, etc., all have high risk factors. Safety factors should be increased accordingly by the user to reduce these risks.

SUPER-LIFT INSERT INSTALLATION

The insert shall be located as shown on Meadow Burke Engineering's panel erection details with the arrow on the yellow void former pointing towards the top of the panel, unless noted otherwise on the details. Be certain the void former is pushed onto the insert with the latch inside the void former secure and tight. Allow at least 13" from the center of the insert to the nearest obstruction above it to insure Ring Clutch handle closes completely. The rebar surrounding the insert should be fully supported and the insert should be securely wired to the rebar. Care should be taken not to move or jar the inserts once concrete is placed and proper vibration for concrete consolidation is required. After the concrete has hardened or set for 24 hours, remove the plastic void former and any debris in the void using the method described on page 28. Inspect the insert to insure it is perpendicular to the concrete. It cannot be used if it is tipped more than 10 degrees in any direction or protrudes above the surface of the concrete. Be careful not to damage the curved surfaces of the void as the lifting unit must bear on them. If the curved surfaces are damaged, the void must be reconstructed before using the insert. With the void former installed, reform the void using a non-ferrous, non-shrink grout. Allow the grout to harden until it reaches a compressive strength equal to the panel's strength. Figures 1 & 2 illustrate this point.

SUPER-LIFT INSPECTION

Install the Super-Lift Ring Clutch into the void and engage the handle toward the top of the panel. The handle should drop freely without forcing. The handle must rotate down flat on the panel with the underside of the tip of the handle no more than 3/4" above the panel surface (See Figure 3). With the handle engaged, pull the bail perpendicular to the panel surface to ensure there is at least 1/8" movement between the clutch and insert. While pulling on the bail, rotate it toward the top of the panel until it strikes the handle, making sure the clutch bears on the concrete at the top end of the void (See Figure 4). If any of the inspections cannot be completed, remove the Ring Clutch and reconstruct or chip out concrete as necessary to permit proper installation. Repeat the inspection procedure. After the above inspection is complete, attach the crane cable and lift.





SUPER LIFT III DOUBLE BAR

The Super-Lift Double Bar (patented) provides the easiest to use connection for a double insert in the industry. The Double Bar slides onto the inserts at the job site providing a positive connection between the two inserts. This product allows a maximum lifting capacity of 32,000 pounds with a 2.5:1 safety factor with Super-Lift III, and a maximum lifting capacity of 20,000 pounds with a 2.5:1 safety factor with Super-Lift II.

DOUBLE BAR DATA

Item Number	Description	Width	Length	Unit Weight
MB45SL3990	S-L III Double Bar	1.25"	23.25"	1.1 lbs
MB45990	S-L II Double Bar	1.00"	15.0"	0.8 lbs



SUPER-LIFT SPREADER BEAM

Meadow Burke can produce certified spreader beams with various widths and lifting capacities. Please call your MB Tilt-Up distributor for details and pricing.



SUPER-LIFT III DOUBLE LIFTING BEAM

The Double Lift Beam is engineered for strength and ease of use. The Double Lift Beam comes complete with two clevises for attaching Super-Lift III Clutches at the job site. Simply unscrew the bolt in the clevis, insert the clevis in the Clutch bail and screw the bolt back into the clevis. The Meadow Burke Super-Lift III design eliminates stocking a special double clutch. This beam has a safe lifting capacity of 32,000 pounds with a 5:1 safety factor.

DOUBLE LIFTING BEAM DATA

Item Number	Description	Ultimate Lifting Capacity	Unit Weight
MB45500	Double Lifting Beam	160,000 lbs	58 lbs

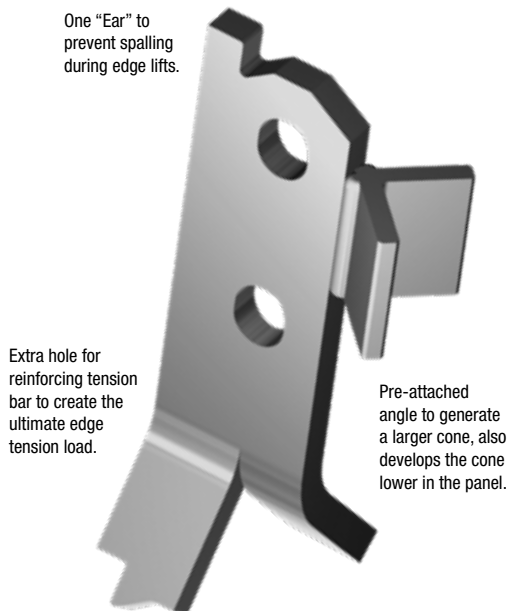
Meadow Burke offers three (3) different insert options for edge lifting tilt-up panels when required:

1. Super-Lift III Edge Lift Inserts
2. 8-Ton Erection Anchors
3. 8-Ton Tech Erection Anchors

All three inserts are compatible with Super-Lift III Lifting Hardware. The systems are totally compatible and eliminate the need to change lifting systems to coils or other hardware.

SUPER-LIFT III EDGE LIFT INSERT

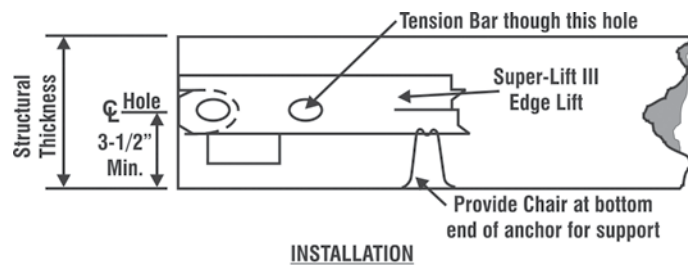
Super-Lift III Edge Lift Inserts provide secure, spall-free edge lifting of tiltup panels without the use of Shear Bars.



SUPER-LIFT III EDGE LIFT INSERT

WORKING LOADS IN LBS. IN 3000 PSI CONCRETE, 2.5:1 SAFETY FACTOR			
Item Number	Conc. Thick. in inches	Face Tension	Face Shear
MB45SL3995	6"	7,650	4,840
MB45SL3995	6-½"	8,170	5,560
MB45SL3995	7"	9,990	6,088
MB45SL3995	7-½"	10,690	6,088
MB45SL3995	8"	11,390	6,088
MB45SL3995	8-½"	11,940	6,088
MB45SL3995	9"	12,790	6,088
MB45SL3995	9-½"	13,360	6,088
MB45SL3995	10"	14,190	6,088
MB45SL3995	10-½"	14,780	6,088
MB45SL3995	11"	15,720	6,088
MB45SL3995	11-½"	16,350	6,088
MB45SL3995	12"	17,290	6,088

The safety factor to be applied to a particular product is a variable, depending on the degree of hazard or risk involved in the application of that product. In tilt-up construction various conditions can often increase the loadings as well as the degree of risk involved. Adhesion of the panel to the casting surface, jerking of the panel during lift, use of a crane not adequate for the job, bouncing of the wall panel after it has been lifted, handling the panel more than anticipated, transporting panel over rough surfaces, under or over booming, etc., all have high risk factors. Safety factors should be increased accordingly by the user to reduce these risks. If reinforced with #6 X 6'-0" long rebar through lower hole, working load in tension is 22,400 lbs.



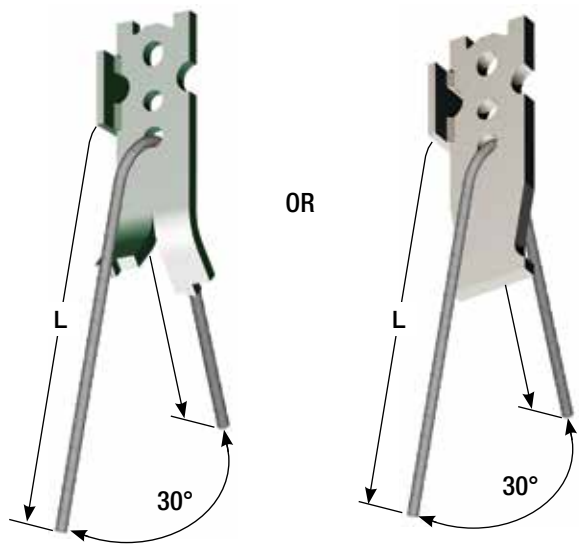
Erection Anchors with Shear Plates

Both the standard Erection Anchor with Shear Plate and the Tech Erection Anchor with Shear Plate are specifically designed for horizontal to vertical edge lifts and rotation of thin-walled units. These anchors are used extensively in the precast industry as part of the Meadow Burke Rapid-Lift System. Erection Anchors and their Recessing Members create the same semicircular recess in the concrete as Super-Lift Anchors.

ERECTION ANCHORS

Two steel ears on the head provide added protection against spalling. These ears hug the two sides of the ring clutch to give added support when pulled laterally.

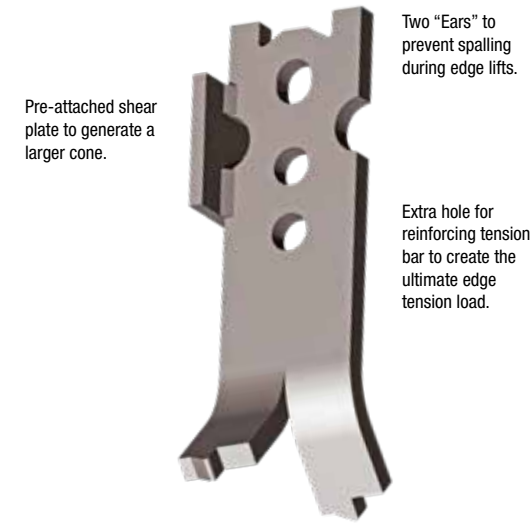
Minimum reinforcing length [L] needed to develop the full strength of the anchor



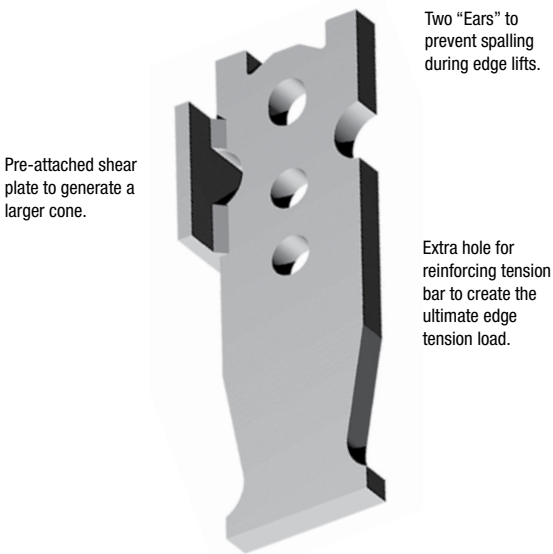
Ton Size		2-Ton	4-Ton	6-Ton	8-Ton
Rebar Size	Inch	#3*	#4*	#5*	#6*
	Metric	#10*	#12*	#16*	#19*
Concrete Strength		"L" Dimension			
1,500psi		3'-0"	4'-0"	5'-3"	6'-0"
2,000psi		2'-9"	3'-6"	4'-9"	5'-6"
2,500psi		2'-8"	3'-0"	4'-3"	5'-0"
3,000psi		2'-6"	3'-0"	3'-9"	4'-6"

*Grade 60 Rebar

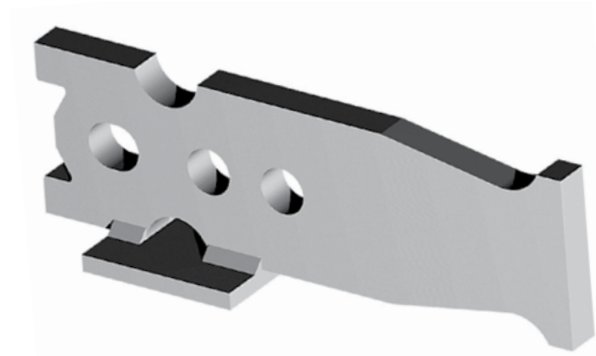
ERECTION ANCHOR W/SHEAR PLATE



TECH ERECTION ANCHOR W/SHEAR PLATE



Meadow Burke Inserts: Load Data for Selected Panel Thickness



**TECH ERECTION ANCHOR
W/SHEAR PLATE IN EDGE LIFT**

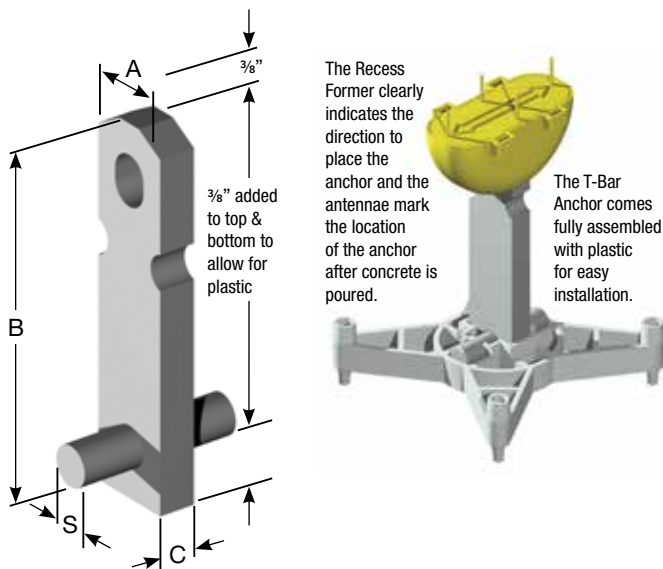


**ERECTION ANCHOR
W/SHEAR PLATE IN EDGE LIFT**

WORKING LOADS IN LBS. IN 2500 PSI CONCRETE							
Tech Erection Item Number	Erection Item Number	Size in Tons	Conc. Thick. in inches	Allowable Unreinforced Tension Load 2.5:1 SF	Allowable Reinforced Tension Load 2.5:1 SF	Allowable Edge Shear Load 2.5:1 SF	Minimum Corner Distance
MB79527SP	79147	2	3-½"	3,570 lbs	6,400 lbs	1,934 lbs	12 in
MB79527SP	79147	2	4"	4,320 lbs	6,400 lbs	2,637 lbs	12 in
MB79527SP	79147	2	4-½"	4,800 lbs	6,400 lbs	2,731 lbs	12 in
MB79527SP	79147	2	5"	5,280 lbs	6,400 lbs	2,840 lbs	12 in
MB79548SP	79148	4	4"	4,600 lbs	12,800 lbs	2,434 lbs	12 in
MB79548SP	79148	4	4-½"	5,226 lbs	12,800 lbs	3,341 lbs	12 in
MB79548SP	79148	4	5"	6,400 lbs	12,800 lbs	3,597 lbs	12 in
MB79548SP	79148	4	5-½"	6,720 lbs	12,800 lbs	3,746 lbs	12 in
MB79548SP	79148	4	6"	6,992 lbs	12,800 lbs	3,867 lbs	12 in
MB79589SP	79149	8	7"	9,600 lbs	25,600 lbs	5,422 lbs	18 in
MB79589SP	79149	8	7-½"	9,760 lbs	25,600 lbs	5,422 lbs	18 in
MB79589SP	79149	8	8"	10,400 lbs	25,600 lbs	5,422 lbs	18 in

Minimum anchor spacing is double the corner distance for unreinforced anchors.

The safety factor to be applied to a particular product is a variable, depending on the degree of hazard or risk involved in the application of that product. In tilt-up construction various conditions can often increase the loadings as well as the degree of risk involved. Adhesion of the panel to the casting surface, jerking of the panel during lift, use of a crane not adequate for the job, bouncing of the wall panel after it has been lifted, handling the panel more than anticipated, transporting panel over rough surfaces, under or over booming, etc., all have high risk factors. Safety factors should be increased accordingly by the user to reduce these risks.



The large Super-Lift II base gives stable support and proper height for sturdy anchor footing. Rebar slips easily over the extended legs. The pin section of the Super-Lift II Anchor snaps securely into the center of the base. The rugged plastic base has been engineered to resist bending and twisting if accidentally trampled by workers. The neutral colored leg tips will be virtually invisible on the surface of the erected panel. Base extensions are available for use with form liners or to adjust for thicker panels.

To order Super-Lift III Anchors, slab thickness should equal anchor height with plastic assembled.



RL-60 PLATE ANCHOR BASE 4-Ton

The RL-60 Plate Anchor Base is a plastic base designed for use with specific RL-24 Plate Anchor 4-Ton units and SL II Lift Inserts 4" and 4-½" in height (item numbers MB45SL040 and MB45SL045) to hold and position the anchors in face lift applications.

To Order, Specify: quantity, name and item number.

Super-Lift II

Simplifies installation,
minimizes labor time

The Meadow Burke Super-Lift II insert module is the first generation of innovative Meadow Burke lifting systems for tilt-up construction. It is a dependable combination of three economical parts: a large, sturdy base, a high strength steel anchor and a two-part, snap-together recess former.

SUPER-LIFT II INSERT

Super-Lift II Anchor is made of high strength, low alloy steel. The shape of the anchor is engineered for maximum strength and economy. The hole at the top of the anchor accepts the sliding clutch bar of the lifting unit for a safe, secure engagement.

Super-Lift II insert modules are manufactured in heights ranging from 4" (102 mm) to 12" (305 mm) in ½" (12.7 mm) increments. Also available in ¼" increments (upon request). As the anchor gets longer, its load capacity increases until the tensile strength of the material is reached. Notches on the sides of the anchor aid in wiring the anchor to rebar. Do not weld the anchor to rebar. Welding may cause embrittlement.

RECESS FORMER

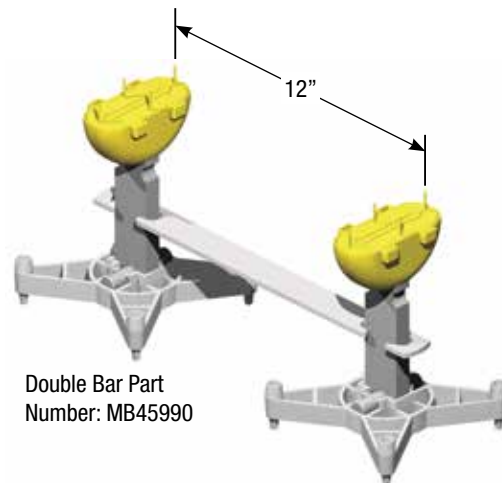
The Super-Lift II recess former fits firmly over the head of the anchor to create a recess that accepts the lifting unit's ring clutch. The precise fit prevents concrete from leaking into the recess. Two tabs, inside the recess former, slip into the anchor hole. This prevents the recess former from dislodging or rising up as concrete is poured around it. Four outside tabs hold the top of the recess former securely in place. Screeds and finishing equipment won't knock it loose. The top of the recess former has an indicator arrow for proper placement. Four locator antennae clearly signal the presence of the insert in concrete. The springy antennae will not interfere with screeding. Once the insert has been located, simply chip away the thin plane of concrete covering the top of the recess former. Use a screw driver to pop off the top of the recess former and pry the plastic tabs out of the anchor hole. The recess former then can easily be removed with a screw driver or claws of a hammer. One simple operation leaves a smooth clean recess for the lifting unit.

Meadow Burke Inserts: Load Data for Selected Panel Thicknesses

Super-Lift II Insert

The minimum edge distance required to centerline of nearest insert void is 12" to obtain the listed loads.

Reduce loads by the ratio of the concrete densities for lightweight concrete.



SUPER-LIFT II INSERT

WORKING LOADS IN LBS. IN 3000 PSI CONCRETE, 2.5:1 SAFETY FACTOR			
Item Number	Conc. Thick. in inches	Face Tension	Face Shear
MB45SL040	4"	5,290	7,490
MB45SL045	4-½"	6,950	9,830
MB45SL050	5"	8,090	11,330
MB45SL052	5-¼"	9,320	12,000
MB45SL055	5-½"	10,560	12,000
MB45SL060	6"	12,000	12,000
MB45SL062	6-¼"	12,000	12,000
MB45SL065	6-½"	12,000	12,000
MB45SL070	7"	12,000	12,000
MB45SL072	7-¼"	12,000	12,000
MB45SL075	7-½"	12,000	12,000
MB45SL080	8"	12,000	12,000
MB45SL085	8-½"	12,000	12,000
MB45SL090	9"	12,000	12,000
MB45SL092	9-¼"	12,000	12,000
MB45SL095	9-½"	12,000	12,000
MB45SL100	10"	12,000	12,000
MB45SL105	10-½"	12,000	12,000
MB45SL110	11"	12,000	12,000
MB45SL112	11-¼"	12,000	12,000
MB45SL115	11-½"	12,000	12,000
MB45SL120	12"	12,000	12,000

* Not compatible with MB Double Bar (Part Number 45990).

The safety factor to be applied to a particular product is a variable, depending on the degree of hazard or risk involved in the application of that product. In tilt-up construction various conditions can often increase the loadings as well as the degree of risk involved. Adhesion of the panel to the casting surface, jerking of the panel during lift, use of a crane not adequate for the job, bouncing of the wall panel after it has been lifted, handling the panel more than anticipated, transporting panel over rough surfaces, under or over booming, etc., all have high risk factors. Safety factors should be increased accordingly by the user to reduce these risks.

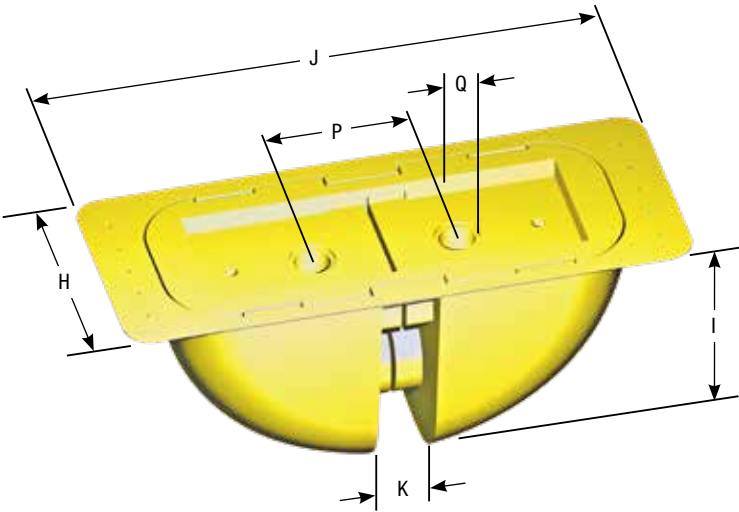
2 SUPER-LIFT II INSERTS W/DOUBLE BAR

WORKING LOADS IN LBS. IN 3000 PSI CONCRETE, 2.5:1 SAFETY FACTOR			
Item Number	Conc. Thick. in inches	Face Tension	Face Shear
MB45SL040*	4"	10,580	14,960
MB45SL045*	4-½"	13,910	19,660
MB45SL050	5"	15,960	20,000
MB45SL052	5-¼"	16,920	20,000
MB45SL055	5-½"	17,700	20,000
MB45SL060	6"	19,450	20,000
MB45SL062	6-¼"	20,000	20,000
MB45SL065	6-½"	20,000	20,000
MB45SL070	7"	20,000	20,000
MB45SL072	7-¼"	20,000	20,000
MB45SL075	7-½"	20,000	20,000
MB45SL080	8"	20,000	20,000
MB45SL085	8-½"	20,000	20,000
MB45SL090	9"	20,000	20,000
MB45SL092	9-¼"	20,000	20,000
MB45SL095	9-½"	20,000	20,000
MB45SL100	10"	20,000	20,000
MB45SL105	10-½"	20,000	20,000
MB45SL110	11"	20,000	20,000
MB45SL112	11-¼"	20,000	20,000
MB45SL115	11-½"	20,000	20,000
MB45SL120	12"	20,000	20,000

* 12" SLII Double Bar is not compatible with the 4" & 4 ½" SLII Anchors.

SUPER-LIFT III EDGE LIFT INSERT VOID

Item Number	Description	H	I	J	K	P	K	Unit Weight
MB45SL3998	Edge Lift Void	2 3/4"	3 3/8"	6 1/2"	3/4"	2"	1/2"	0.13 lbs



SUPER-LIFT III EDGE LIFT RECESSING MEMBER

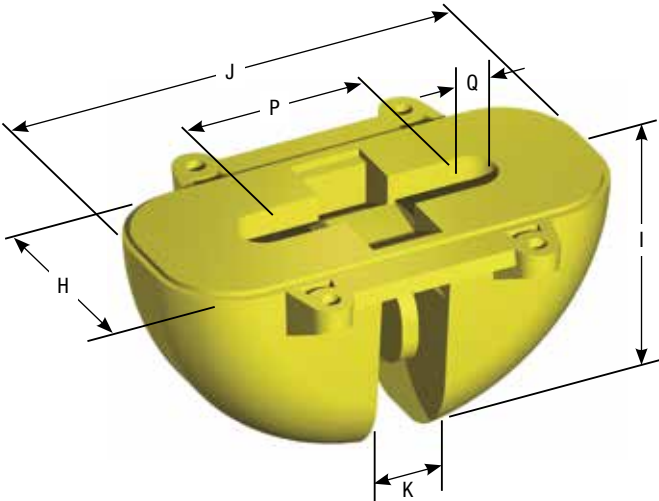
The recessing member is made of high quality plastic and creates a narrow, semicircular recess in the concrete for the ring clutch.

Installation:

1. Pry open recessing member and insert the Edge Lift Insert.
2. Position insert on form as detailed in the MB Engineering detail sheet.
3. Using flange of recessing member, nail insert to the form.
4. Support end of the insert using a plastic Super Chair.

SUPER-LIFT II PLASTIC DISPOSABLE RECESSING MEMBER

Item Number	Description	H	I	J	K	P	K	Unit Weight
MB79067	4-Ton	2 1/2"	2 1/4"	4 5/16"	5/8"	2"	1/2"	0.20 lbs



SUPER-LIFT II PLASTIC DISPOSABLE RECESSING MEMBER

Made of high density polyethylene, the recessing member holds the Rapid-Lift Anchor in place during casting and creates a narrow, semicircular recess in the concrete for the ring clutch. The disposable recessing member is available in two and four-ton sizes.

Installation:

1. Nail plastic holding plate to wood bulkhead.
2. Place recessing member on anchor.
3. Slide recessing member and anchor over holding plate.
4. Nail recessing member to bulkhead.

Rapid Lift System Anchors

RL-24 PLATE ANCHOR 2-Ton, 4-Ton and 8-Ton

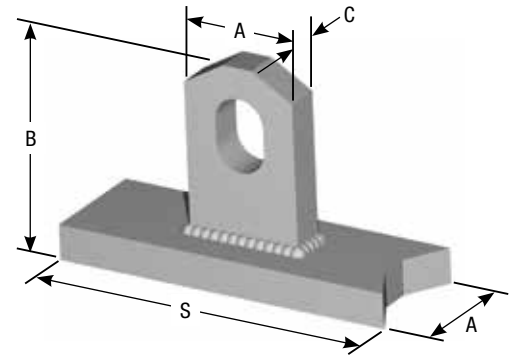
The RL-24 Plate Anchor is designed with a plate welded to the bottom to provide high pullout strength with a low profile. This design makes the anchor ideal for face and back lifts of thinwall units and stripping, handling and erection applications. The 4-ton Plate Anchor is ideal for use in the *Thermomass® 3-2-3 composite insulated panel system (see detail below). The Plate Anchor is available in the sizes shown in the table and in plain or hot dip galvanize finish.

Reinforcing Recommendation:

Crisscross the lower plate of the anchor with four (4) 18" long #4 rebar as shown in the sketch.

NOTE: A minimum $\frac{3}{4}$ " concrete cover below the anchor is required to achieve posted working loads.

NOTE: The Plate Anchor has allowable face shear loads that are equal to or greater than unreinforced face tension loads for anchors located in a panel or concrete unit at a distance of at least $2B+A$ from the edges.

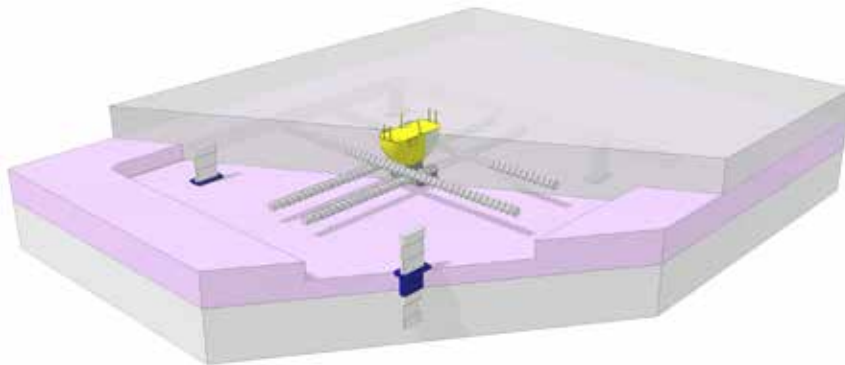


Typical method of reinforcing
Plate Anchors

RL-24 RAPID LIFT PLATE ANCHOR DATA										
Ring Clutch System	Clutch I.D.	Item Number	A	B	C	S	Allowable Unreinforced Tension Load 2.5:1 SF ₁	Allowable Reinforced Tension Load 2.5:1 SF ₂	Ultimate Mechanical Load Tension	Weight Per Piece
2T/2.5T	2.5T	MB79128	1- $\frac{1}{4}$ "	2- $\frac{1}{4}$ "	$\frac{3}{8}$ "	3- $\frac{3}{4}$ "	1,287 lbs	5,842 lbs	16,000 lbs	0.71 lbs
4T/5T	5T	MB45846	1- $\frac{1}{2}$ "	3"	$\frac{5}{8}$ "	3"	6,761 lbs	8,252 lbs	32,000 lbs	1.21 lbs
4T/5T	5T	MB45847	1- $\frac{1}{2}$ "	3- $\frac{1}{2}$ "	$\frac{5}{8}$ "	3"	6,896 lbs	8,398 lbs	32,000 lbs	1.31 lbs
4T/5T	5T	MB79044	1- $\frac{1}{2}$ "	4- $\frac{3}{8}$ "	$\frac{5}{8}$ "	3- $\frac{7}{8}$ "	8,790 lbs	10,662 lbs	32,000 lbs	1.91 lbs
8T/10T	10T	MB79054	2- $\frac{1}{2}$ "	6- $\frac{1}{4}$ "	$\frac{3}{4}$ "	5"	14,401 lbs	16,870 lbs	64,000 lbs	4.29 lbs
8T/10T	10T	MB79042	2- $\frac{1}{2}$ "	7- $\frac{1}{8}$ "	$\frac{3}{4}$ "	5"	18,391 lbs	21,106 lbs	64,000 lbs	5.55 lbs

1. Tension values shown are based on 2,500 psi standard weight concrete and a minimum edge distance of $(2B+A)/2$.
2. Tension values shown are based on 2,500 psi standard weight concrete, a minimum edge distance of 10" and #4 rebar cut to 18" lengths reinforcing the anchor as shown in the sketch.

To Order, Specify: quantity, name, item number and finish.



Tilt-Up Lifting Products



Strongbacks

WHEN WILL THEY BE NEEDED?

- A. If a panel looks like it would fall over when standing up. The strongback acts as a crutch to balance the weight.
- B. When panels have very wide openings. The strongback keeps the panel from sagging under the opening.
- C. When panels have “wimpy” legs, less than 7” thick, where the height of the leg divided by the width of the leg is less than 0.12. A strongback is needed because the leg cannot support the weight of the panel bearing on it during lift. For legs 7” and thicker often ties can be added around the reinforcing to avoid strongbacks.
- D. To avoid large amounts of added reinforcing. In certain instances, strongbacks are cheaper.

HOW TO ATTACH STRONGBACKS PROPERLY

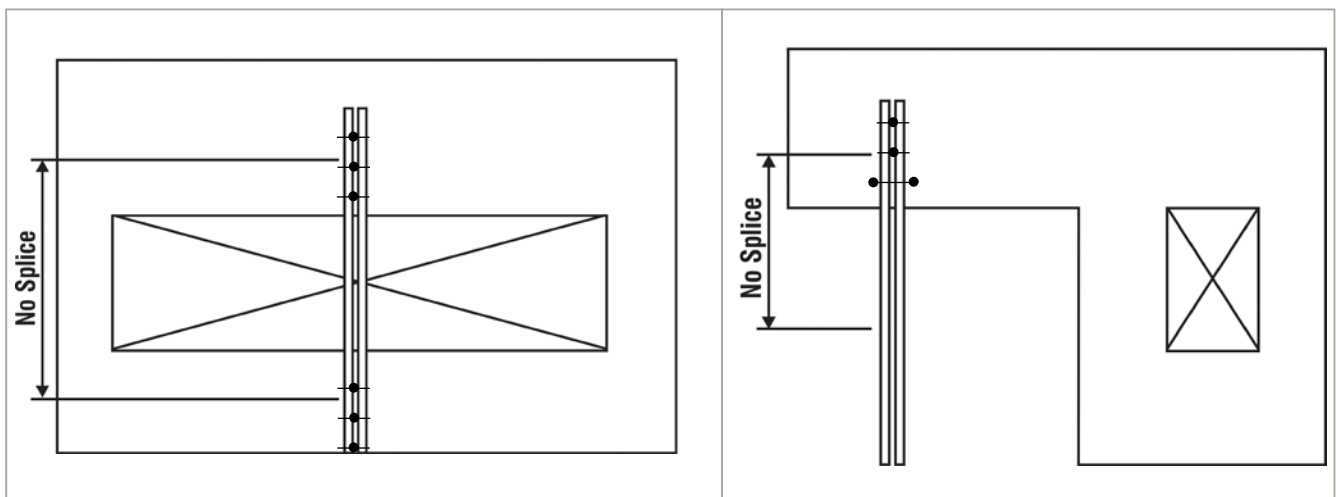
Using splice plates on 8” channel allows a “hinge” to form thereby reducing the capacity on the strongback, depending on the location of the splice. So it’s important to know where to splice a strongback.

1. Strongback Legs - We do not want the hinge to occur between $H/2 + 3'0$ above the Double Lift Plate.

H - is the distance from bottom of panel to DBL coil.

$H/2$ - $\frac{1}{2}$ of that distance. If you have a notch that is 12', it's $\frac{1}{2}$ of 12' or $6 + 3 = 9'$. You can't have a splice in that 9'.

2. Second condition is strongbacks spanning openings. We don't want the splice to occur within 3' above to 3' below the first strongback insert around the opening.



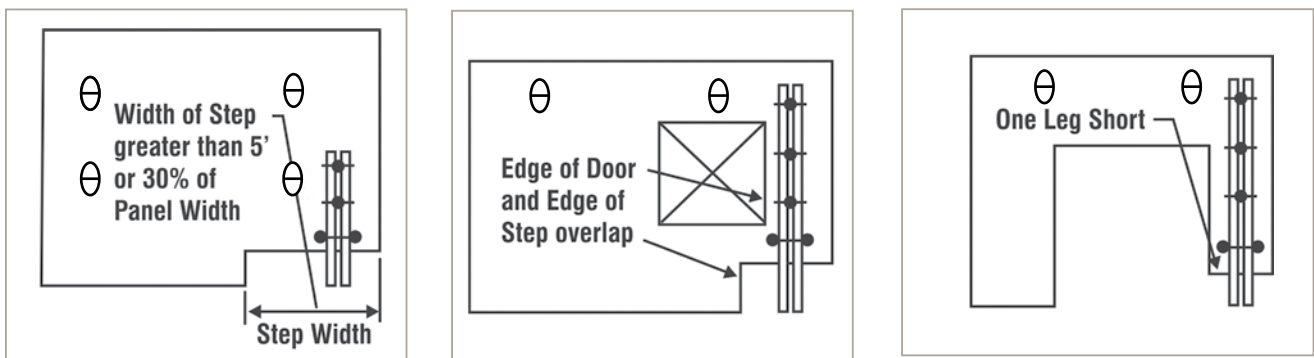
Strongbacks

SPECIAL REQUIREMENTS

This section covers a few of the conditions that will normally require the use of wood or steel strongbacks. If your project has panel configurations that are similar to the conditions shown in this section, it is very likely strongbacks will be required to lift the panels. Please remember that this is a guideline of some of the more common cases and does not cover all of the many possible requirements for strongbacks.

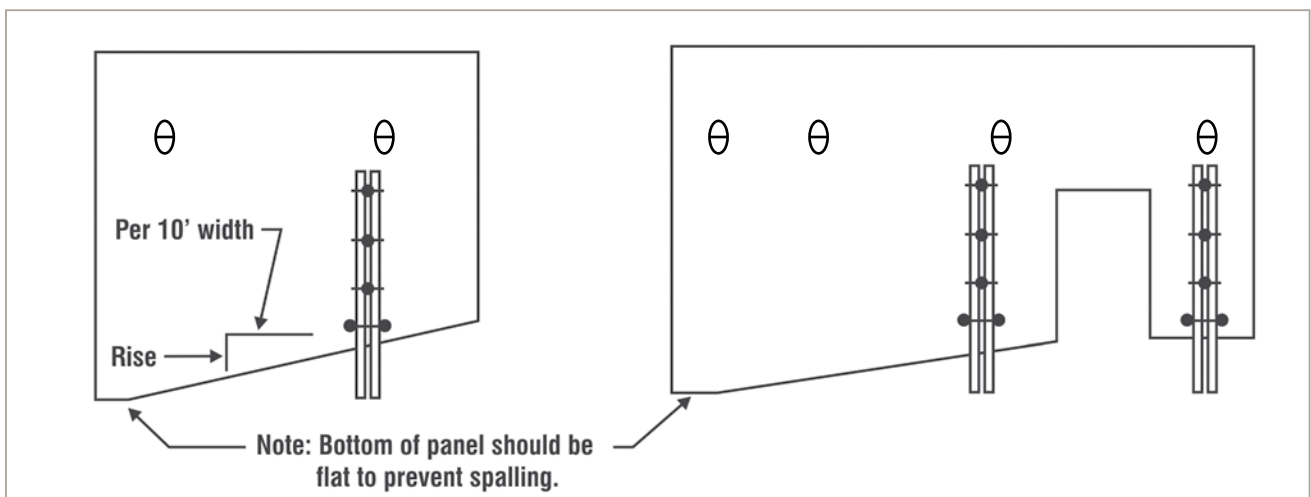
PANELS WITH STEPPED BOTTOMS

1. The bottom of the panel must be relatively straight in order for it to rotate properly. When a portion of the bottom end of the panel does not contact the ground, a strongback leg may be rebuilt to provide support for the panel. The three step conditions shown represent cases where strongbacks may be required to provide support.



PANELS WITH SLOPED BOTTOMS

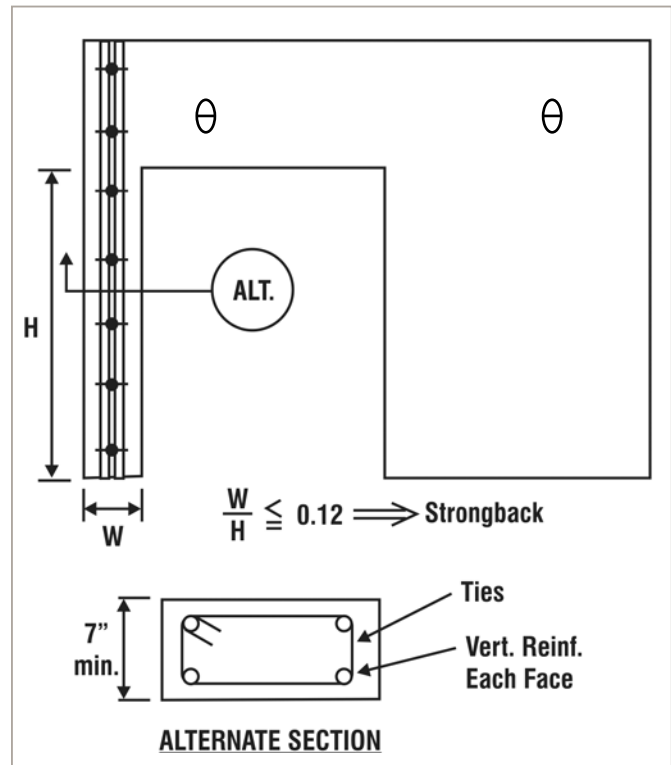
2. When the bottom of a panel slopes, strongback legs may be required to ensure the panel lifts straight. As a general rule, if the slope of the bottom end of the panel has a rise of 4" or more per 10' of panel width, strongback legs will be required. The following conditions are common and will normally need strongback legs to lift.



Strongbacks

PANELS WITH NARROW LEGS

1. Panels with tall narrow concrete legs may require strong backs for added strength. As a guideline, any leg less than 2' in width, whose width to height ratio is less than 0.12, will normally require a strong back over its entire height.
2. or panel legs 7" or more thick, it may be possible to eliminate the need for added strongbacks by the addition of added reinforcing steel, and ties in a column pattern. In order for this method to work, the reinforcing steel must be detailed with minimum concrete cover.



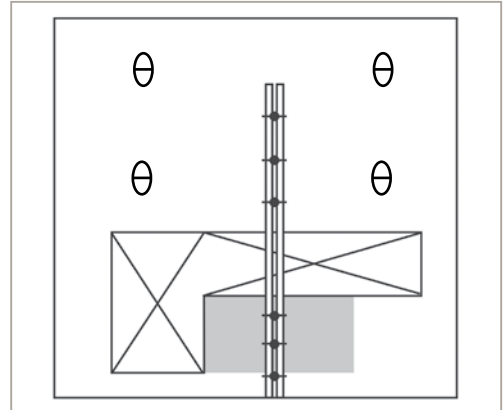
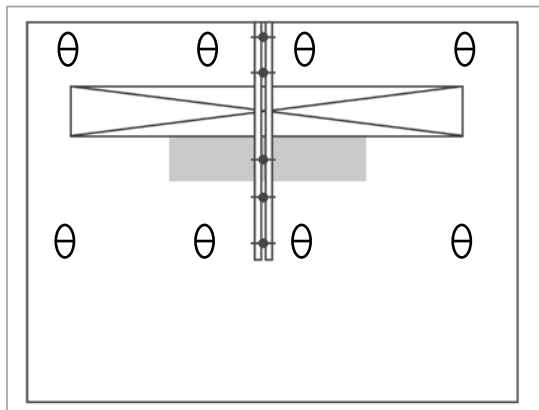
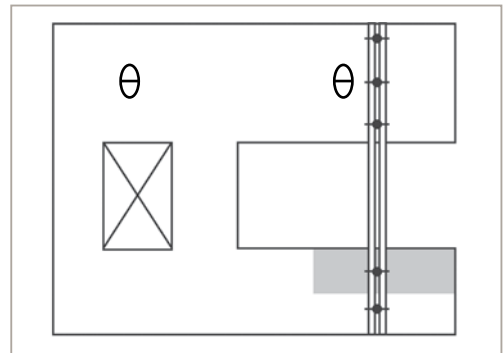
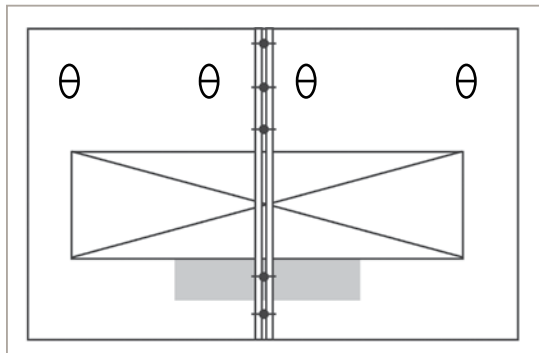
PANELS WITH NON-REINFORCEABLE SECTIONS

1. A non-reinforceable section is one in which reinforcing steel cannot be added to adequately resist the bending stresses related during the lifting process. This may result from many different conditions. The following are a few typical cases.
 - a. If the existing structural reinforcing steel is placed too deep in the panel to be used to resist the erection stresses and the structural engineer will not move the steel closer to the surface, there may not be sufficient room to add additional erection reinforcing at the required clearances.
 - b. Deep reveals do not allow placement of the reinforcing steel close enough to the smooth surface of the panel between the reveals to prevent visible cracking. While it may be possible to place the reinforcing steel close enough to the reveals to prevent deep cracking within them, the depth of the reinforcing steel in the smooth areas between reveals will result in cracks that go deep enough into the panel surface to still be visible after the panel is erected.
 - c. Sections of some panels can be subjected to such high bending stresses that it is impossible to fit enough reinforcing steel in the sections to prevent visible cracks from occurring.
2. If the insert spacings cannot be adjusted to reduce the concrete bending stresses and eliminate the need for the reinforcing steel the only option may be to use external strong backs to resist the erection stresses.

Strongbacks

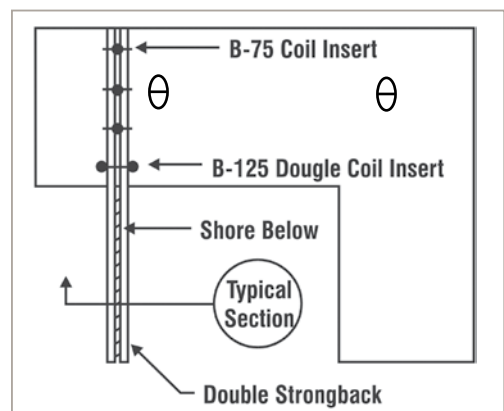
PANELS WITH AN OPENING SEPARATING CONCRETE AREAS

Certain panel configurations make it difficult to place lifting inserts in the concrete areas that they must pick up. This normally occurs when large openings are placed in the panels and the inserts can be located on only one side of the opening. A strongback is used to span across the opening like an arm to pick up the concrete on the opposite side. The following cases are examples of typical conditions that may require the use of strongbacks. The shaded areas represent the portion of the panel the strongback is trying to lift.



“L”-SHAPED PANELS [ONE LEGGED-PANELS]

“L”-shaped panels will normally require a long strongback attached to the upper portion of the panel extending to the ground, to act as a temporary leg for support during erection. A shore, attached to the underside of the strongback, extending from the bottom of the panel to the top of the opening, is to provide initial bearing for the strongback and vertical support of the panel once it is in the vertical position.

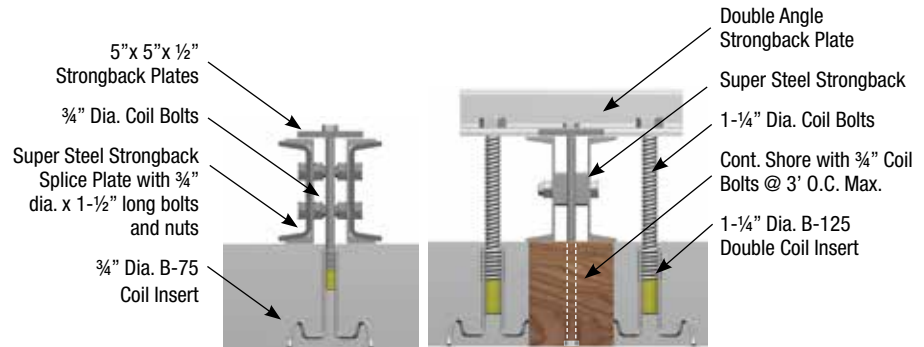


Strongbacks

GENERAL INFORMATION

1. It is sometimes necessary to add more than one strongback leg. This is not usually preferred but is sometimes necessary to limit the size of the strong backs to a member that is readily available.
2. Strongbacks are normally made of double wood or steel members placed back-to-back. The size of the strongbacks required is dependent upon the size and shape of each panel and, therefore, can only be determined by a full analysis of each panel.
3. Douglas Fir or Southern Pine wood beams, ranging in size from 4 x 8's to 4 x 16's, are commonly used and are available members preferred for use as strongbacks. Lengths exceeding 20' are not usually available in most areas of the country.
4. Where common wood size members are not available, the required strongback length exceeds 20' or when wood members are not strong enough, the double 8 x 11.5 steel channel can be used. Check to determine the availability of these members in your area.
5. Strongbacks are attached to the concrete with B-75 Coil Inserts spaced 2' to 3' maximum on center. For strongback leg conditions, the first insert above the top of the door is normally a B-125 Double Coil Insert.

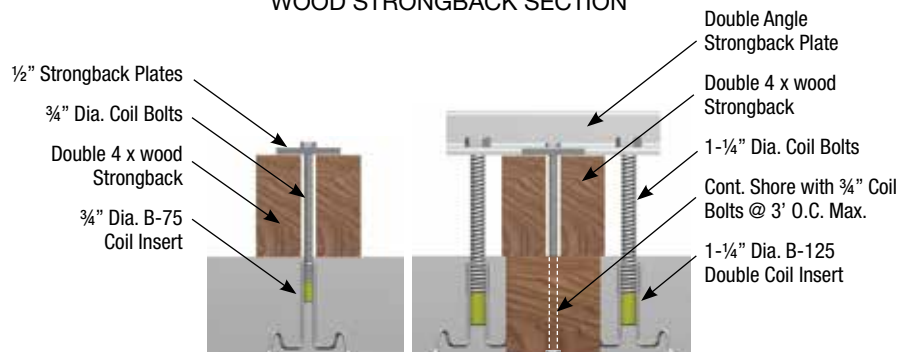
MB STEEL STRONGBACK SECTION

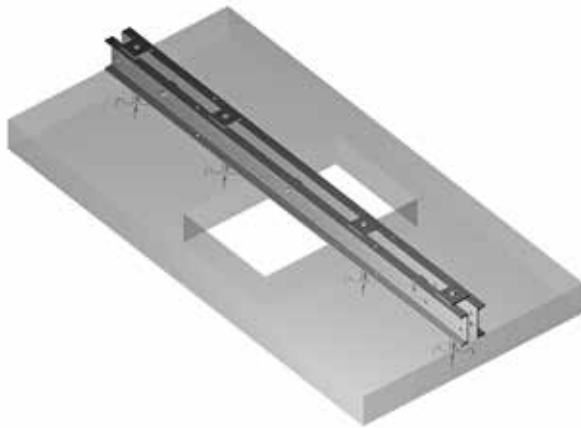


NOTE:

When strongbacks are used as legs, it is critical that they are placed on the panel truly vertical. The shore placed beneath the strongback must be from one solid piece of timber from top to bottom and be bolted to the strongback at 6" from the top and bottom and no more than 3' on center. (Banding the shore to the strongback is not recommended)

WOOD STRONGBACK SECTION





Strongbacks

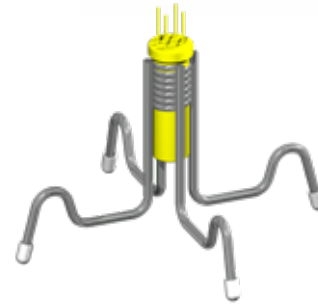
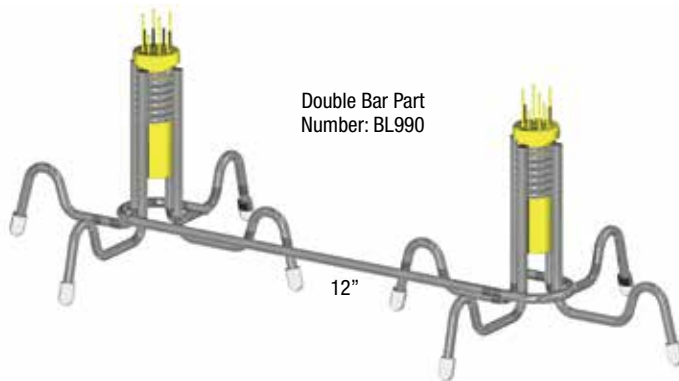
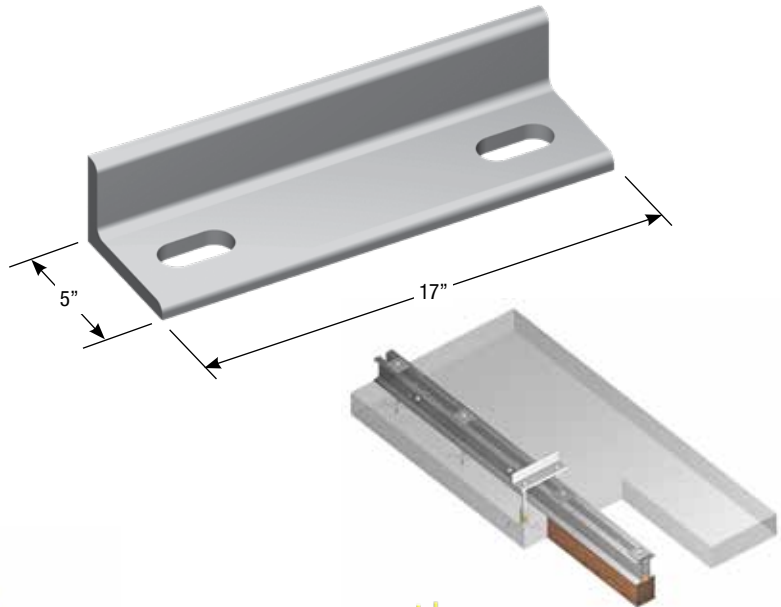
Meadow Burke's Double Channel Strongbacks are made from back-to-back 8 x 11.5 double steel channels. With no welded parts, this strongback can be dis-assembled for maintenance or part replacement. If required by Engineering, they can be 'stacked' for superior strength. The open slot between the channels will allow up to a 1-½" diameter bolt and will accommodate most any bolt pattern. The strongbacks are available in 10', 15' and 20' lengths and have full moment splices plate sets to join them. They are available in mill finish or painted steel to reduce rusting.

STRONGBACK DATA

Item Number	Description	Unit Weight (lbs)
MB45110C	10' Strongback	233
MB45115C	15' Strongback	350
MB45120C	20' Strongback	468
MB45100C	Splice Set Complete	72

Double Angle Strongback Plate

The safety factor to be applied to a particular product is a variable, depending on the degree of hazard or risk involved in the application of that product. In tilt-up construction various conditions can often increase the loadings as well as the degree of risk involved. Adhesion of the panel to the casting surface, jerking of the panel during lift, use of a crane not adequate for the job, bouncing of the wall panel after it has been lifted, handling the panel more than anticipated, transporting panel over rough surfaces, under or over booming, etc., all have high risk factors. Safety factors should be increased accordingly by the user to reduce these risks.



DOUBLE COIL INSERTS (B-125) W/DOUBLE BAR

WORKING LOADS IN LBS. IN 2500 PSI CONCRETE, 2.5:1 SAFETY FACTOR			
Item Number	Conc. Thick. in inches	Face Tension	Face Shear
MBBL150	5"	14,580	18,940
MBBL155	5-½"	16,170	20,300
MBBL160	6"	17,770	21,800
MBBL165	6-½"	18,800	22,770
MBBL170	7"	19,900	23,840
MBBL175	7-½"	20,110	24,580
MBBL180	8"	20,220	25,430
MBBL185	8-½"	20,500	25,960
MBBL190	9"	20,750	26,600
MBBL195	9-½"	20,850	27,020
MBBL110	10"	20,950	27,560
MBBL105	10-½"	20,950	27,560
MBBL111	11"	20,950	27,560
MBBL115	11-½"	20,950	27,560
MBBL120	12"	20,950	27,560

MEADOW BURKE INSERTS: LOAD DATA FOR SELECTED PANEL THICKNESSES

The minimum edge distance required to centerline of nearest insert void is 12" to obtain the listed loads. Reduce loads by the ratio of the concrete densities for lightweight concrete.

SINGLE COIL INSERTS (B-125)

WORKING LOADS IN LBS. IN 2500 PSI CONCRETE, 2.5:1 SAFETY FACTOR			
Item Number	Conc. Thick. in inches	Face Tension	Face Shear
MBBL150	5"	8,300	11,060
MBBL155	5-½"	8,700	12,770
MBBL160	6"	9,150	13,360
MBBL165	6-½"	9,580	13,360
MBBL170	7"	10,000	13,360
MBBL175	7-½"	10,200	13,360
MBBL180	8"	10,530	13,360
MBBL185	8-½"	10,750	13,360
MBBL190	9"	11,060	13,360
MBBL195	9-½"	11,170	13,360
MBBL110	10"	11,380	13,360
MBBL105	10-½"	11,700	13,360
MBBL111	11"	12,000	13,360
MBBL115	11-½"	12,000	13,360
MBBL120	12"	12,000	13,360

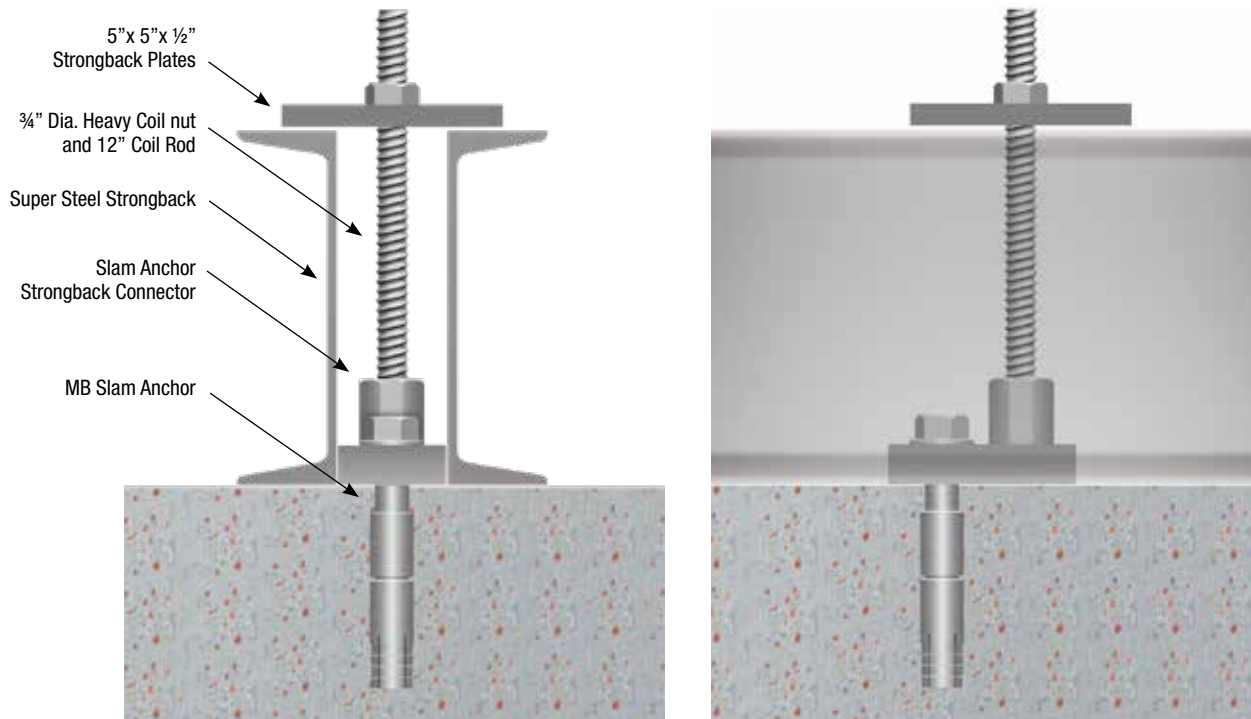
MEADOW BURKE INSERTS: LOAD DATA FOR SELECTED PANEL THICKNESSES

The minimum edge distance required to centerline of nearest insert void is 12" to obtain the listed loads. Reduce loads by the ratio of the concrete densities for lightweight concrete.

Quick Connect Slam Anchor Strongback Assembly

In Tilt-Up construction, Strongbacks are sometimes required to be added to a panel after the concrete has been placed. The solution for any strongback not requiring a 1- $\frac{1}{4}$ " double holddown is the Slam Anchor Strongback Assembly. This assembly procedure allows the contractor a fast, safe and effective means of post-concrete pour attachment of a Strongback with the use of Meadow Burke's Slam Anchor and the new MB Strongback Connector. This connection meets all of Meadow Burke's strength requirements and is approved by Meadow Burke Engineering.

Item Number	Description	Unit Weight
MB45100SAC	Slam Anchor Strongback Connector	9 lbs



INSTALLATION PROCEDURE:

1. Locate where the centerline of the strongback will be.
2. Starting 6" from the bottom of the strongback, drill $\frac{7}{8}$ " holes a minimum of 6" deep on centerline at 24" on center for the length of the needed Strongback.
3. Install the Slam Anchors thru the hole in the MB Strongback Connector at each drilled hole.
4. Place the Strongback over the set Connectors.
5. Screw $\frac{3}{4}$ " x 12" coil rod into the nut on the Connector.
6. Place plate washer of coil rod and strongback and bolt down with the $\frac{3}{4}$ " coil nut.
7. Strongback and panel are now ready for lifting!

NOTE: This system can replace all single $\frac{3}{4}$ " assemblies, but is not acceptable for double 1- $\frac{1}{4}$ " insert assembly.

The MB Brace Bolt may be utilized in lieu of the Slam Anchor on panels 7- $\frac{1}{2}$ " or thicker.

Lift-It Plate

The Super-Lift III Lift-it Plate will lift panels with misplaced or displaced inserts. In general, it requires the use of six MB Brace Bolts for panels thicker than 9- $\frac{1}{4}$ " and six MB Slam Anchors for panels less than 9- $\frac{1}{4}$ " (check with your engineer to determine if Slam Anchors may be used for panels greater than 9- $\frac{1}{4}$ " in thickness).

INSTALLATION (PANELS LESS THAN 9- $\frac{1}{4}$ ")

1. Drill $\frac{7}{8}$ " diameter hole to 6" deep (minimum) from tip of drill bit. Clean out dust. Use Lift-It Plate as template.
2. Place six bolt and drop-in assemblies through the Lift-it plate and into the $\frac{7}{8}$ " holes and tap until flush with the top of the plate.
3. Tap the bottom base of the Lift-it Plate towards the top of panel (about $\frac{1}{16}$ ") to engage the plate to the bolts.
4. Insert a setting pin into the hole in the center of a bolt. Place the specially designed slammer setting tool over the pin and bolt and pound the ram on the setting tool all the way down.
5. Once the ram is driven all the way down use the Slammer setting tool to check that the Slam Anchor is tightened using approximately $\frac{1}{8}$ (minimum) to $\frac{1}{2}$ (maximum) turns. Do not use an impact wrench and no torque wrench is required.
6. Repeat steps 4 and 5 for remaining 5 bolts.

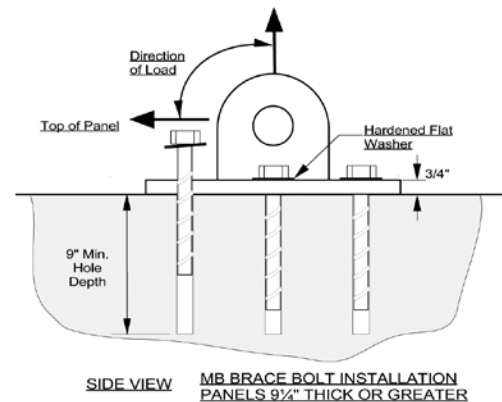
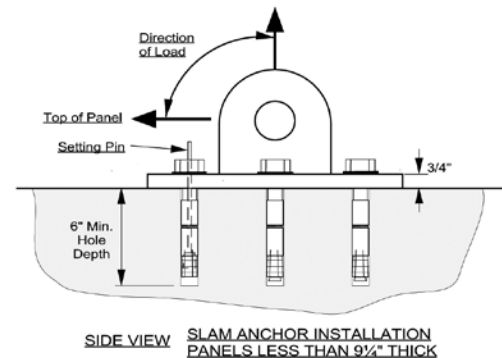
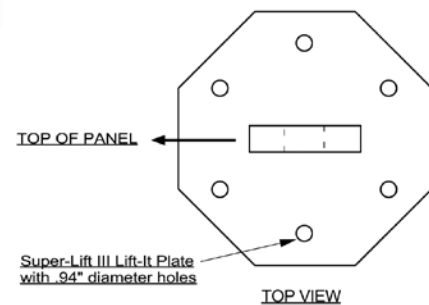
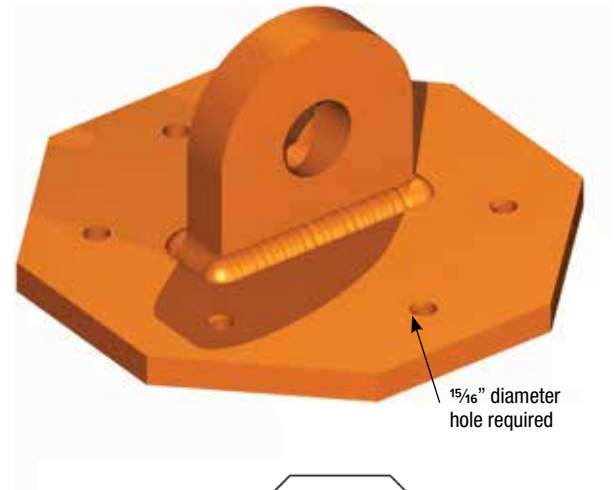
INSTALLATION (PANELS GREATER THAN 9- $\frac{1}{4}$ ")

1. Drill 20mm diameter hole to 9" deep (minimum) from tip of drill bit. Clean out dust. Use Lift-It Plate as template.
2. Place MB Brace Bolt into the hole through the hardened washer and the Liftit Plate as shown.
3. Turn bolt into the concrete using a large $\frac{3}{4}$ " impact wrench with a 30mm socket
4. If it is necessary to remove the bolt and reinstall it, hand thread the bolt to start it in the original threads.

LIFT-IT PLATE DATA

Item Number	Description	Unit Weight
MB45800	Lift-It Plate	32 lbs

Contact Leviat Engineering for assistance or for additional information.



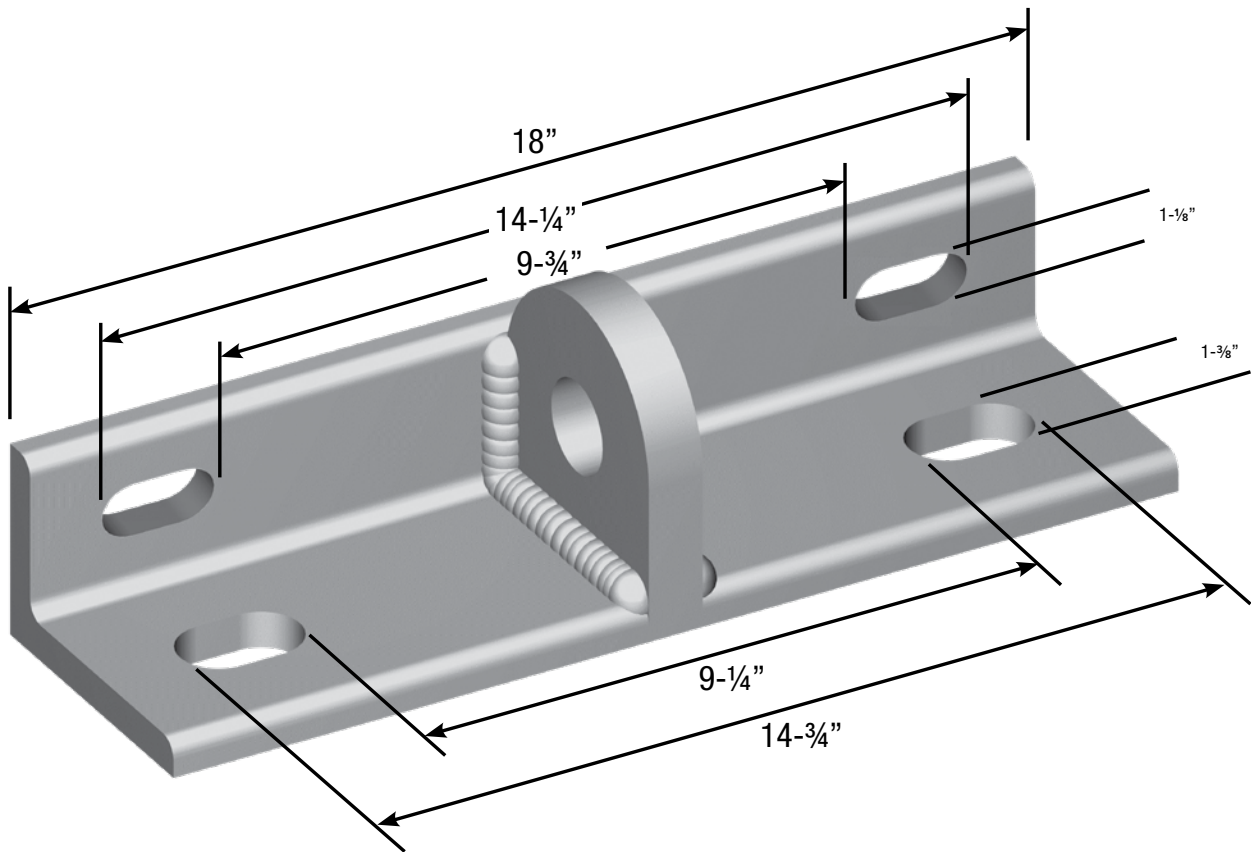
DOUBLE ANGLE LIFT PLATE

Double-Angle Lift Plate is 4" x 6" x 3/4" (102 mm x 152 mm x 19 mm) structural angle with welded center lug 1-1/8", (29 mm) plate. Wt. = 53 lbs. Use with coil bolts 4" (102 mm) in length. Washers required under bolt head. Exposed aggregate face-up panels may require longer bolts. See Meadow Burke's Engineering Details.

LIFT-IT PLATE DATA

Item Number	Description	Bolt Diameter	Unit Weight
MB45305	Angle Lift Plate	1" - 1-1/4"	53 lbs

Contact Leviat Engineering for assistance or for additional information.



Super-Lift III

Super Patch

THE MB SUPER LIFT III PATCH AESTHETICALLY SEALS THE SUPER LIFT III RECESS VOIDS IN CONCRETE.

There's no need to waste money on time-consuming mortar mix patches when MB Super Lift III Patch can do the same job in less time, with unskilled labor, and at a lower overall cost. MB Super Lift III Patch pops into the Super Lift III recess void and leaves a strong, attractive shield.

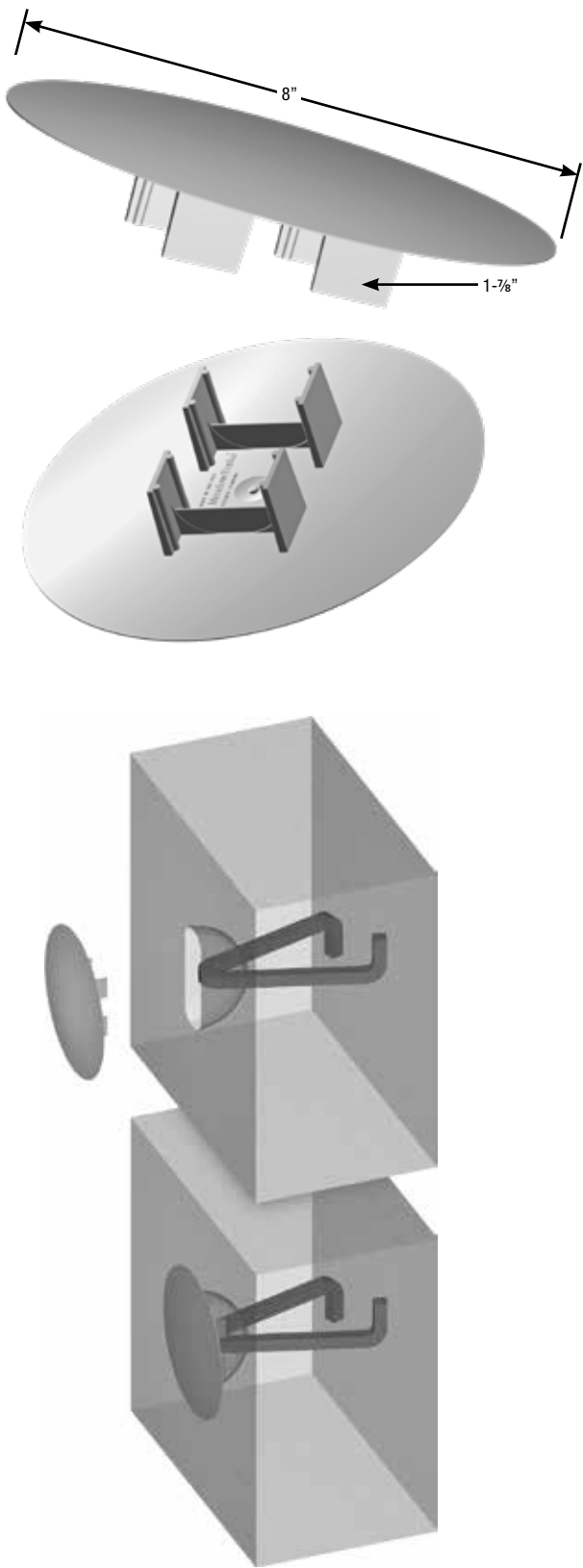
MB Super Lift III Patch is precision molded of durable and high-impact plastic, which has the color and texture of concrete and resists assault from manufacturing and environmental chemicals.

INSTALLATION INSTRUCTIONS

Simply press the Super Lift III Patch into the insert void hole. The compression fit stays tight and flat to the panel.

SUPER LIFT III PATCH

Item Number	Description	Unit Weight
MB45615	Super Lift III Patch	0.05 lbs.



MB Shims

The shims are designed to quickly and safely adjust for an uneven footing or panels. They provide excellent stability and will not rust or stain the concrete.

FEATURES

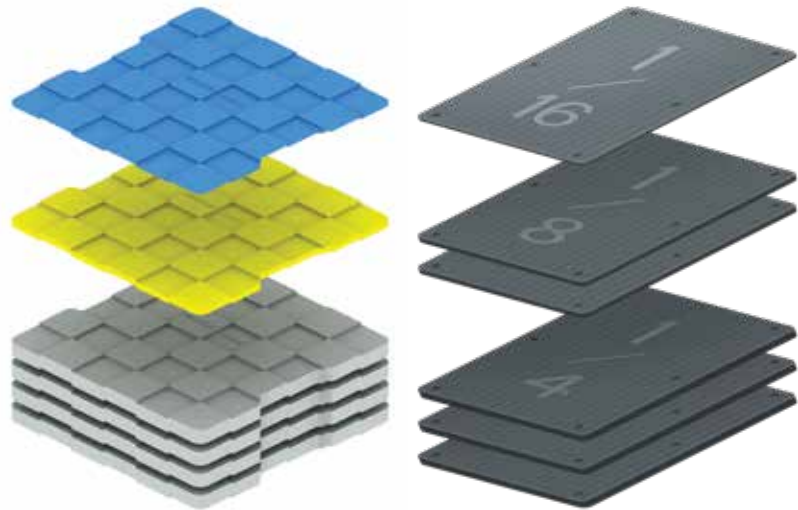
- Manufactured with extremely tough high-impact polystyrene
- Ultimate compressive strength of 8,000 psi per ASTM-D695 for up to 3" thick shims
- Manufactured by Meadow Burke in the USA

RL-75 Checker Board Shim Packs contain:

- One 1/16" (blue)
- One 1/8" (yellow)
- Four 1/4" (grey)

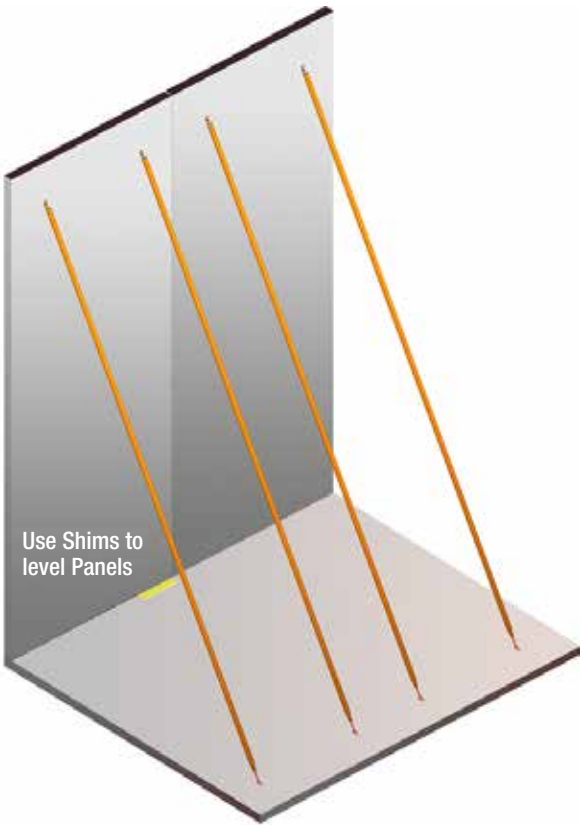
RL-77 Ridged Shim Packs contain:

- One 1/16" (black)
- Two 1/8" (black)
- Three 1/4" (black)



RL-75 Checker Board

RL-76 / RL-77 Ridged Shim



SINGLE SHIMS					
Item Number	Type	Size	Pieces/Package	Weight Ea. (lbs)	Color
MB40204	RL-75	2"X 3"X 1/2"	125	0.01060	Black
MB40203	RL-75	2"X 3"X 1/4"	250	0.050	Grey
MB40202	RL-75	2"X 3"X 1/8"	500	0.020	Yellow
MB40201	RL-75	2"X 3"X 1/16"	1,000	0.013	Blue
MB45607	RL-76	4"X 6"X 1/16"	400	0.09	Black
MB45608	RL-76	4"X 6"X 1/8"	200	0.19	Black
MB45609	RL-76	4"X 6"X 1/4"	100	0.33	Black
SHIM PACKS					
MB283120	RL-75	3"X 3"X 1-3/16"	50	0.368	Mix
MB283122	RL-75	6"X 6"X 1-3/16"	20	1.545	Mix
MB45604	RL-77	4"X 6"X 1-1/16"	30	1.1	Black

Notes

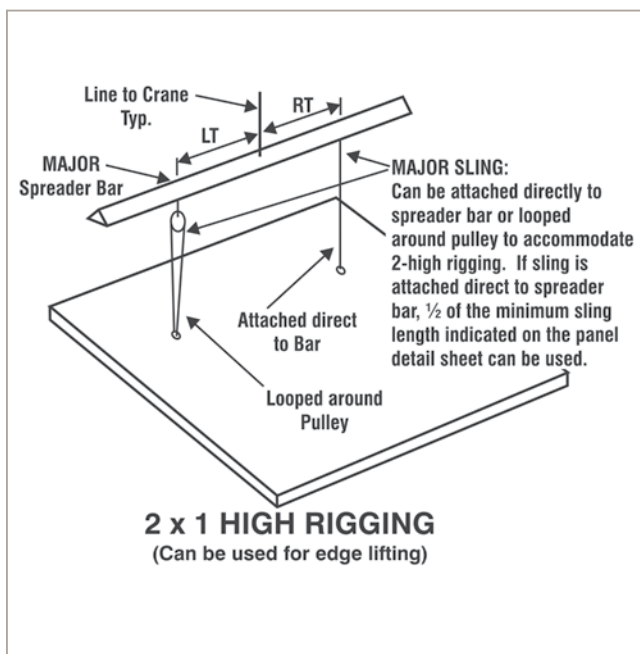
Panel Erection Information



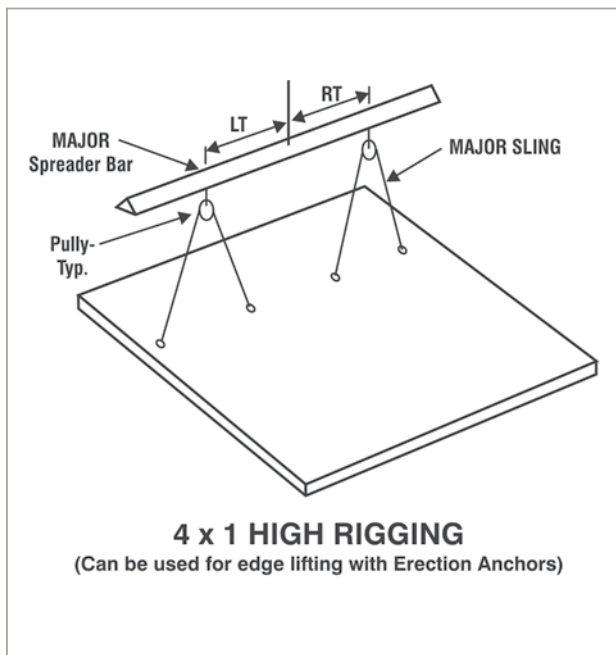
Erection Day

RIGGING PROCEDURES

Once the concrete has reached the design strength, the panels are ready to be lifted. The strength of the inserts is governed by the strength of the surrounding concrete. Premature lifting may cause cracked panels or concrete failure. Insert pullout may result. The concrete also will be less resistant to flexural stresses. The time taken to wait until the concrete has reached adequate strength prevents problems and minimizes the risk of injury. Prior to the start of the lifting sequence, full consultation between the contractor and the crane company representative will avoid misunderstanding and delays. The erection details supplied by Meadow Burke Engineering should be reviewed and the suggested rigging configurations and cable lengths followed. The mobile crane, its experienced crew, and safe rigging determines the speed, efficiency, and safety of panel erection. The crane should be of adequate size to easily handle the largest panel on the job. Factors such as the height of the panel, the amount of movement of the crane, and the position of the crane relative to the panel must be considered. The crane should be able to erect panels without sliding or jerking them upward and with a minimum number of moves. The lifting position of the crane will vary depending on whether the panel is cast inside face-up or outside face-up, and whether the crane must work from inside the building or outside. The safest, quickest, and least expensive method is to lift from the inside face of the panel from inside the building. But it might be necessary to cast the panel outside face-up to achieve an exposed aggregate surface on the outside. The crane may have to work outside because of the lack of unobstructed interior space. Stack casting panels may overcome the lack of interior space. Before the crane arrives, the jobsite must be cleaned to remove obstacles and debris. If the crane must work from outside, the surface should be as even as possible to reduce impact loading on the inserts. Braces should be placed on the panels prior to lifting if possible. When the coil lift system is used, numerous swivel lift plates or double angle lift plates should be available to allow uninterrupted panel preparation during the lift. Only one set of lifting hardware is necessary with Super-Lift. The following pages show some of the recommended rigging configurations. These configurations equalize and minimize the load on the inserts. Although the amount of rigging is determined by the number of inserts cast, the actual rigging configuration used may vary from area to area. It is very important that the crane rigging cables be of sufficient length. Short cable lengths may result in cracked panels or overloaded inserts. Cable of the largest diameter is recommended to minimize tension stretch. Although thinner cables may be of sufficient strength, their “springiness” aggravates impact loading. Side pulls exceeding 20° should only be executed following consultation with Meadow Burke’s Tilt-Up Engineering Center. Rigging changes should be kept to a minimum to avoid costly delays. It may be more economical to add a few inexpensive inserts on the lighter panels than to constantly change rigging. If variations are unavoidable, consult the following pages for suggestions on how to convert 2 high rigging to 4 high.



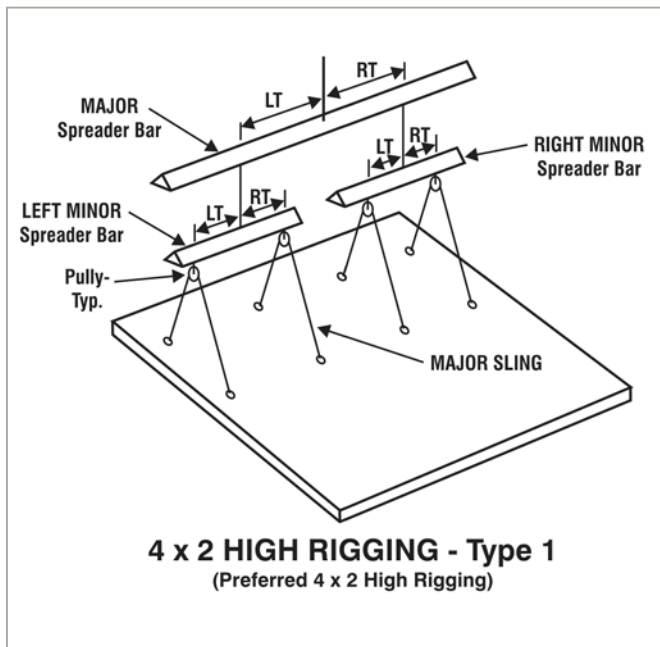
Note: See panel details for required minimum sling lengths. Contact Meadow Burke Engineering for assistance or for additional information about other rigging.



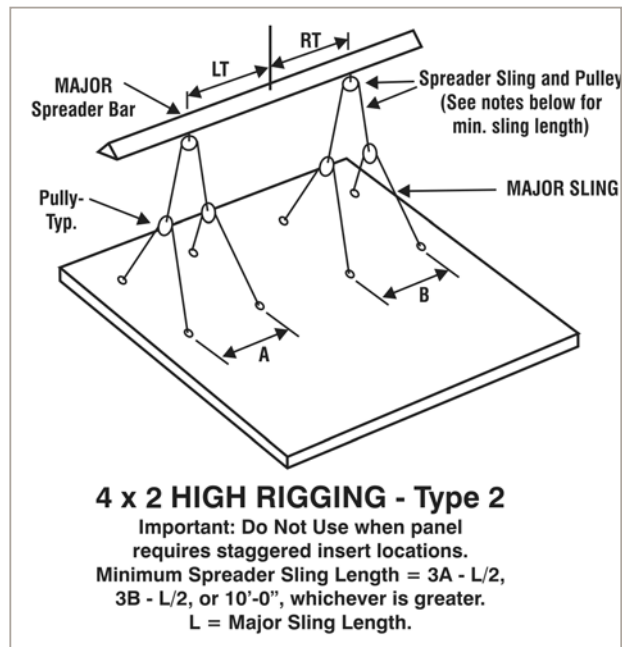
Note: See panel details for required minimum sling lengths. Contact Meadow Burke Engineering for assistance or for additional information about other rigging.

Suction Load

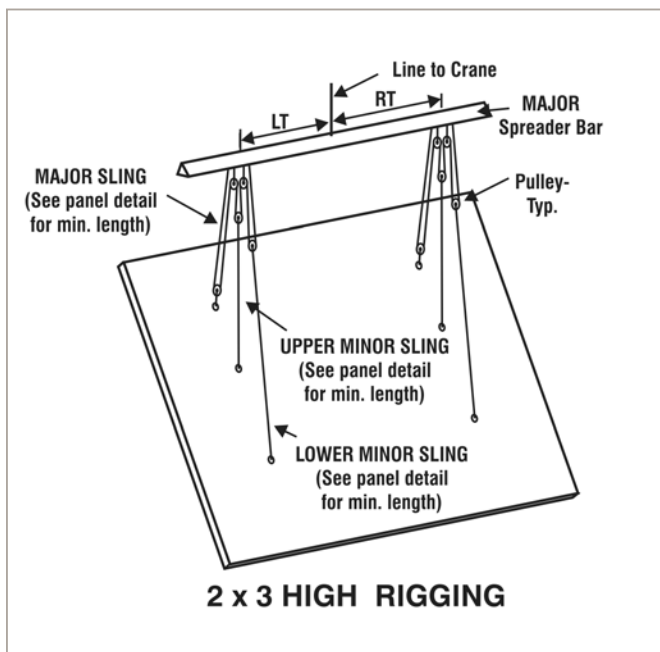
Stressing of inserts at the moment of initial lift is compounded by suction loading caused by a vacuum between the panel and the casting surface. Bond breaker application prevents chemical bonding but will not stop suction loading. Crane operators should apply a smooth and even lifting pressure to allow air to penetrate the interface and break the suction force. Water around the perimeter of the panel may seal the edge and prevent penetration of air. Sweep water away from panel edges. Use lateral jacks or wedges to overcome a chemical bond due to improper bond breaker application. Wedges should be hammered in line with the lifting inserts to minimize stress on the panel.



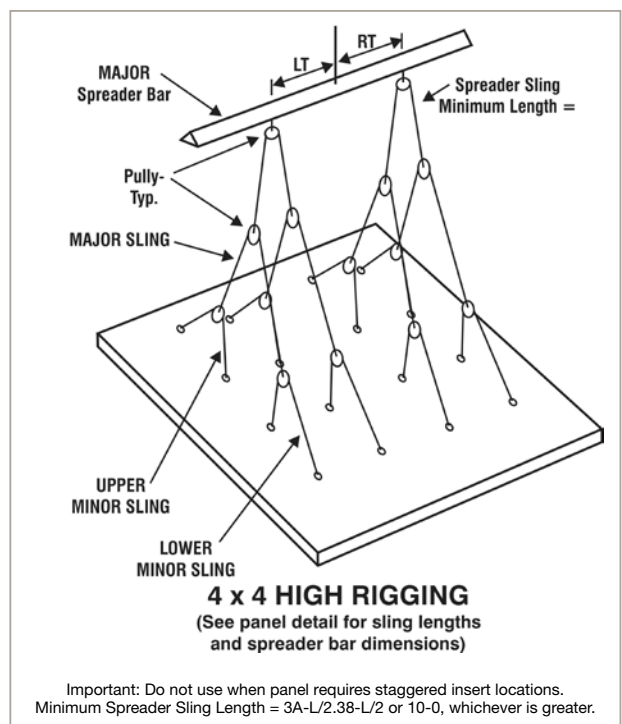
Note: See panel details for required minimum sling lengths. Contact Meadow Burke Engineering for assistance or for additional information about other rigging.



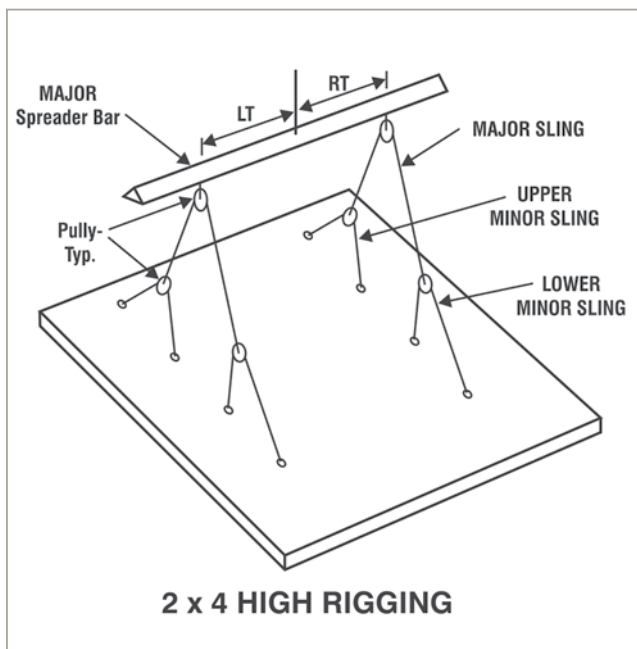
Note: See panel details for required minimum sling lengths. Contact Meadow Burke Engineering for assistance or for additional information about other rigging.



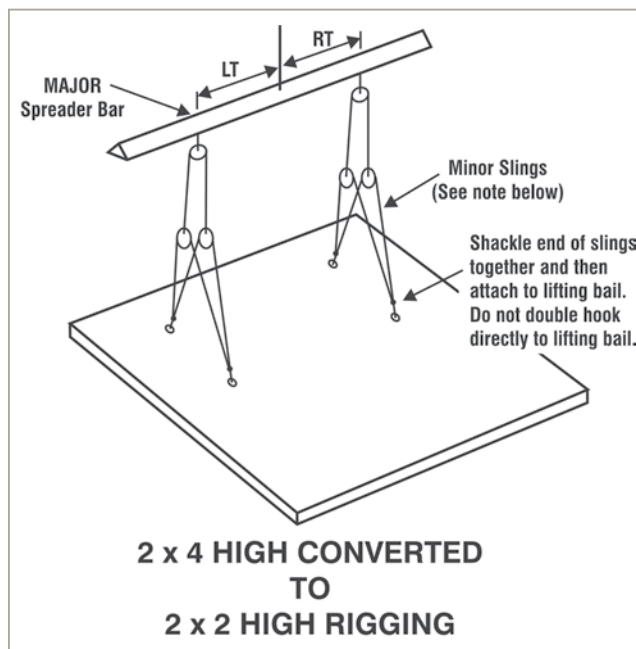
Warning: Pulleys can bind at spreader bar due to insufficient clearance unless sling lengths are sized correctly. To provide adequate clearance between pulleys, the Major Sling must be at least 3.7 times longer than the Minor Slings. Minor Slings should be equal in length. See panel details for correct sling lengths.



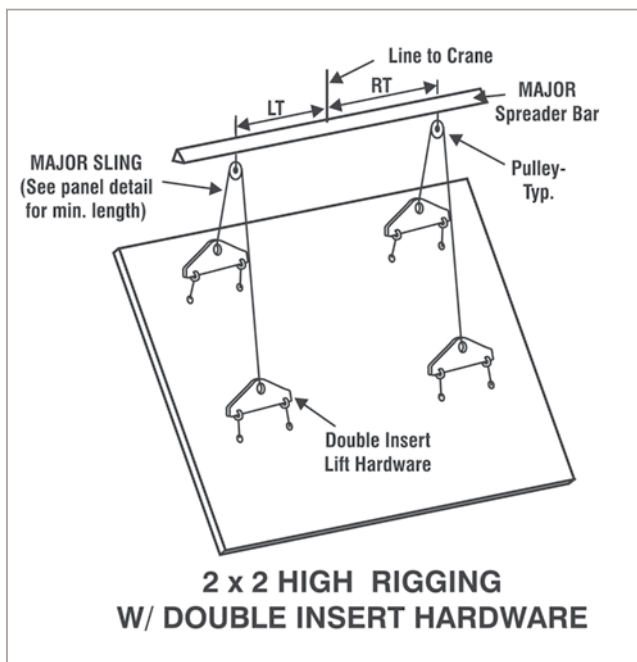
Note: See panel details for required minimum sling lengths and spreader bar dimensions.



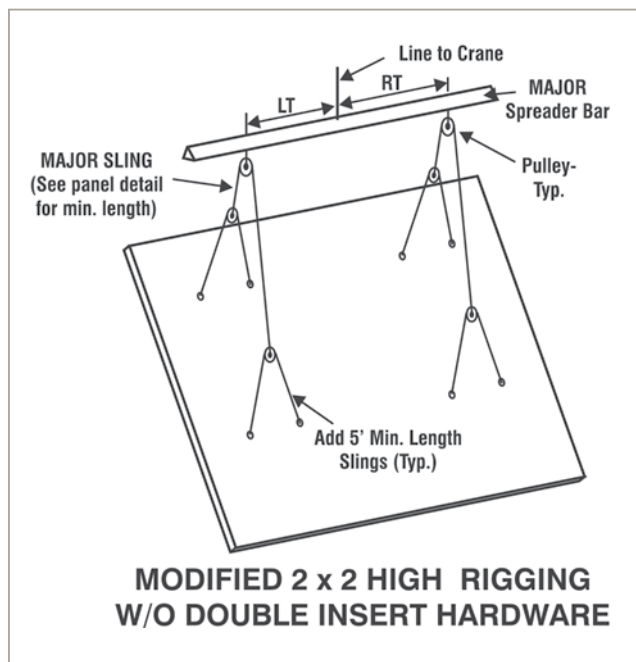
Note: In order to convert 2 x 4 High Rigging to 2 x 2 High Rigging as shown above, the length of the Minor Slings used for the 2 x 2 High Converted Rigging must be greater than or equal to the minimum.



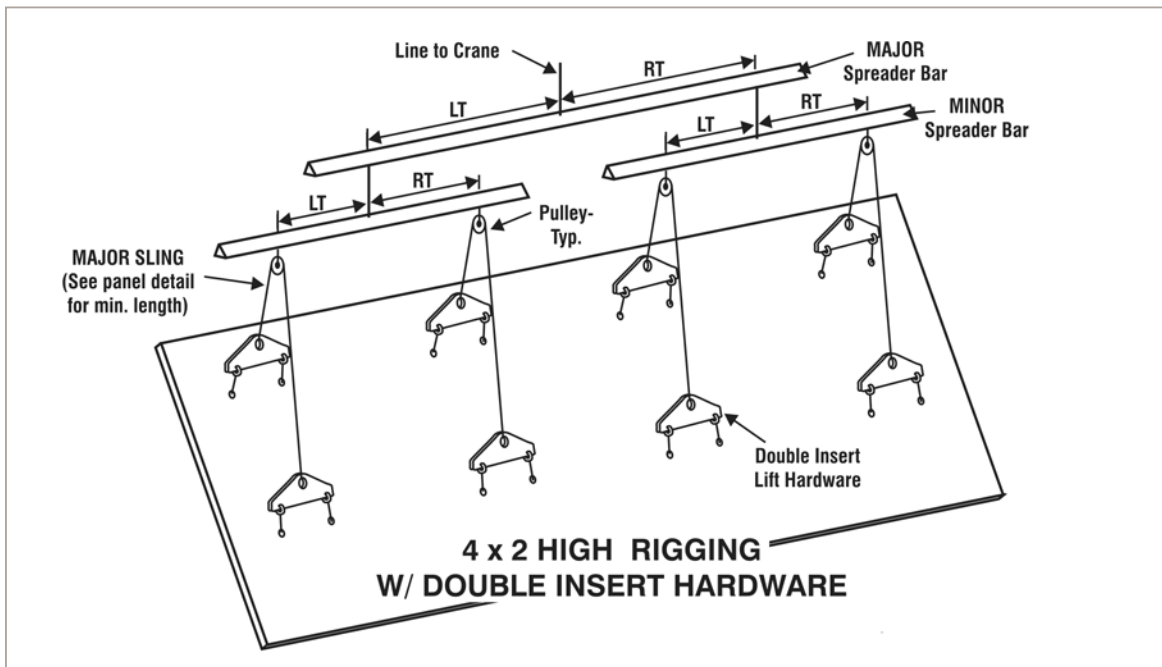
length required for the Major Slings when using 2 x 2 High Standard Rigging, as shown on page 43. See panel detail for the minimum sling length requirement.



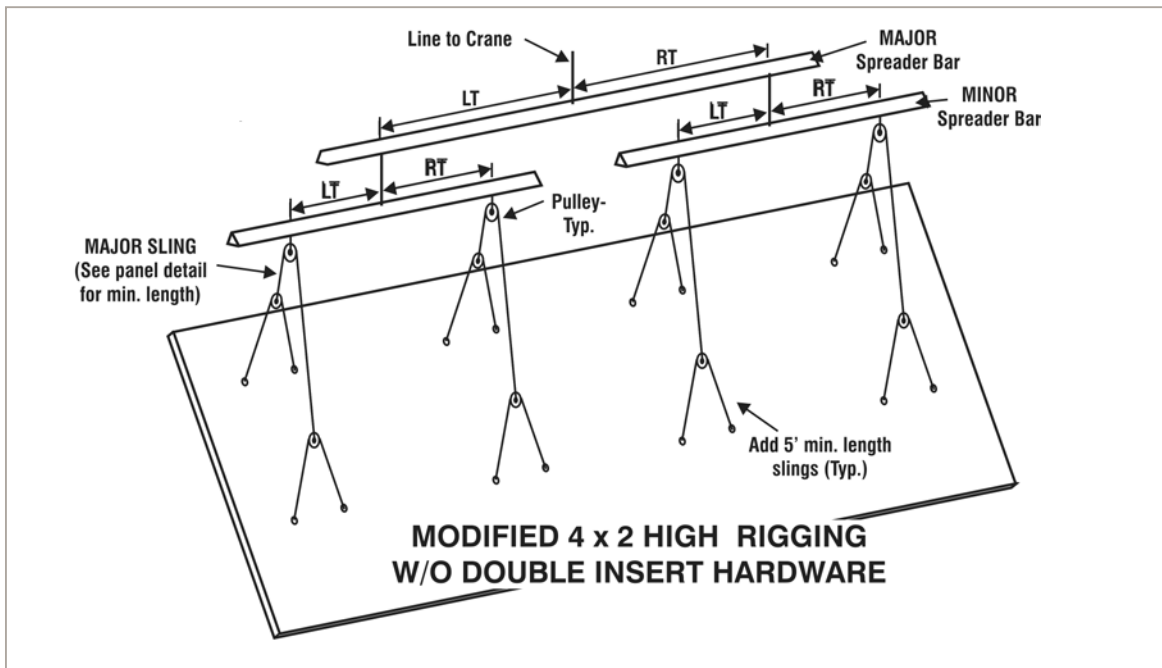
Note: If double insert lift hardware is not available for use with the double inserts cast in the panel, single lift units can be used to erect the panel by modifying the standard 2 x 2 High Rigging shown above.

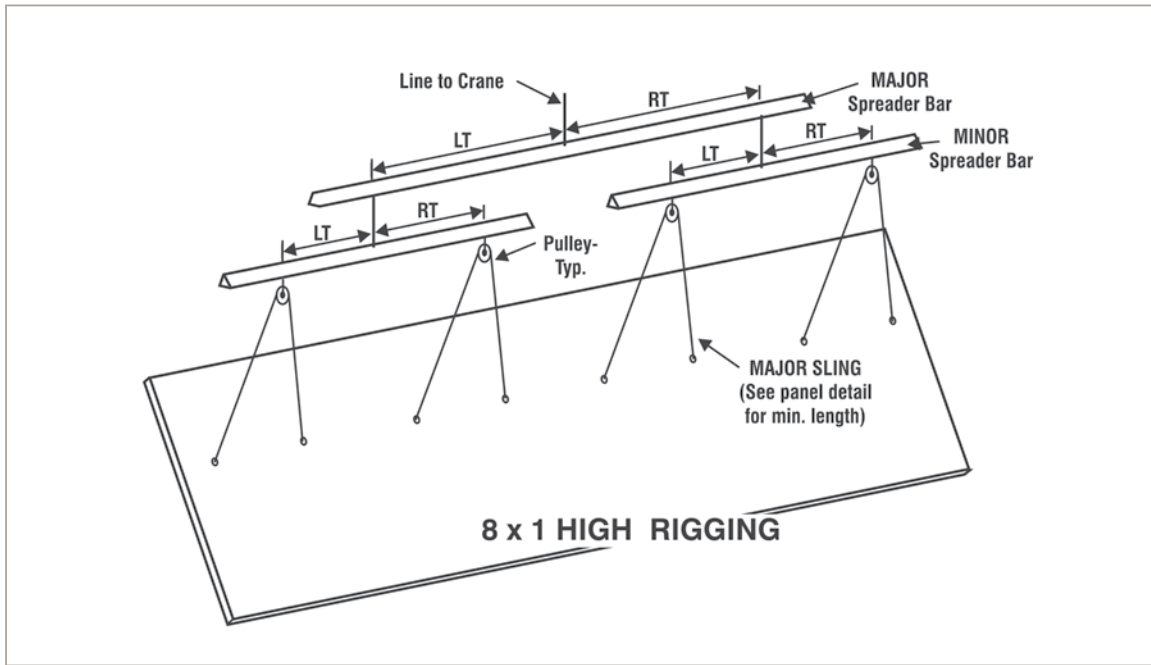


To modify the rigging, add 4 additional pulleys and slings as shown above and connect to all 8 insert locations using 8 single insert lift units.

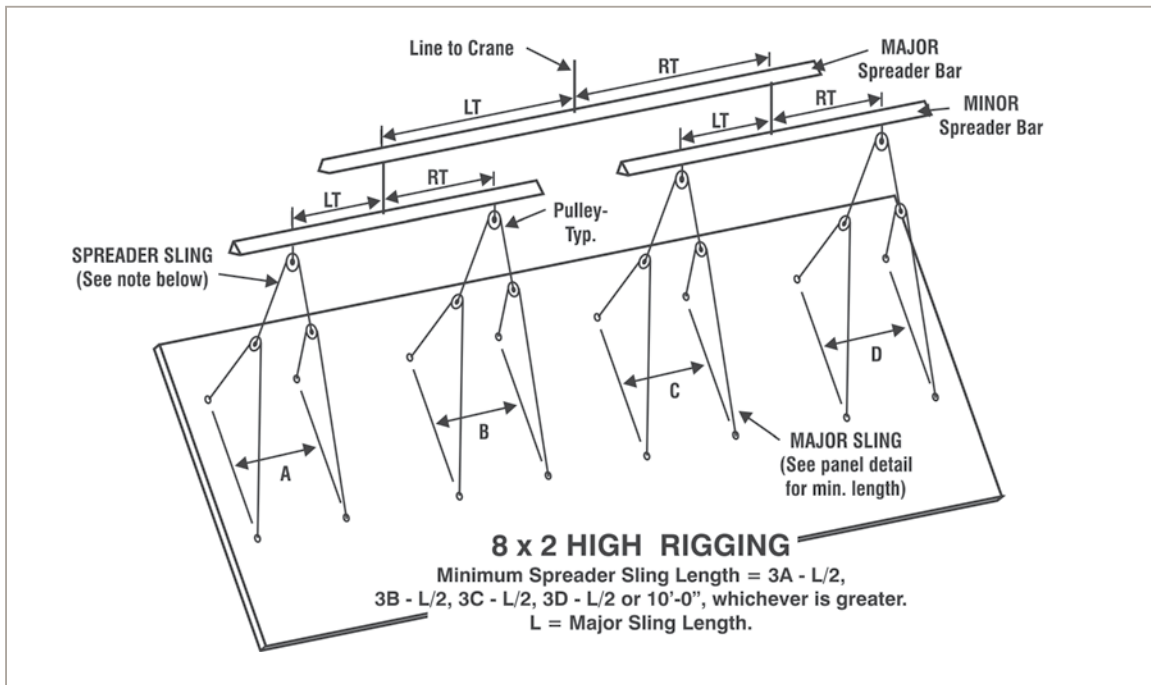


Note: If double insert lift hardware is not available for use with the double inserts cast in the panel, single lift units can be used to erect the panel by modifying the standard 4 x 2 High Rigging shown above. To modify the rigging, add 8 additional pulleys and slings as shown below and connect to all 16 insert locations using 16 single insert lift units.





Note: See panel details for required minimum sling lengths. Contact Meadow Burke Engineering for assistance or for additional information about other rigging configurations.



Note: See panel details for required minimum sling lengths. Contact Meadow Burke Engineering for assistance or for additional information about other rigging configurations.

Hazards of High and Low Booming

CRANE BOOM POSITION

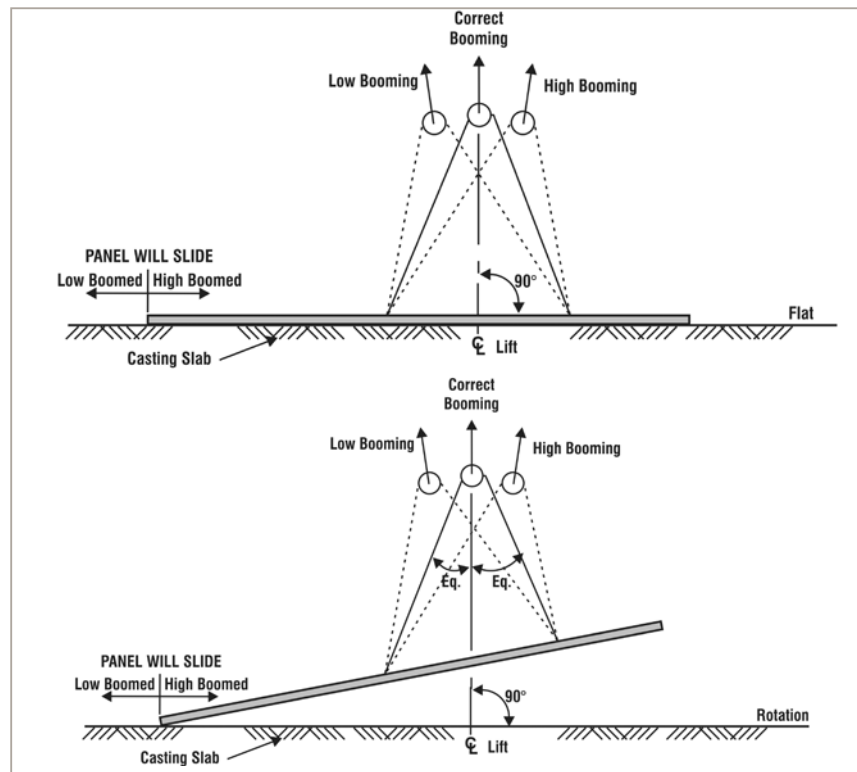
Meadow Burke's design of tilt-up panels for erection requires that the crane must be positioned so that the crane line is vertical and perpendicular to the panel surface and casting slab when the lift begins. It must remain perpendicular to the casting slab with its line of action bisecting the sling angle throughout the lift. If the crane line is not in the correct position as shown below, the loads to the inserts and the stresses in the concrete will be different than those calculated. To help the erector position the crane boom, the location of the initial center of lift is shown on the erection panel details for each panel.

HIGH BOOMING

"High Booming" is when the crane boom is positioned too far towards the top end of the panel. Because the crane line is not perpendicular to the panel face, and is, instead, sloped toward the top of the panel, the load to the lifting inserts is not shared equally, with more load applied to the upper rows and less to the lower rows. The change in lifting forces will cause the bending tensile stresses on the bottom surface of the panel to be higher than originally computed. If the stresses become too large, the panel will crack.

LOW BOOMING

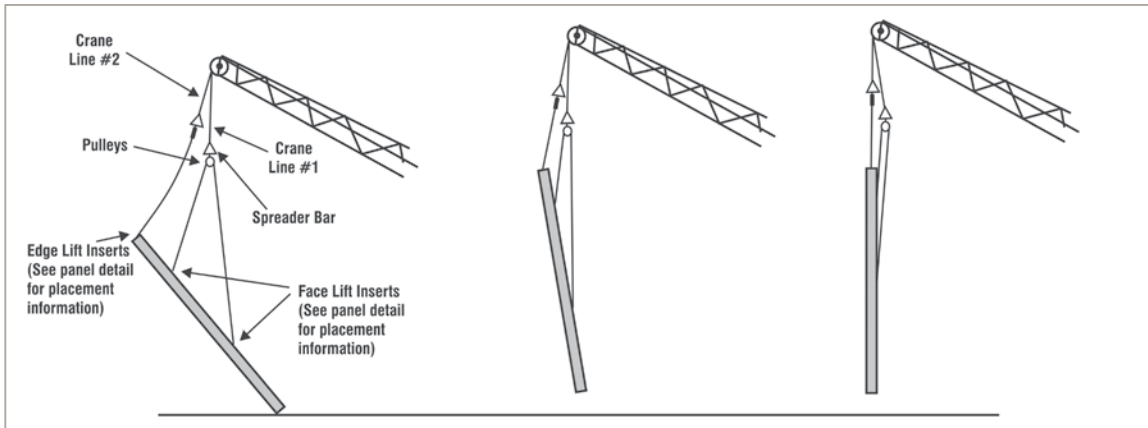
"Low Booming" is when the crane boom is positioned too far towards the bottom end of the panel. Because the crane line is not perpendicular to the panel face, and is, instead, sloped toward the bottom of the panel, the load to the lifting inserts is not shared equally, with more load applied to the lower rows and less to the upper rows. The change in lifting forces will cause the bending tensile stresses on the top surface of the panel to be higher than originally computed. If the stresses become too large, the panel will crack.



The bottom end of the panel should not move or slide if the crane is positioned correctly. Excessive "High Booming" will cause the panel to slide towards the top end. Excessive "Low Booming" will cause the panel to slide towards the bottom end.

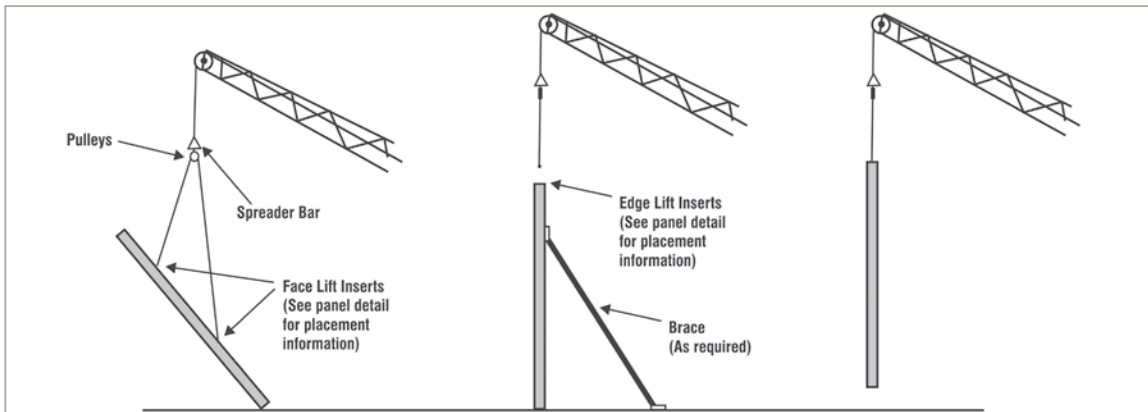
Horizontal to Vertical Panel Transfer Mid-air Transfer (two crane line method)

1. Lift the panel to vertical position using crane line #1 and face lift inserts only, leaving slack in crane line #2.
2. Once the panel is hanging vertical and free of the casting bed, transfer the entire load of the panel to crane line #2 and the inserts in the top edge of the panel.
3. The panel may now be set into position using crane line #2 and the inserts in the edge of the panel only.



Brace and Transfer (single crane line method)

1. Lift the panel to vertical position using face lift inserts only.
2. Securely brace the panel in the vertical position in a manner consistent with applicable building codes and construction safety orders.
3. Release the crane lines from the face lift inserts and attach to the inserts in the top edge of the panel. Change lifting hardware and rigging as required for compatibility.
4. With the crane lines taut, supporting the panel, release the bracing and lift the panel with the edge lift inserts to set it in its final location.

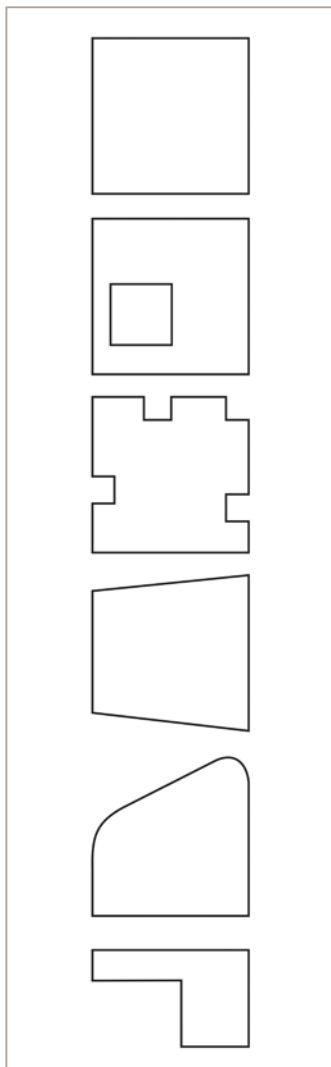


Note: “Two-High” rigging shown above is for illustration purposes only. See general notes and panel details for actual rigging configuration, sling lengths and spreader bar requirements.

Bid Chart Considerations

These bid charts may be used to determine the approximate number of lifting inserts required to lift a panel of the given size. The number of lifting inserts indicated on the charts will generally be the number detailed by Meadow Burke Engineering. Exceptions may occur however, such as when panels have large openings. The use of 6, 9, or 12 lifting inserts is not common and unless requested by the contractor is generally not designed. Where the charts indicate these quantities, go to the next higher large block for the appropriate quantity.

USE OF BID CHARTS



A. Solid Rectangular Panels

1. Select the chart for the correct panel thickness and insert type.
2. Find intersection of panel height and width on chart.
3. Intersection will be in heavily bordered area which contains a large number.
The large number is the required number of lifting inserts.

B. Panels with Openings

Ignore all openings and use the Bid Charts as if panels were solid. Any lifting inserts indicated by the charts which may not be used will partially offset inserts which may be required for strongbacks.

C. Solid Rectangular Panels with Notches

Ignore all notches and bid on maximum height and width. The number of inserts required is then found as for a solid rectangular panel.

D. Straight Sided Panels with Sloping Tops or Bottoms

1. If the difference in height from one side to the other is less than 5' use average panel height.
Now bid as if solid rectangular panel.
2. If the difference in height from one side to the other is greater than 5' use minimum height plus $\frac{2}{3}$ the height difference. Now bid as if solid rectangular panel.

E. Panels with Curves

Find extreme height and extreme width. Use these values to bid as solid rectangular panel.

F. "L" Shaped Panels

Find extreme height and extreme width. Use these values to bid as solid rectangular panel.

BID CHART CONSIDERATIONS

G. Unusual Panels

Confer with appropriate Meadow Burke Engineering Service Center for bidding assistance.

H. Exposed Aggregate Panels

Determine number of inserts required for gross panel thickness. Determine number of inserts required for structural panel thickness. Bid larger of two numbers.

I. Narrow Panels

1. For panels 4'0" to 10'0" in width use the number of inserts required for a 10'0" wide panel of the same height.
2. For panels less than 4'0" in width use half the number of inserts required for a 10'0" wide panel of the same height.

J. Short Panels

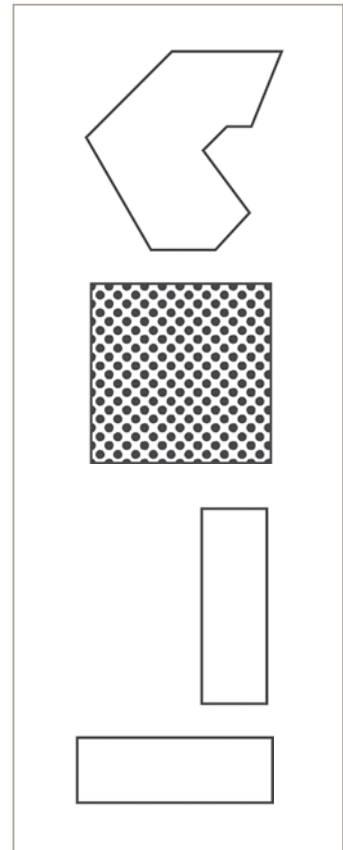
For panels shorter than 10'0" use the number of inserts required for a 10'0" high panel of the same width.

K. Large Panels

For panels larger than those shown on Bid Charts consult the appropriate Meadow Burke Engineering Service Center.

L. Panels of Intermediate Thickness

Determine number of inserts required for closest thicker panel. Determine number of inserts required for closest thinner panel. Use larger number.



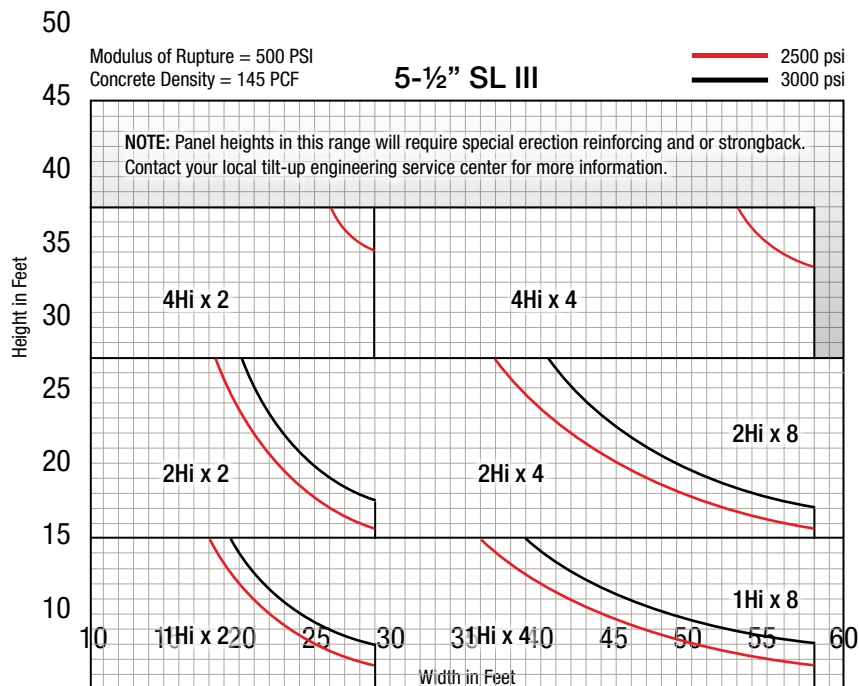
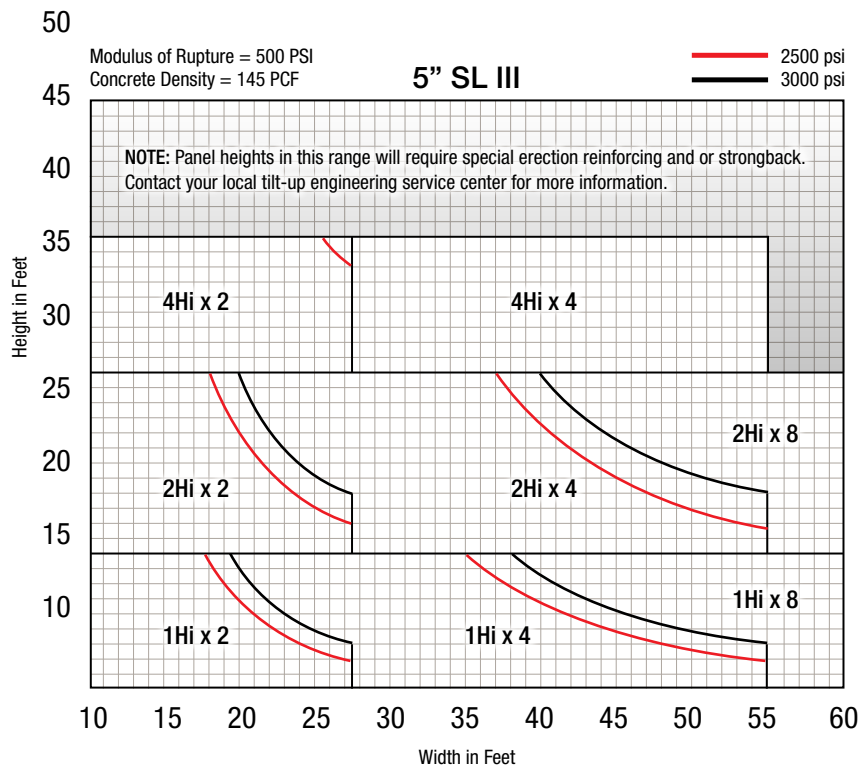
ASSUMPTIONS USED IN PREPARATION OF BID CHARTS

1. Concrete compressive strength at time of erection is 2,500 psi (Per ASTM C 39).
2. Concrete modulus of rupture at time of erection is 500 psi (Per ASTM C 78).
3. Single curtain of reinforcing steel at panel center.
4. Steel does not contribute to bending strength of panel.
5. Static factor of safety of 2 on embedment strength with panel weight increased 25% to account for suction and dynamic loads.
6. Standard Meadow Burke insert spacings.
7. Design cantilever =

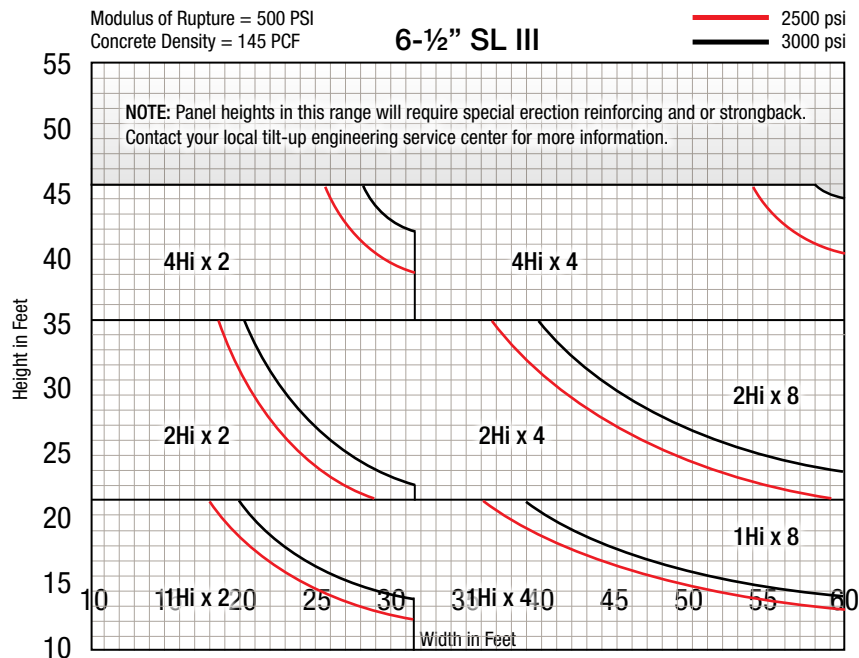
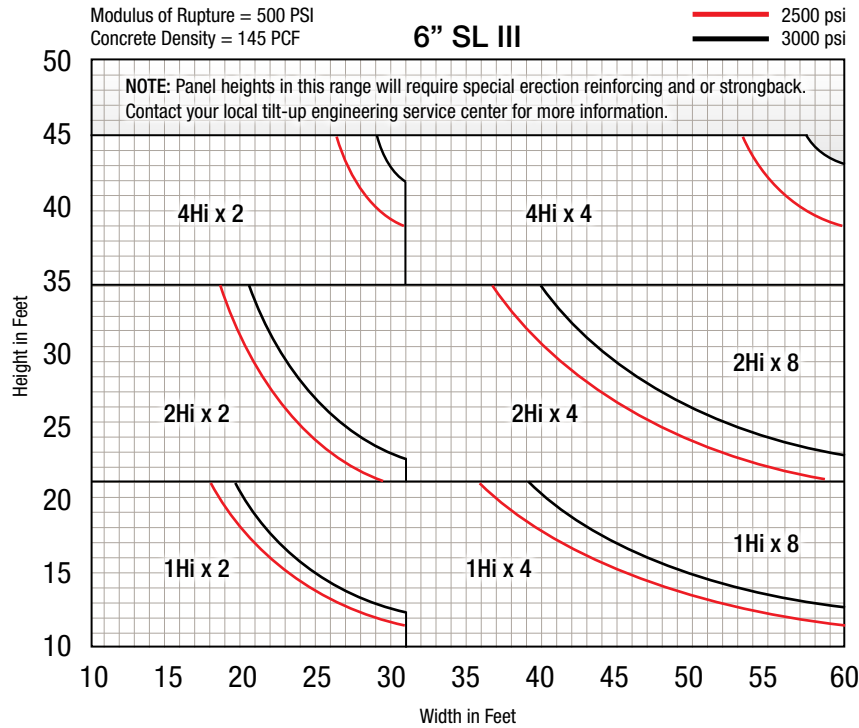
$$\sqrt{\frac{(1.6) (\text{Moment allowable})}{(\text{KSF})}}$$

Where, Moment allowable produces stress equal to half the Modules of Rupture.

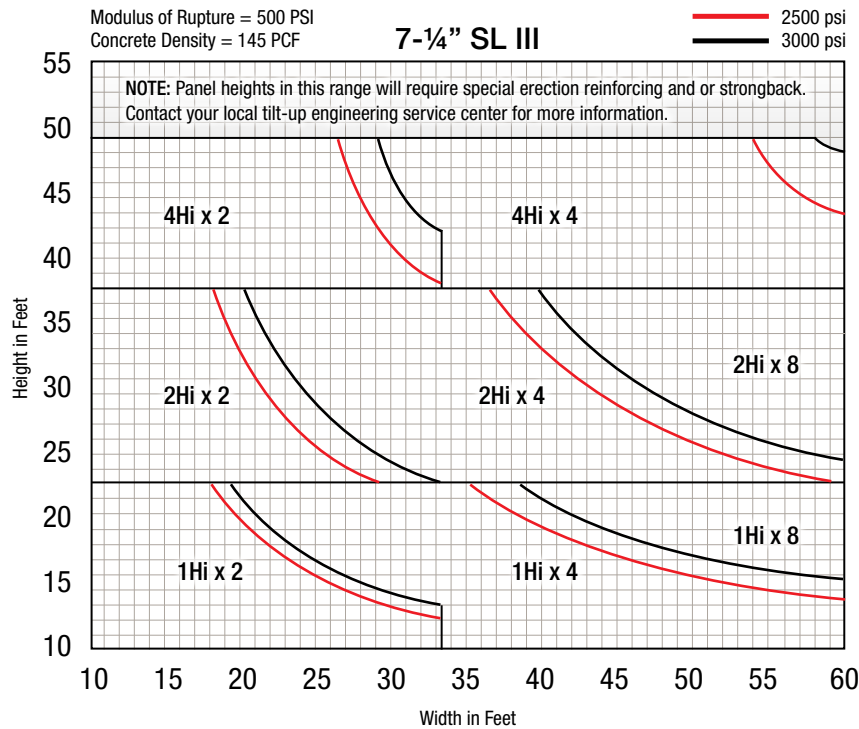
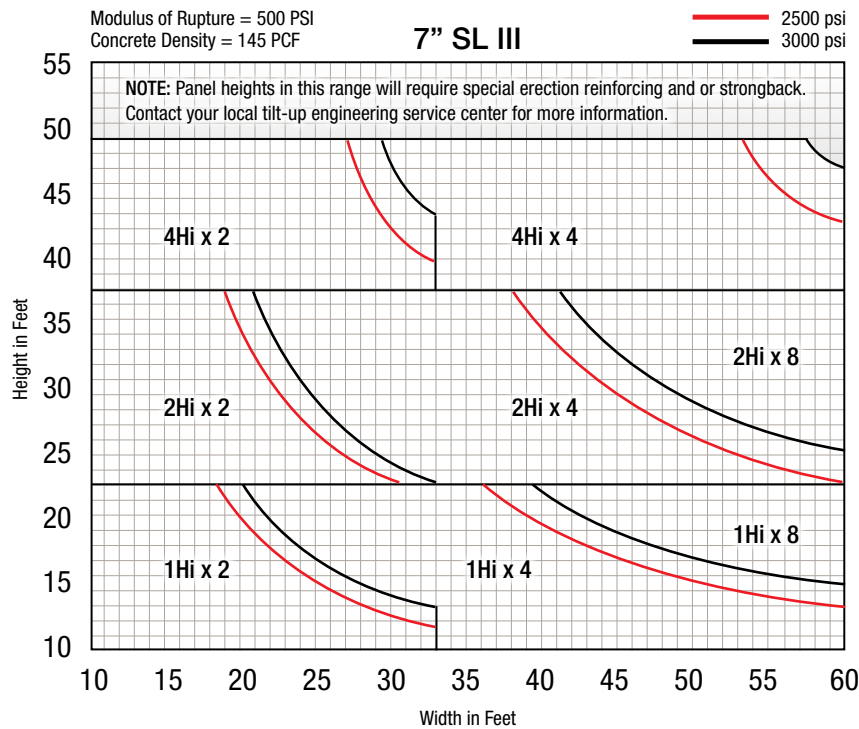
Super-Lift III Bid Chart



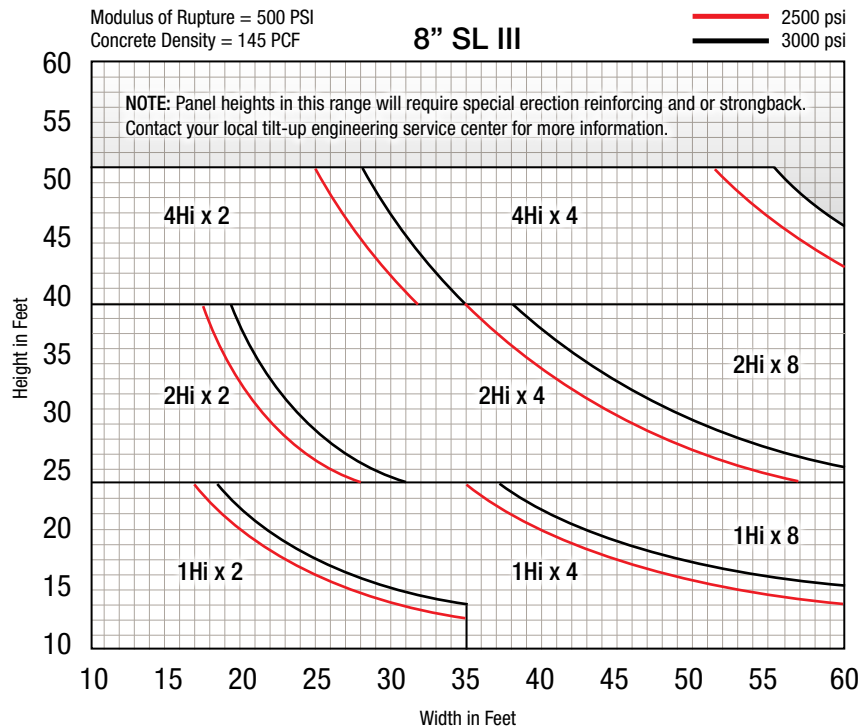
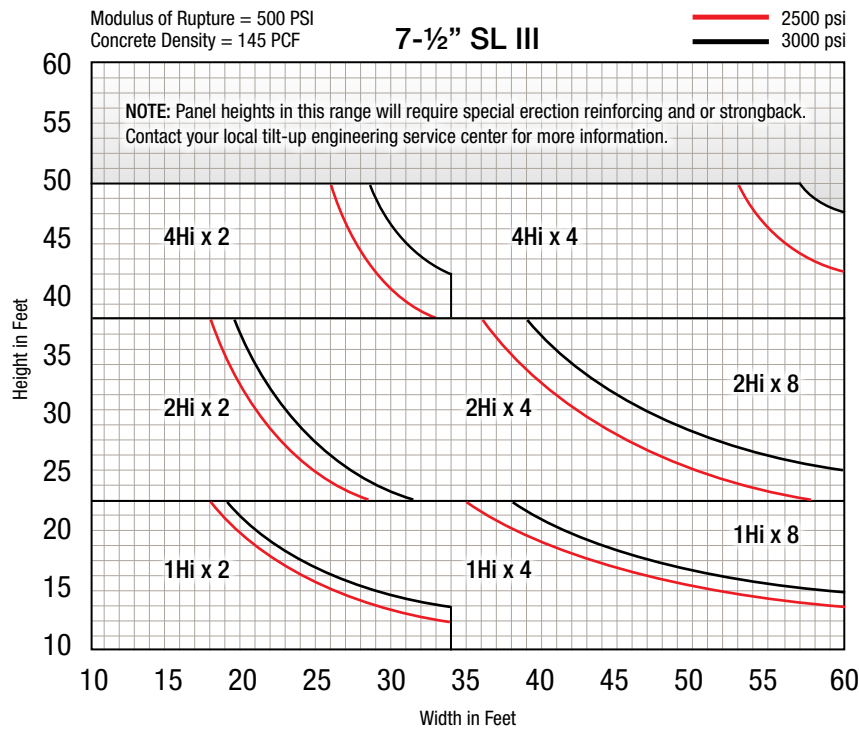
Super-Lift III Bid Chart



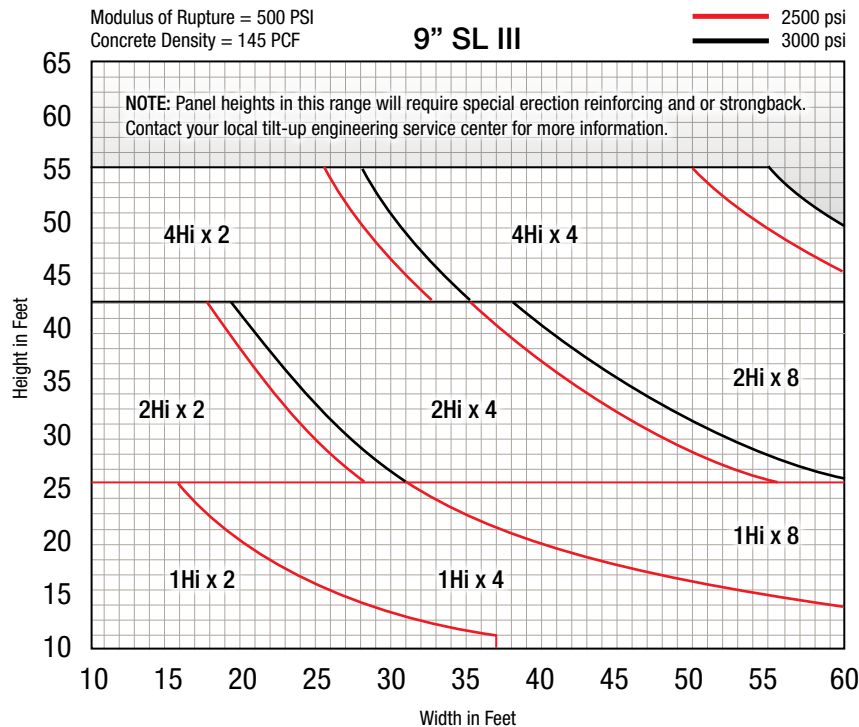
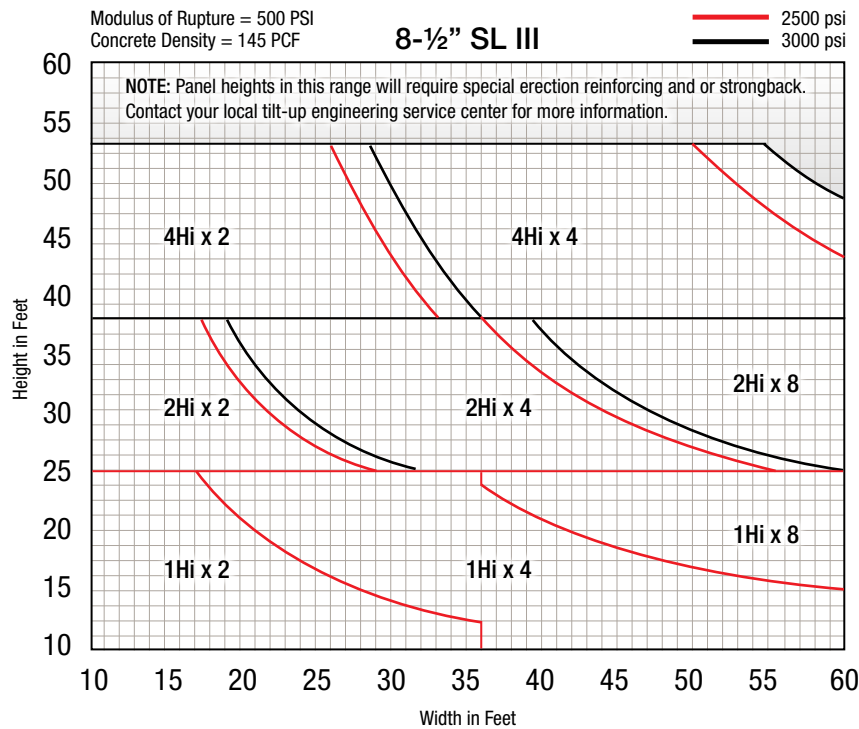
Super-Lift III Bid Chart



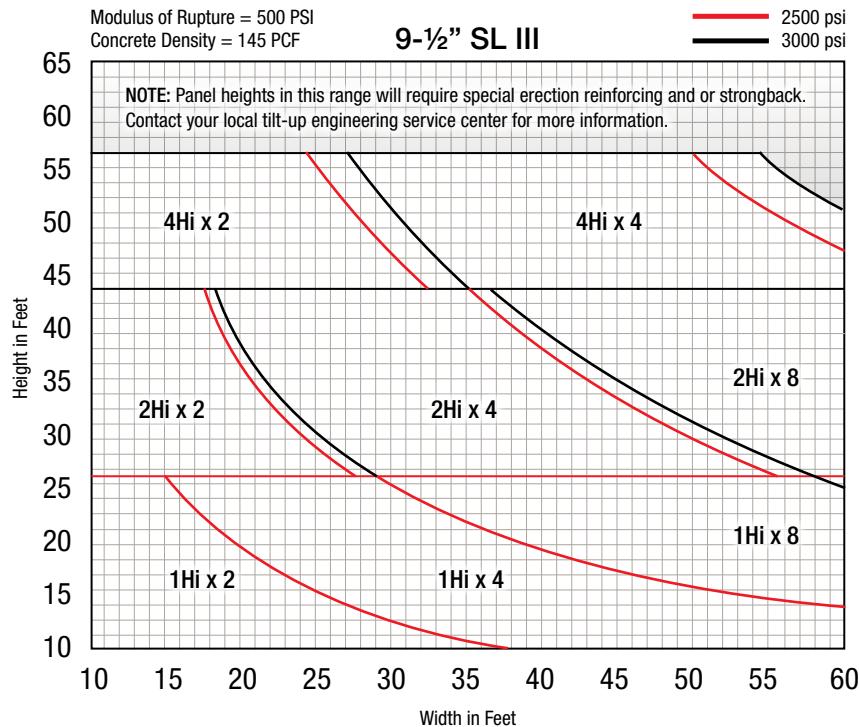
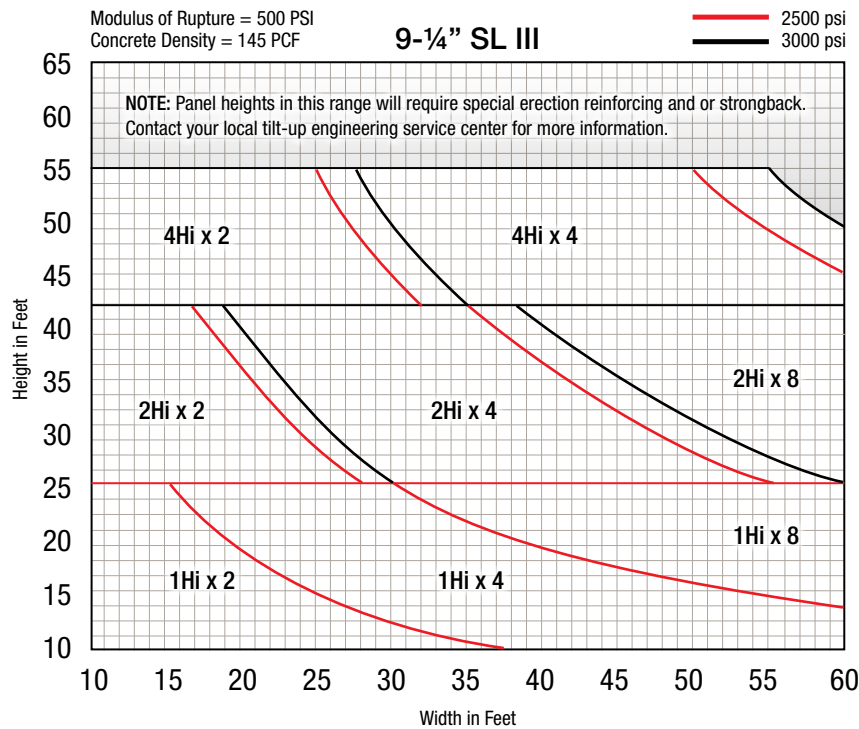
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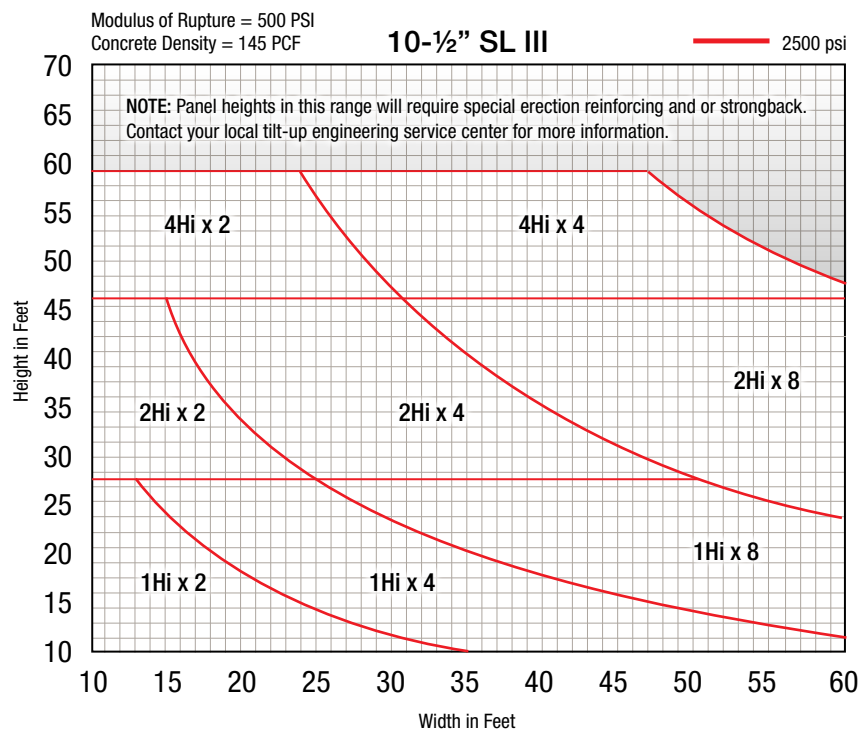
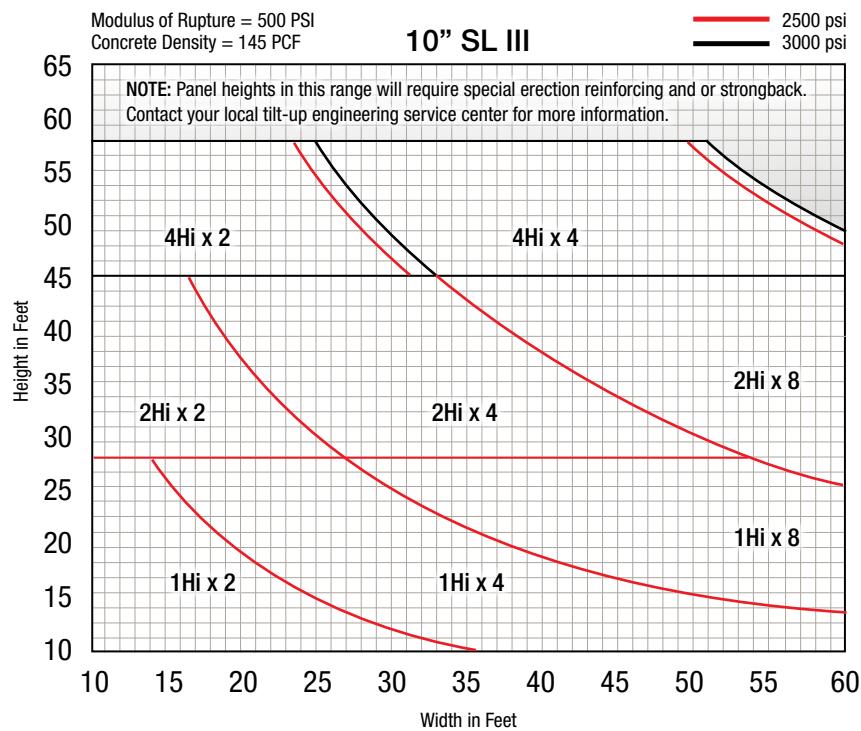
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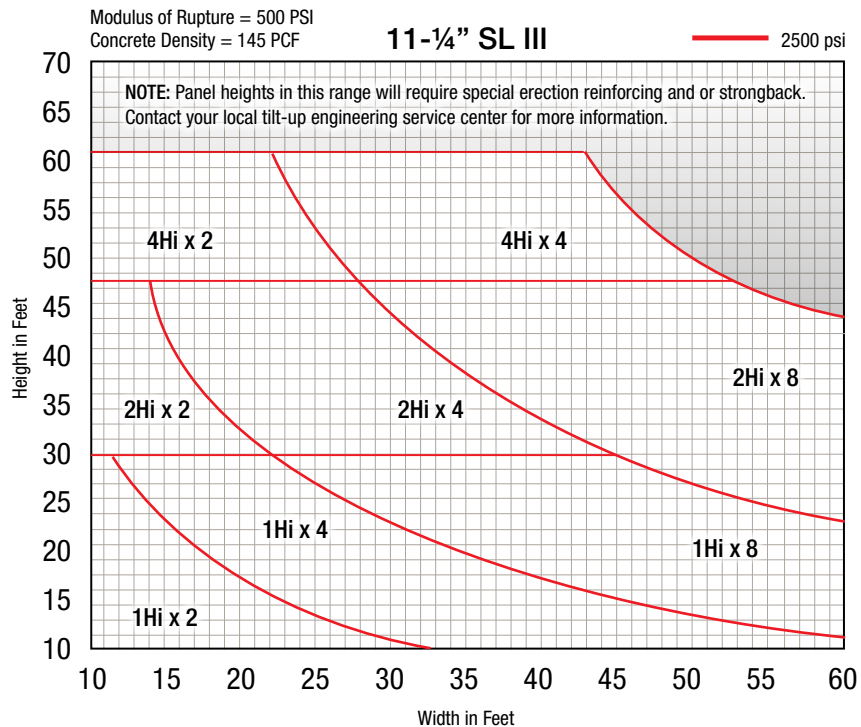
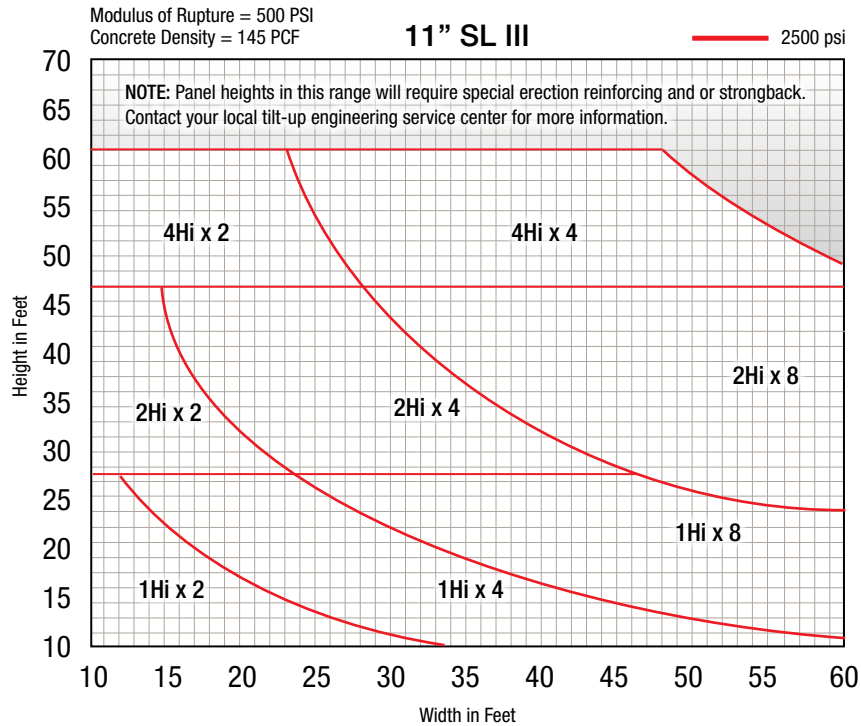
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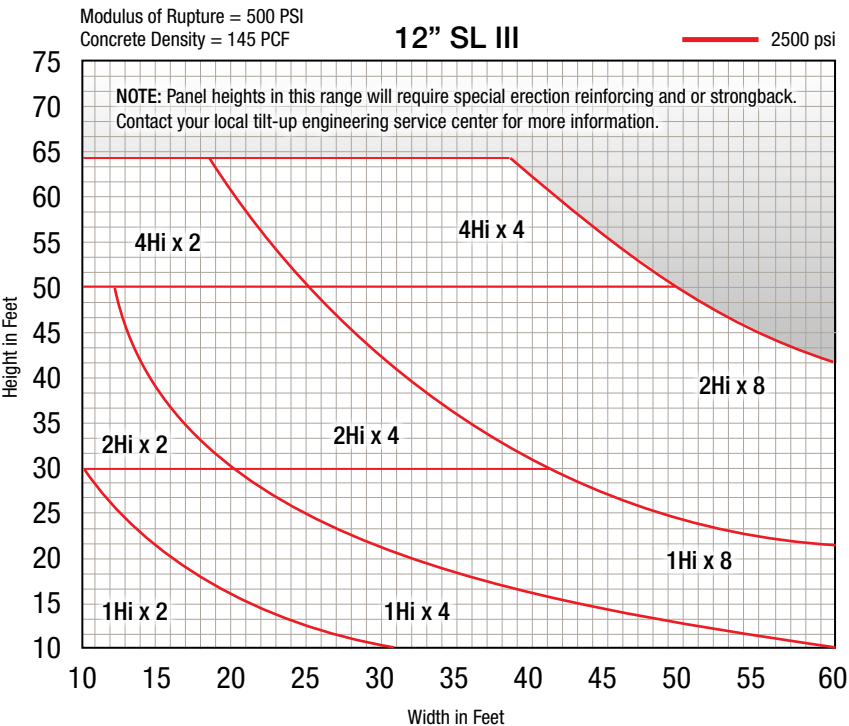
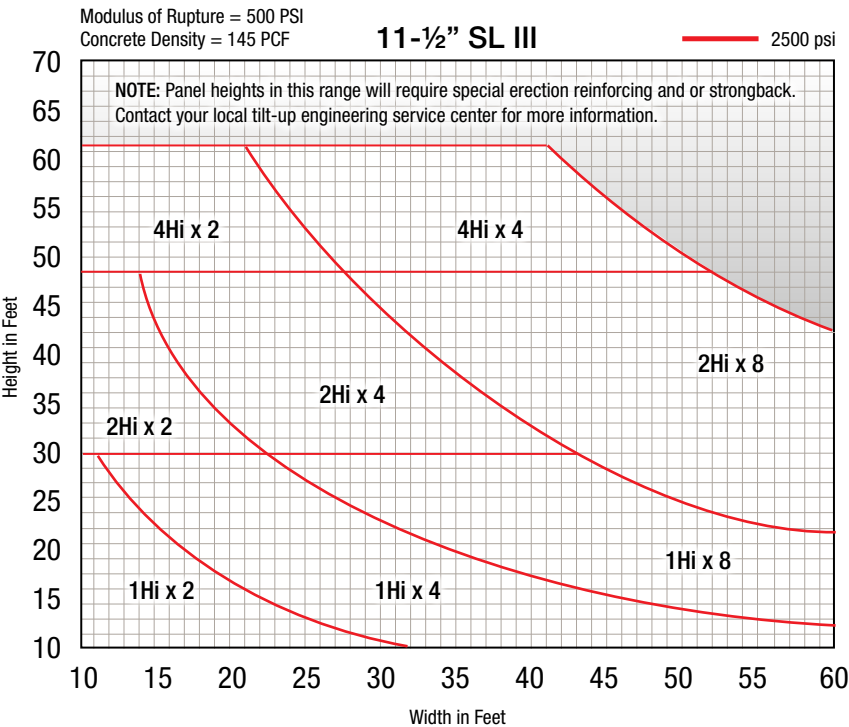
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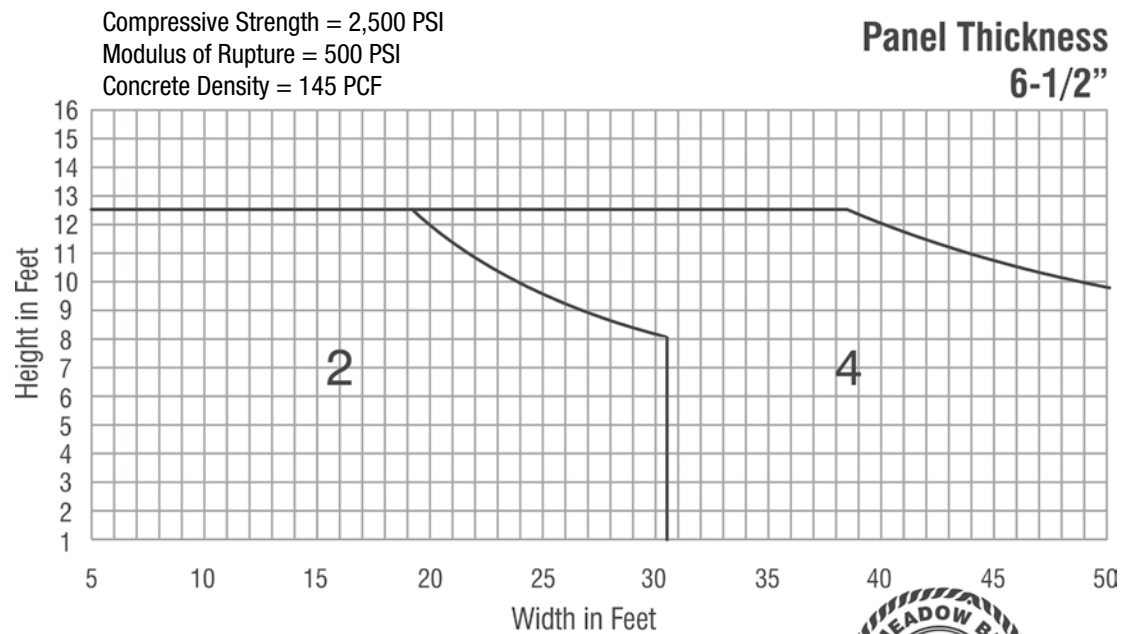
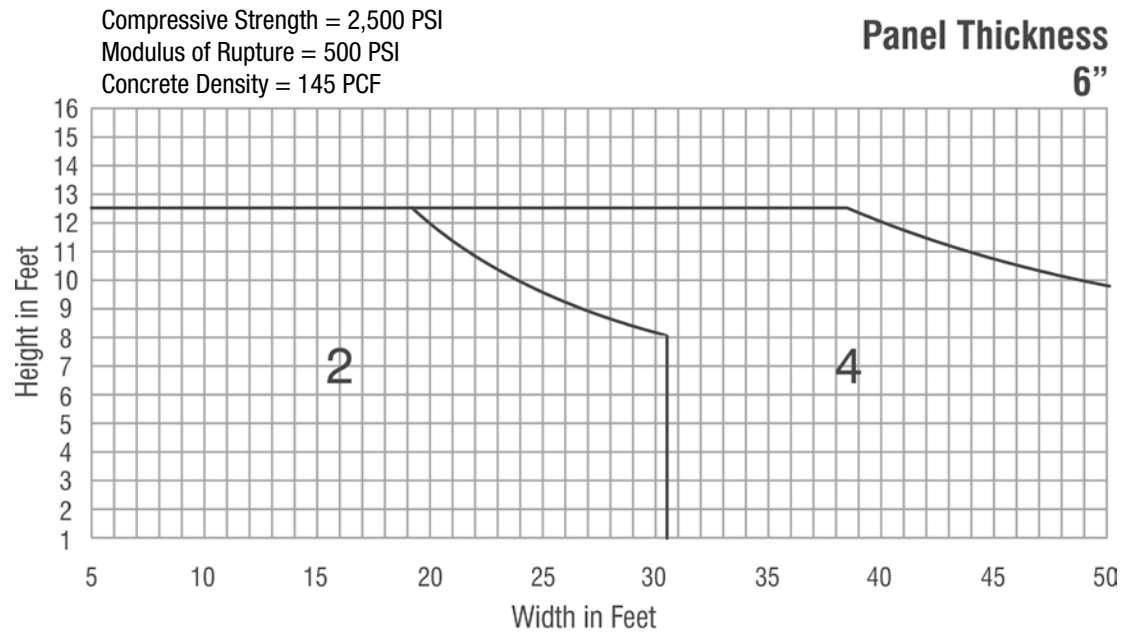
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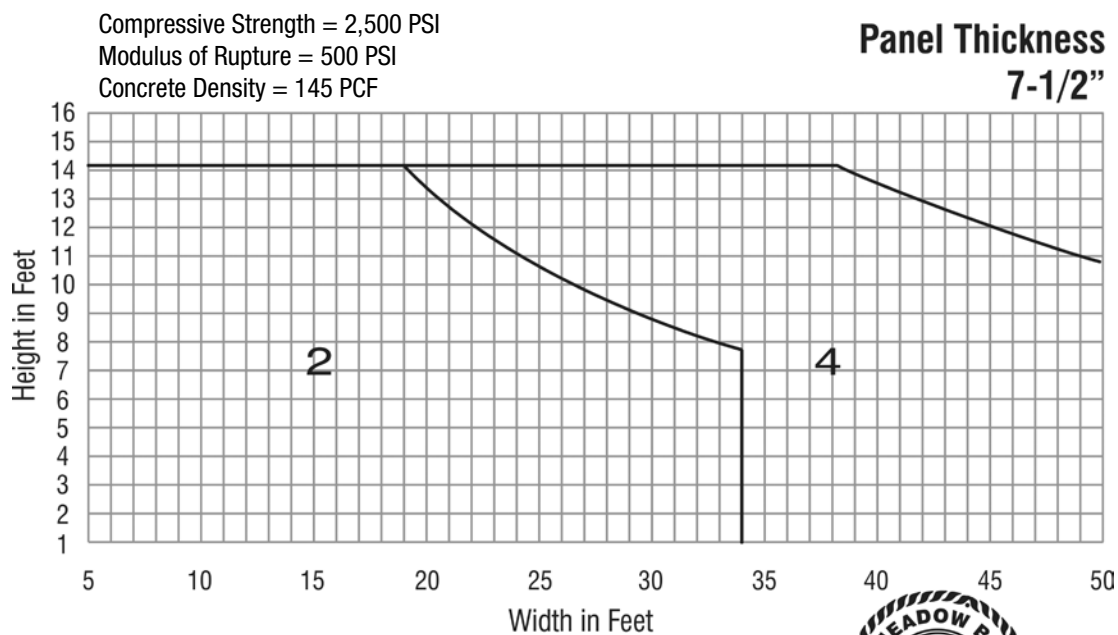
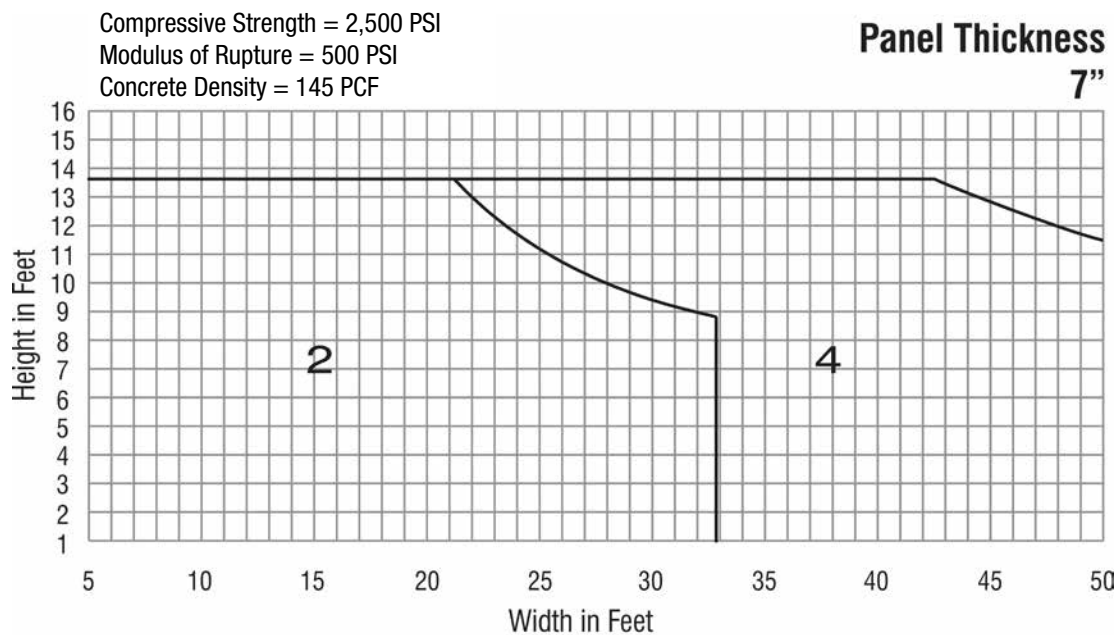
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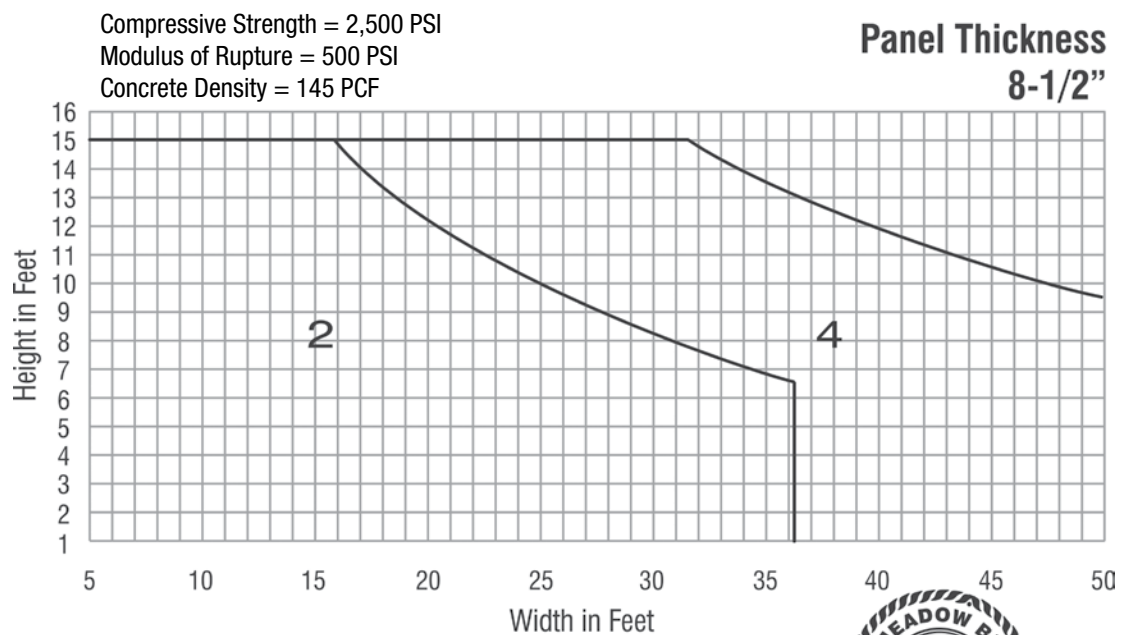
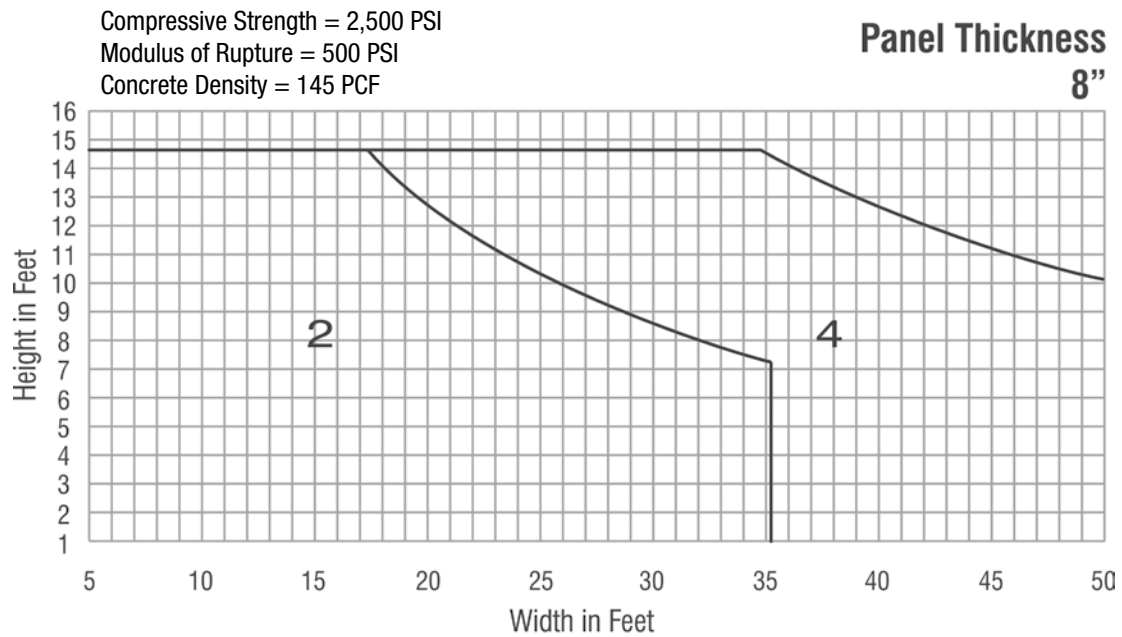
Super-Lift III Edge Lift Bid Chart



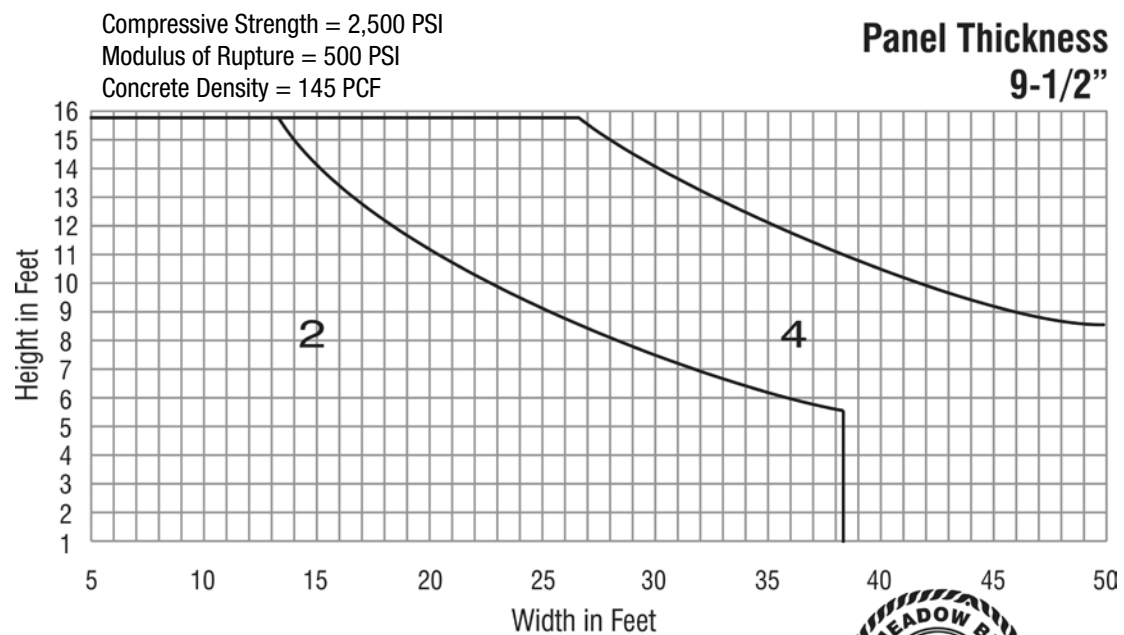
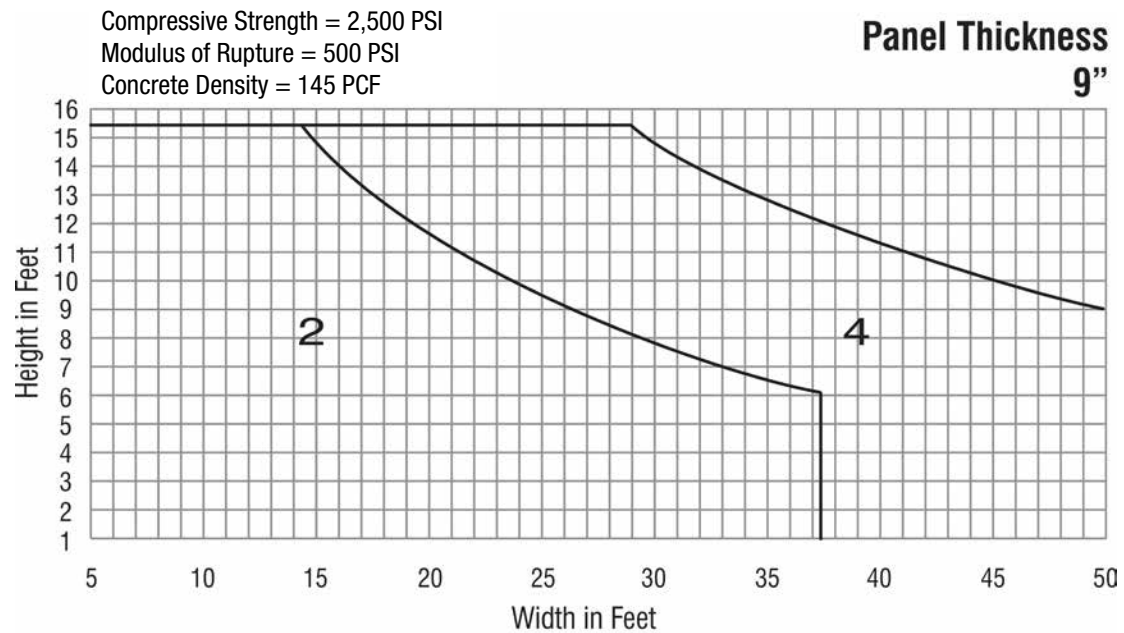
Super-Lift III Edge Lift Bid Chart



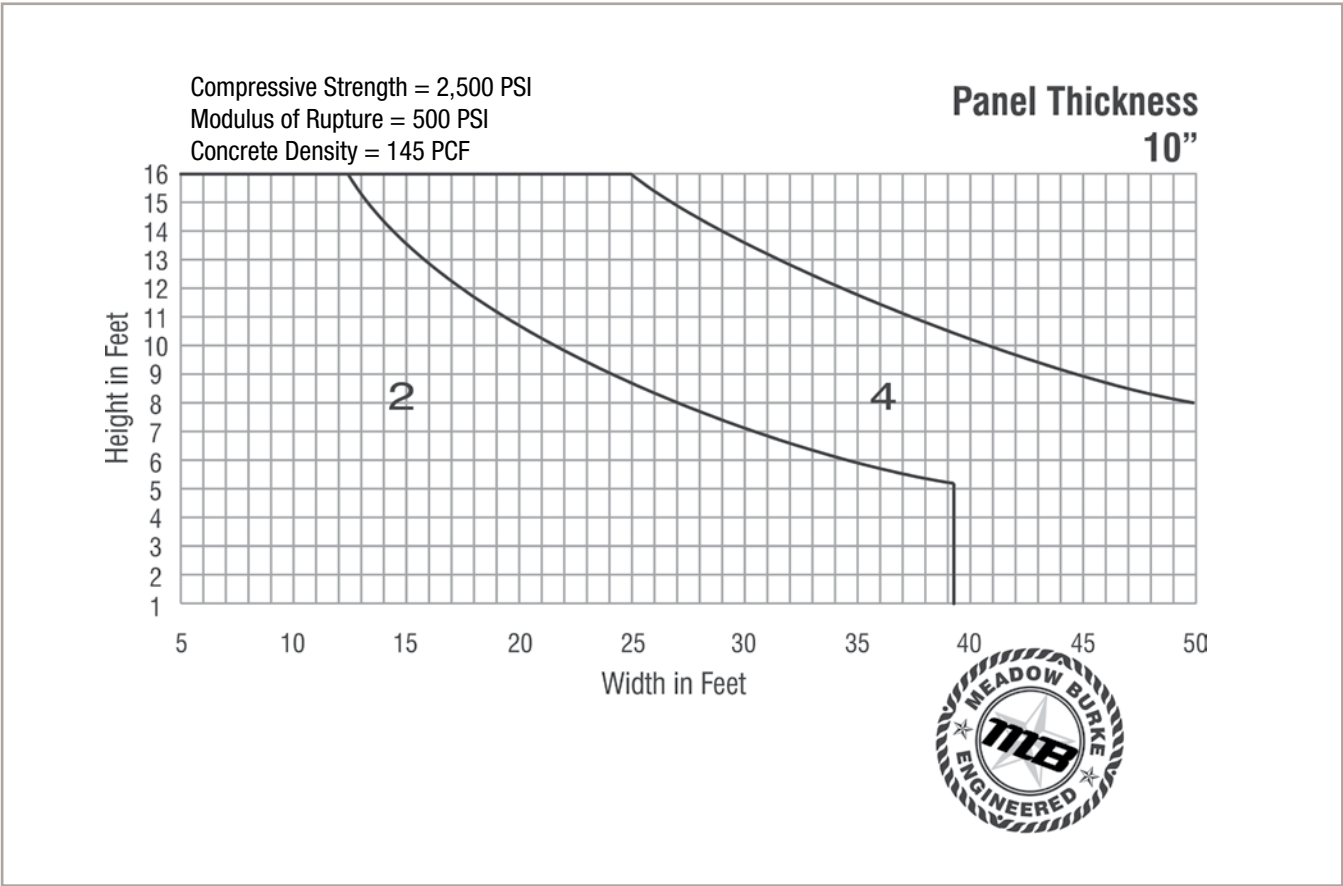
Super-Lift III Edge Lift Bid Chart



Super-Lift III Edge Lift Bid Chart



Super-Lift III Edge Lift Bid Chart



Notes

Bracing Tilt-Up Panels



Upon erection, tilt-up panels require bracing to resist wind loading until permanent structural connections are made.

A number of variables will effect the amount of force Meadow Burke braces must resist. The amount of lateral pressure on newly erected tilt-up panels will vary with wind velocity, the surface area of the panel and the presence or absence of openings. Wind velocity and therefore pressure, will depend on the geographical location of the building and seasonal conditions. The amount of this force will rise further if the wind is supplemented with either driving rain, blowing snow, or windblown dust and sand.

Before selecting a brace type in the Bracing Tables, contact the local Meadow Burke Distributor to determine what equipment is available. When using the Bracing Tables, make certain the brace selected will reach between the available floor and wall panel without falling in an opening or conflicting with an obstruction.

The following Tilt-up Brace Spacing Tables A, B, C and D were developed using a minimum ultimate construction period wind speed of 80 mph with exposure C and a Risk Category Type 1 unoccupied structure as recommended by the 2018 edition of the "TCA Guideline for Temporary Wind Bracing of Tilt-Up Panels During Construction" published by the Tilt-Up Concrete Association. This is the 100 mph basic wind speed modified by 0.8 to convert to a one year mean recurrence interval for the construction period. The tables incorporate minimum safety factors of 1.67 on the braces and 2.0 on the brace inserts. When wind speeds are predicted to occur to exceed 50 mph and while panels are temporarily supported by braces, for worker safety the project site should be shut down and cleared of personnel. When the panels to be braced are within a distance to areas accessible to the public that is less than or equal to two times the panel height contact Meadow Burke Engineering so the bracing can incorporate appropriate factors for a Risk Category Type II occupied structure.

Meadow Burke braces are designed for use with the Meadow Burke Brace Badger, Slam Anchor, Super Bolt, MB Brace Bolt, or with cast-in-place B-75, BI-75 and BG-75 coil inserts only. The use of other types of inserts may reduce the capacity of the bracing system and therefore should not be used. In order to develop the full capacity of the brace inserts, the inserts must be embedded in concrete with 2,500 psi minimum concrete compressive strength, 5 inch minimum embedment and located 1 foot minimum from all concrete edges. Lesser embedments or lower concrete strengths will reduce the capacity of the brace insert and may reduce the allowable brace spacings shown in the tables or on the panel erection details. Meadow Burke does not recommend the use of expansion type inserts for attaching tilt-up braces and assumes no responsibility if used.

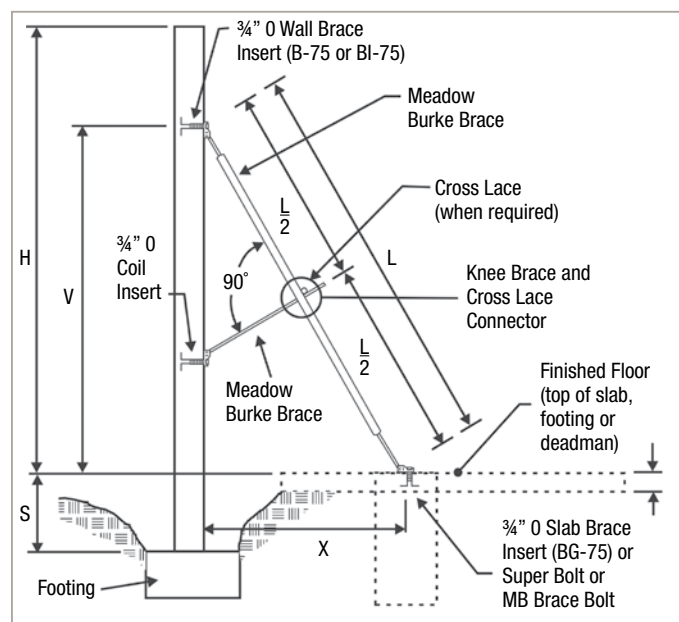
To achieve the spacings shown in the brace tables or on the panel erection details, the braces must be anchored to a concrete floor slab, footing or deadman with sufficient area, weight and strength to resist the applied brace loads. The braces are designed for attachment at top of floor slab elevation unless noted otherwise on the details. The floor slab has not been checked or designed by Meadow Burke. Using floor slabs, footings or deadmen of insufficient size or strength may result in failure of the brace system before the design wind load is reached. It is the users responsibility to have a qualified professional engineer design the floor slab, footing or deadman to insure that they are adequate to anchor the braces for this application. To assist the engineer, the applied design concentric brace load as determined by Meadow Burke Engineering for each brace is indicated on the panel detail sheets.

The brace information shown herein reflects spacings for the resistance of wind load only. The effect of construction live loads, soil backfill loads, vertical and lateral loads, etc., have not been considered in the design of the brace tables or brace information shown on the erection details. It is the responsibility of others to determine the effect of such loads and provide additional bracing as required to support the panels.

The vertical dimension of the wall brace insert above the floor slab, footing or deadman and the horizontal dimension to the floor brace insert from the face of the panel where the wall brace inserts are located is indicated in the brace tables for a specified panel height, or is shown on the panel erection details. Deviations from the dimensions shown in the tables or on the panel details may significantly reduce the indicated capacity of the braces.

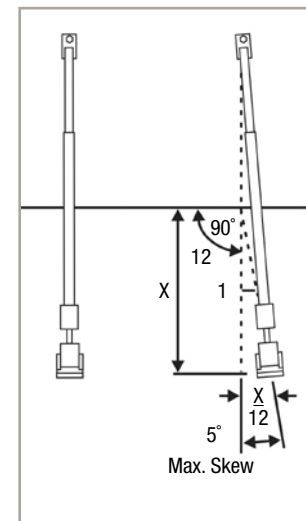
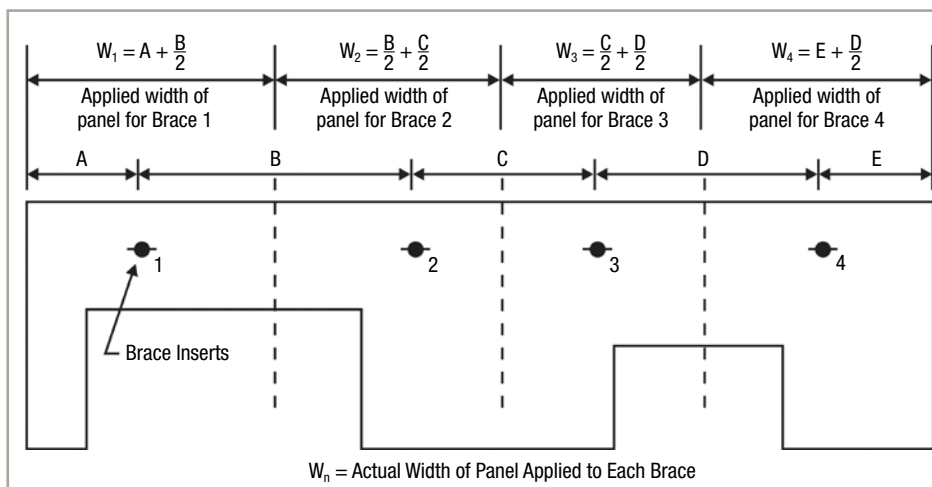
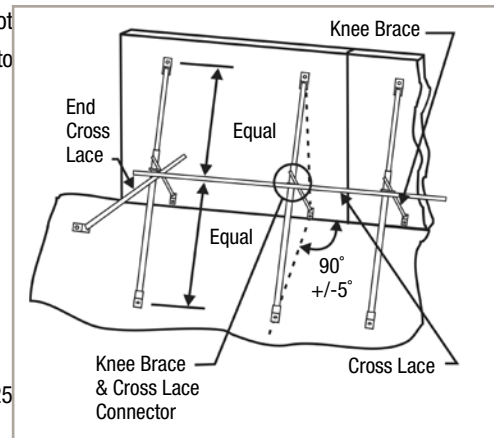
Whenever knee braces are used, continuous cross lacing is required. Knee braces must have positive connection at each end and connect at mid-span of the tilt-up brace. Cross lacing must be continuous and have positive connection at the mid-span of each tilt-up brace and at the end of each cross lace line.

The bracing recommendations contained herein apply to standard bracing situations for full height panels setting on footings and may not be applicable to all jobsite conditions. If this project has conditions that require a special brace design, the contractor should contact Meadow Burke Engineering for assistance.



Bracing Guidelines

1. Braces are designed to be placed in a plane at 90 degrees to the face of the panel. Skewing a brace will reduce the load carrying capacity of the brace. The maximum horizontal skew of the braces is limited to 5 degrees. A 5 degree skew is approximately equal to 1 inch skew for each 12 inches the brace insert is placed from the face of the wall (see detail at lower right). The brace spacing shown in the tables or on the panel details must be reduced when the braces are skewed more than 5 degrees. Even when the brace spacings are reduced to account for the increased brace load, never skew a brace more than 10 degrees.
2. Due to the increased suction created on the back side of a panel with openings; do not increase the brace spacing for panels with openings, unless a complete wind analysis to determine the effects of the wind passing through the openings is performed.
3. Locate brace inserts 1 foot or more from all concrete edges and floor slab joints.
4. Locate brace inserts to provide clearance between the lifting hardware and braces.
5. Locate brace inserts symmetrically about the panel's center line whenever possible.
6. Locate the first brace insert from each end of the panel at a distance no greater than 25 percent of the panel's width or 10 feet, whichever is less.
7. Locate brace inserts to provide an equal wind load to each brace where possible. Do not exceed the allowable maximum width of panel per brace. The allowable maximum width of panel per brace is the maximum brace spacing shown in the appropriate "S FF" column of the brace tables or as indicated on the panel detail sheets. For braces placed at nearly equal spacings, the actual width of panel applied to each brace (W_n) may be calculated using the method shown below. For panels requiring unequal or unusual brace spacings contact Meadow Burke Engineering for assistance.
8. Brace inserts should not be placed lower than 60% of the panel's height and not less than 5% of the panel's height above the panel's geometric centroid or mass center of gravity, whichever is greater.



Brace Table Legend

The following brace spacing tables have been designed for an 80 mph ultimate wind with a 1 year mean recurrence interval. Spacings are assuming a solid panel with a panel width not less than 20 feet. For more accurate spacings that factor in actual panel shape and openings contact Meadow Burke Engineering. The table should be used in conjunction with the notes and recommendations shown in the Brace Design Notes, on pages 78,79, & 80.

SFF = Maximum brace spacing for a panel with a height below floor (or top of deadman when used) equal to “FF” feet. [ie., the S 0 column yields the maximum spacing for a panel with no height below floor, the S2 column yields the maximum spacing for a panel 2 foot maximum height below floor, etc.]

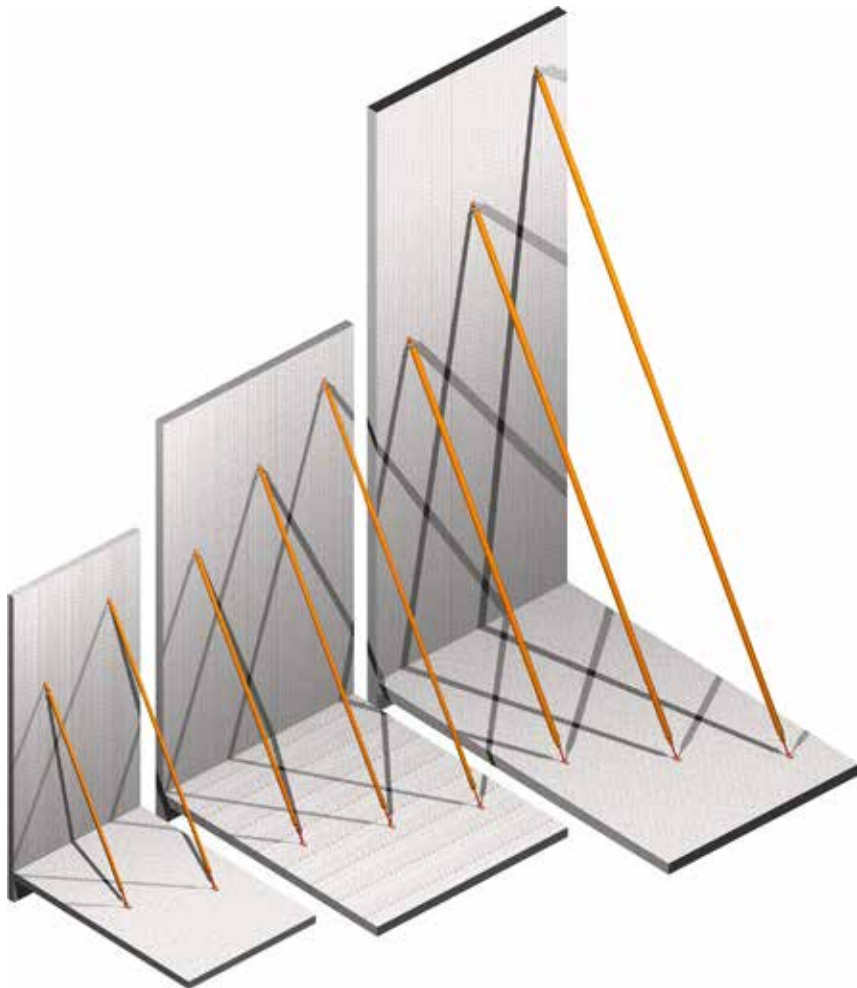
All dimensions are shown in units of feet. Always round the dimensions for the panel height below floor and the panel height above floor, to the next larger chart value. Reference brace detail on Brace Design Notes, on page 78.

H = Height of panel above floor or top of deadman
when used.

V = Brace insert location from face of
floor or top of deadman if used.

X = Horizontal dimension to
floor brace insert from
the face of the panel
where the wall brace
inserts are located.

L = Brace length for given
V and X.



For Brace Legend notes, please refer to pages 78 thru 81.

[illegible]

Tilt-up Brace Spacing Table A © 2018

For Brace Legend notes, please refer to pages 78 thru 81.

WARNING: Some braces may not be available at all distribution locations. Always check with your local distributor for brace availability prior to casting inserts in floor slab or wall panels.

[illegible]

Tilt-up Brace Spacing Table B © 2018

For Brace Legend notes, please refer to pages 78 thru 81.

WARNING: Some braces may not be available at all distribution locations. Always check with your local distributor for brace availability prior to casting inserts in floor slab or wall panels.

Note values shown require braces to be attached to Badgers or a 6" thick x 3,000 psi slab with an MB Brace Bolt.

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Tilt-up Brace Spacing Table C © 2018

Brace Tables

For Brace Legend notes, please refer to pages 78 thru 81.

WARNING: Some braces may not be available at all distribution locations. Always check with your local distributor for brace availability prior to casting inserts in floor slab or wall panels.

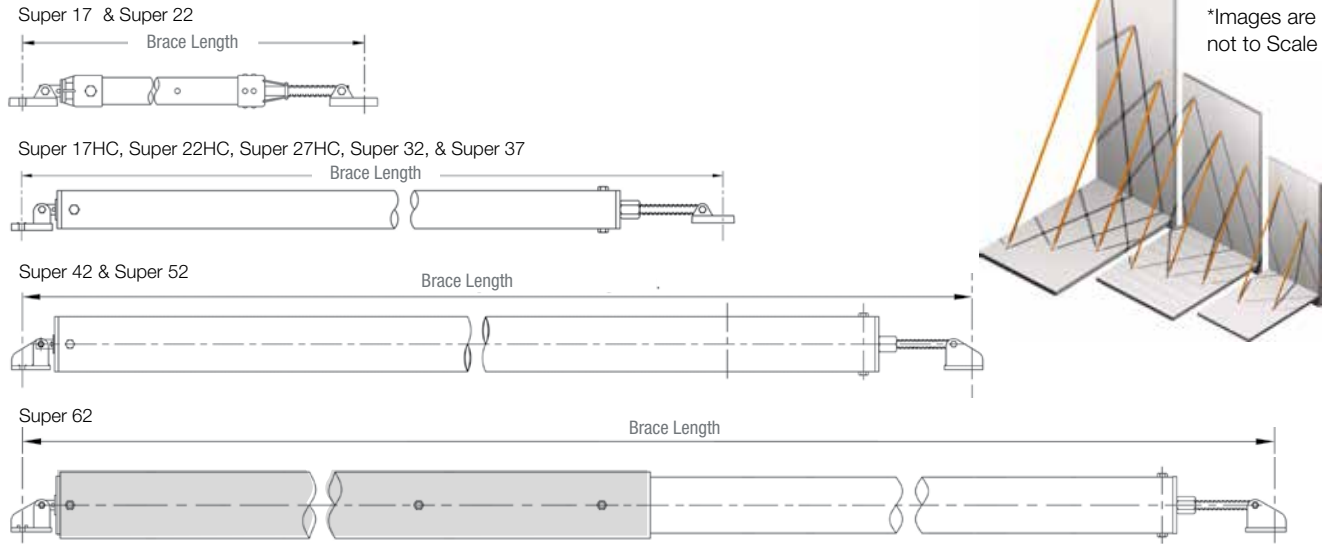
53	33.13	19.12	38.25	3.56	3.47	3.38	3.30				
52	32.50	18.76	37.53	3.79	3.69	3.60	3.50				
51	31.88	18.40	36.81	4.03	3.93	3.82	3.72				
50	31.25	18.04	36.08	4.30	4.19	4.07	3.96				
49	30.63	17.68	35.36	4.45	4.32	4.20	4.09				
48	30.00	17.32	34.64	4.57	4.43	4.31	4.19				
47	29.38	16.96	33.92	4.70	4.56	4.42	4.30				
46	28.75	16.60	33.20	4.83	4.68	4.54	4.40				
45	28.13	16.24	32.48	4.97	4.82	4.66	4.52				
44	27.50	15.88	31.75	5.12	4.96	4.80	4.64				
43	26.88	15.52	31.03	5.28	5.11	4.94	4.78				
42	26.25	15.16	30.31	5.44	5.26	5.08	4.91				
41	25.63	14.79	29.59	5.61	5.42	5.23	5.05				
40	25.00	14.43	28.87	5.79	5.59	5.40	5.21				
39	24.38	14.07	28.15	5.99	5.77	5.57	5.37				
38	23.75	13.71	27.42	6.19	5.97	5.75	5.54				
37	23.13	13.35	26.70	6.41	6.17	5.94	5.72				
36	22.50	12.99	25.98	6.64	6.39	6.14	5.90				
35	21.88	12.63	25.26	6.88	6.62	6.36	6.11				
34	21.25	12.27	24.54	7.14	6.86	6.58	6.32				
33	20.78	12.00	24.00	7.48	7.17	6.87	6.58				
32	20.78	12.00	24.00	8.02	7.66	7.31	6.98				
31	20.78	12.00	24.00	8.62	8.20	7.80	7.42				
30	20.78	12.00	24.00	9.28	8.79	8.33	7.90				
29	20.78	12.00	24.00	10.05	9.45	8.92	8.43				
28	20.78	12.00	24.00	10.91	10.18	9.56	9.00				
27	20.78	12.00	24.00	11.87	11.02	10.28	9.64				
26	20.78	12.00	24.00	12.96	11.96	11.07	10.33				
25	20.78	12.00	24.00	14.12	13.01	11.99	11.11				
24	20.78	12.00	24.00	15.32	14.20	13.01	11.97				
23	20.78	12.00	24.00	16.68	15.48	14.15	12.95				
22	20.78	12.00	24.00	18.23	16.79	15.45	14.06				
21	20.00	13.27	24.00	21.3	19.53	18.03	16.42				
20	19.00	14.66	24.00	20.0	20.0	20.71	19.04				
19	18.00	15.87	24.00	20.0	20.0	20.0	21.56				
18	17.00	16.94	24.00	20.0	20.0	20.0	20.0				
H	V	X	L	S0	S2	S4	S6				
Install. Dims.				With Knee Brace							
BIG "G"											
Without Knee Brace											
H	V	X	L	S0	S2	S4	S6				
17	17.00	16.94	24.00	20.0	20.0	20.0	21.56				
16	16.00	15.87	24.00	20.0	20.0	20.0	20.0				
15	15.00	14.66	24.00	20.0	20.0	20.0	20.0				
14	14.00	13.27	24.00	20.0	20.0	20.0	20.0				
13	13.00	12.95	24.00	20.0	20.0	20.0	20.0				
12	12.00	12.00	24.00	20.0	20.0	20.0	20.0				
11	11.00	11.00	24.00	20.0	20.0	20.0	20.0				
10	10.00	10.00	24.00	20.0	20.0	20.0	20.0				
9	9.00	9.00	24.00	20.0	20.0	20.0	20.0				
8	8.00	8.00	24.00	20.0	20.0	20.0	20.0				
7	7.00	7.00	24.00	20.0	20.0	20.0	20.0				
6	6.00	6.00	24.00	20.0	20.0	20.0	20.0				
5	5.00	5.00	24.00	20.0	20.0	20.0	20.0				
4	4.00	4.00	24.00	20.0	20.0	20.0	20.0				
3	3.00	3.00	24.00	20.0	20.0	20.0	20.0				
2	2.00	2.00	24.00	20.0	20.0	20.0	20.0				
1	1.00	1.00	24.00	20.0	20.0	20.0	20.0				
0	0.00	0.00	24.00	20.0	20.0	20.0	20.0				
H	V	X	L	S0	S2	S4	S6				
Install. Dims.				Without Knee Brace							
BIG "G"											
Without Knee Brace											
H	V	X	L	S0	S2	S4	S6				
17	17.00	16.94	24.00	20.0	20.0	20.0	21.56				
16	16.00	15.87	24.00	20.0	20.0	20.0	20.0				
15	15.00	14.66	24.00	20.0	20.0	20.0	20.0				
14	14.00	13.27	24.00	20.0	20.0	20.0	20.0				
13	13.00	12.95	24.00	20.0	20.0	20.0	20.0				
12	12.00	12.00	24.00	20.0	20.0	20.0	20.0				
11	11.00	11.00	24.00	20.0	20.0	20.0	20.0				
10	10.00	10.00	24.00	20.0	20.0	20.0	20.0				
9	9.00	9.00	24.00	20.0	20.0	20.0	20.0				
8	8.00	8.00	24.00	20.0	20.0	20.0	20.0				
7	7.00	7.00	24.00	20.0	20.0	20.0	20.0				
6	6.00	6.00	24.00	20.0	20.0	20.0	20.0				
5	5.00	5.00	24.00	20.0	20.0	20.0	20.0				
4	4.00	4.00	24.00	20.0	20.0	20.0	20.0				
3	3.00	3.00	24.00	20.0	20.0	20.0	20.0				
2	2.00	2.00	24.00	20.0	20.0	20.0	20.0				
1	1.00	1.00	24.00	20.0	20.0	20.0	20.0				
0	0.00	0.00	24.00	20.0	20.0	20.0	20.0				
H	V	X	L	S0	S2	S4	S6				
Install. Dims.				Without Knee Brace							
BIG "G"											
Without Knee Brace											
H	V	X	L	S0	S2	S4	S6				
17	17.00	16.94	24.00	20.0	20.0	20.0	21.56				
16	16.00	15.87	24.00	20.0	20.0	20.0	20.0				
15	15.00	14.66	24.00	20.0	20.0	20.0	20.0				
14	14.00	13.27	24.00	20.0	20.0	20.0	20.0				
13	13.00	12.95	24.00	20.0	20.0	20.0	20.0				
12	12.00	12.00	24.00	20.0	20.0	20.0	20.0				
11	11.00	11.00	24.00	20.0	20.0	20.0	20.0				
10	10.00	10.00	24.00	20.0	20.0	20.0	20.0				
9	9.00	9.00	24.00	20.0	20.0	20.0	20.0				
8	8.00	8.00	24.00	20.0	20.0	20.0	20.0				
7	7.00	7.00	24.00	20.0	20.0	20.0	20.0				
6	6.00	6.00	24.00	20.0	20.0	20.0	20.0				
5	5.00	5.00	24.00	20.0	20.0	20.0	20.0				
4	4.00	4.00	24.00	20.0	20.0	20.0	20.0				
3	3.00	3.00	24.00	20.0	20.0	20.0	20.0				
2	2.00	2.00	24.00	20.0	20.0	20.0	20.0				
1	1.00	1.00	24.00	20.0	20.0	20.0	20.0				
0	0.00	0.00	24.00	20.0	20.0	20.0	20.0				
H	V	X	L	S0	S2	S4	S6				
Install. Dims.				Without Knee Brace							
BIG "G"											
Without Knee Brace											
H	V	X	L	S0	S2	S4	S6				
17	17.00	16.94	24.00	20.0	20.0	20.0	21.56				
16	16.00	15.87	24.00	20.0	20.0	20.0	20.0				
15	15.00	14.66	24.00	20.0	20.0	20.0	20.0				
14	14.00	13.27	24.00	20.0	20.0	20.0	20.0				
13	13.00	12.95	24.00	20.0	20.0	20.0	20.0				
12	12.00	12.00	24.00	20.0	20.0	20.0	20.0				
11	11.00	11.00	24.00	20.0	20.0	20.0	20.0				
10	10.00	10.00	24.00	20.0	20.0	20.0	20.0				
9	9.00	9.00	24.00	20.0	20.0	20.0	20.0				
8	8.00	8.00	24.00	20.0	20.0	20.0	20.0				
7	7.00	7.00	24.00	20.0	20.0	20.0	20.0				
6	6.00	6.00	24.00	20.0	20.0	20.0	20.0				
5	5.00	5.00	24.00	20.0	20.0	20.0	20.0				
4	4.00	4.00	24.00	20.0	20.0	20.0	20.0				
3	3.00	3.00	24.00	20.0	20.0	20.0	20.0				
2	2.00	2.00	24.00	20.0	20.0	20.0	20.0				
1	1.00	1.00	24.00	20.0	20.0	20.0	20.0				
0	0.00	0.00	24.00	20.0	20.0	20.0	20.0				
H	V	X	L	S0	S2	S4	S6				
Install. Dims.				Without Knee Brace							
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17	17.00	16.94	24.00	20.0	20.0	20.0	21.56				
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14	14.00	13.27	24.00	20.0	20.0	20.0	20.0				
13	13.00	12.95	24.00	20.0	20.0	20.0	20.0				
12	12.00	12.00	24.00	20.0	20.0	20.0	20.0				
11	11.00	11.00	24.00	20.0	20.0	20.0	20.0				
10	10.00	10.00	24.00	20.0	20.0	20.0	20.0				
9	9.00	9.00	24.00	20.0	20.0	20.0	20.0				
8	8.00	8.00	24.00	20.0	20.0	20.0	20.0				
7	7.00	7.00	24.00	20.0	20.0	20.0	20.0				
6	6.00	6.00	24.00	20.0	20.0	20.0	20.0				
5	5.00	5.00	24.00	20.0	20.0	20.0	20.0				
4	4.00	4.00	24.00	20.0	20.0	20.0	20.0				
3	3.00	3.00	24.00	20.0	20.0	20.0	20.0				
2	2.00	2.00	24.00	20.0	20.0	20.0	20.0				
1	1.00	1.00	24.00	20.0	20.0	20.0	20.0				
0	0.00	0.00	24.00	20.0	20.0	20.0	20.0				
H	V	X	L	S0	S2	S4	S6				
Install. Dims.				Without Knee Brace							
BIG "G"											
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17	17.00	16.94	24.00	20.0	20.0	20.0	21.56				
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14	14.00	13.27	24.00	20.0	20.0	20.0	20.0				
13	13.00	12.95	24.00	20.0	20.0	20.0	20.0				
12	12.00	12.00	24.00	20.0	20.0	20.0	20.0				
11	11.00	11.00	24.00	20.0	20.0	20.0	20.0				
10	10.00	10.00</									

Notes

Tilt-Up Bracing Hardware



Temporary Panel Bracing – Super 17, 22, 27, 32, 37, 42, 52, 62



Super 17 – 62 Braces are used to temporarily support concrete panels to resist wind load until a permanent connection is made. The brace is anchored to a concrete floor slab, Deadman or an MB Brace Badger. The top foot attaches via an embedded brace insert.

Super Braces are manufactured in a variety of sizes for use on panels 10 ft to 94 ft in height and can be used on the inside or outside of the structure using Meadow Burke's Badger, Slam Anchor, MB Brace Bolt and Brace Insert. All braces have additional length adjustment to simplify final plumbing. Super Braces comply with ASCE 37-02 and ASCE 7-10 regarding basic wind speeds.

Product Data - MB Super Braces

Item Code	Brace Type	Pipe Diameter	Brace Length	Ultimate Brace Buckling Load at Max Extension	Unit Weight
MB45280	Super 17	3.5"	16'-3" to 17'-9"	13.00 kips	105 lbs
MB45295	Super 17 HC	5.5"	16'-4" to 17'-8"	18.50 kips	165 lbs
MB45202	Super 22 ¹	3.5"	21'-5" to 22'-11"	11.00 kips	136 lbs
MB45297	Super 22 HC	5.5"	21'-4" to 22'-8"	16.75 kips	225 lbs
--	Super 22 + 5' Extension	3.5"	26'-4" to 27'-8"	8.85 kips	136 lbs
MB45187	Super 27 HC	5.5"	26'-4" to 27'-8"	15.00 kips	250 lbs
MB45201	Super 32 ¹	5.5"	31'-4" to 32'-8"	13.50 kips	275 lbs
--	Super 32 + 5' Extension	5.5"	36'-4" to 37'-8"	10.36 kips	275 lbs
--	Super 32 + 10' Extension	5.5"	41'-4" to 42'-8"	8.04 kips	275 lbs
MB45198	Super 37	5.5"	36'-4" to 37'-8"	10.36 kips	315 lbs
MB45199	Super 42	8.6"	41'-4" to 42'-9"	17.87 kips	550 lbs
MB45200	Super 52	8.6"	51'-4" to 52'-9"	16.05 kips	680 lbs
MB45262	Super 62 ²	8.6"	61'-6" to 62'-8"	16.05 kips	950 lbs

1. Super 22 and Super 32 are available with 5ft and 10ft extensions.

2. Super 62 brace requires some extension assembly on site.

NOTE: A 1.67 minimum safety factor is recommended for temporary wind bracing of concrete tilt-up wall panels.

Notes:

- A. The equations above for ultimate buckling loads are based on test results performed on the braces when they were placed at an angle of 60 degrees to horizontal. For brace angles between 45 and 60 degrees to horizontal, multiply the buckling load derived from the equations above by the factor "K".

$$K = \frac{(1390 + 47 \emptyset)}{4210}$$

Where \emptyset = Brace angle to horizontal in degrees.

Exception: K = 1 may be used for all "Super Braces" except for the Super 22 + 10' Extension.

- B. To determine the concentric brace working load, divide the ultimate load by the desired safety factor. A 1.67 minimum safety factor is recommended for temporary wind bracing of concrete tilt-up wall panels. Braces when used for other purposes or different types of applied loads may require higher safety factors. Safety factor shall be determined by the user.

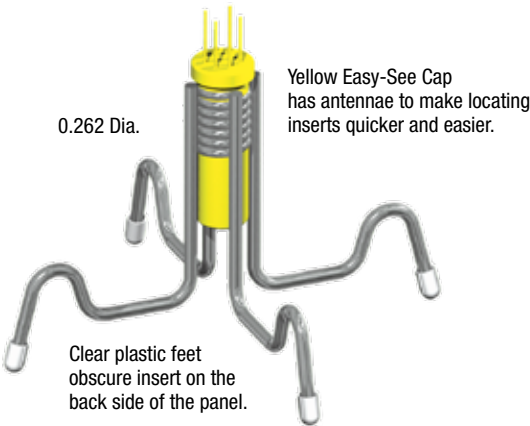
Coil Inserts

Meadow Burke's Brace Inserts have been an industry standard for the past three decades. These solid bolted connections have proven the strength and security of this system on thousands of job sites around the country.

For unshakable reliability the Meadow Burke Coil System is an excellent choice.

B-75 WALL BRACE INSERT

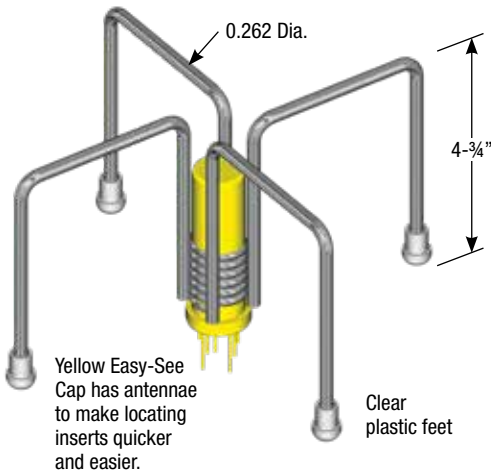
3/4" diameter coil insert height is 1/2" less than panel thickness.
Available in 1/4" increments from 4" through 12".



The minimum edge distance required to obtain the rated loads for face applications is 12 inches.

BII-75 INVERTED WALL BRACE INSERT

3/4" diameter coil insert - Available in size shown only.



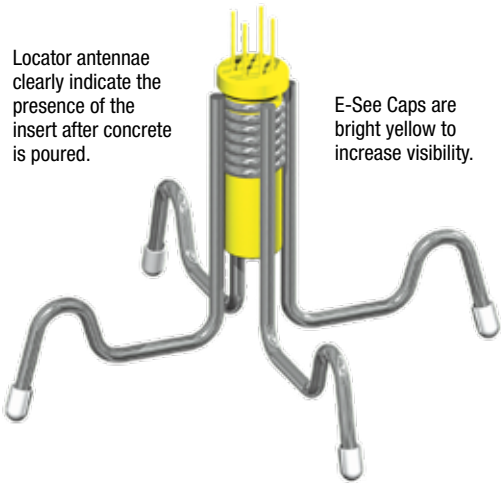
WORKING LOADS IN LBS. IN 2500 PSI CONCRETE, 2.0:1 SAFETY FACTOR			
Item Number	Conc. Thick. in inches	Face Tension	Face Shear
MBB75050	5"	7,800	8,200
MBB75055	5-1/2"	9,625	10,150
MBB75060	6"	10,150	10,150
MBB75062	6-1/4"	10,150	10,150
MBB75065	6-1/2"	10,150	10,150
MBB75070	7"	10,150	10,150
MBB75072	7-1/4"	10,150	10,150
MBB75075	7-1/2"	10,150	10,150
MBB75080	8"	10,150	10,150
MBB75082	8-1/4"	10,150	10,150
MBB75085	8-1/2"	10,150	10,150
MBB75090	9"	10,150	10,150
MBB75092	9-1/4"	10,150	10,150
MBB75095	9-1/2"	10,150	10,150
MBB75100	10"	10,150	10,150
MBB75105	10-1/2"	10,150	10,150
MBB75110	11"	10,150	10,150
MBB75112	11-1/4"	10,150	10,150
MBB75115	11-1/2"	10,150	10,150
MBB75120	12"	10,150	10,150

WORKING LOADS IN LBS. IN 2500 PSI CONCRETE, 2.0:1 SAFETY FACTOR			
Item Number	Conc. Thick. in inches	Face Tension	Face Shear
MBBII75	Inverted	9,625	10,150

Insert Placement

E-SEE CAPS HELP WORKMEN PROTECT, INSPECT, AND DETECT INSERTS

Meadow Burke Inserts come equipped with distinctive, bright yellow E-See Caps. The shape of the cap will differ with the type of insert, but all of them have the easy-to-see yellow antennae. These locator antennae serve two purposes, 1.) they clearly signal the presence of the insert after concrete is poured, 2.) because the antennae are arranged in a circle or ellipse around the perimeter of the insert, they form a separate concrete plane which can be easily cracked and removed with minimum spalling of the surrounding concrete. Patching work is minimized. E-See cap antennae will not interfere with screeding, bull floating, or troweling. These highly flexible, polyethylene antennae merely flatten out during finishing work only to spring back up once finishing equipment has passed. Meadow Burke's resilient caps also protect the insert from seepage while creating a void for the easy entry of lifting equipment or bolts. Once their work is done, Meadow Burke's E-See Caps can be easily removed with a screw driver or other similar instrument.



Locator antennae clearly indicate the presence of the insert after concrete is poured.

E-See Caps are bright yellow to increase visibility.

SPECIALLY DESIGNED BURKE INSERTS FACILITATE PLACEMENT

Meadow Burke Inserts are designed for stability and economy. The inserts should be tied securely to the rebar mesh. Location of the inserts in the panel should correspond exactly to their position on the engineering drawing. If for some reason they cannot be placed in their exact location, contact your Meadow Burke representative or the Meadow Burke Engineering Center. Bracing inserts should not be placed in a position where the attachment of braces prior to lifting would interfere with erection hardware or rigging. They should be placed no closer than 1 ft. (305 mm) away from all edges or openings. It is important that concrete around the anchors be properly consolidated. Care should be taken to assure that the vibrator's head does not hit the surface of the floor. This may cause chipping, mechanical bonding, and surface imperfection. Once the concrete has begun to stiffen, the vibrators should avoid striking the reinforcing rods. Vibration of the rods at this stage may break the existing bond between the concrete and the rods.

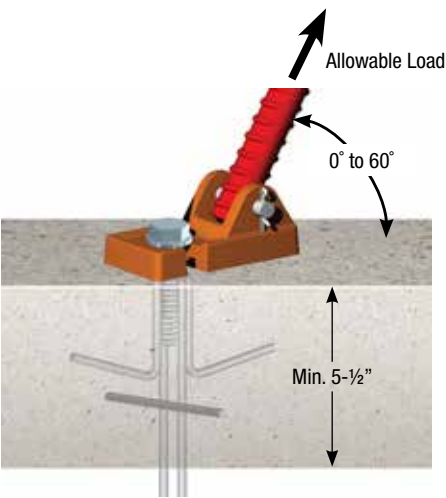
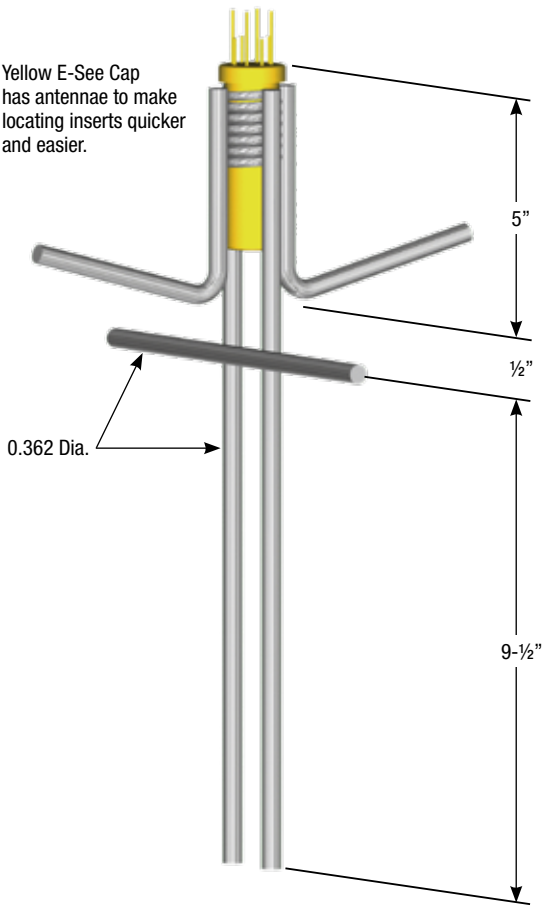
B-75 PATCH DATA

Item Number	Description	Unit Weight
MB45611	B-75 Patch	0.05 lbs



BIG-75 FLOOR SLAB INSERT

¾" diameter coil insert - Available in size shown only.



CB-2 COIL GRADE 5 COIL BOLTS



Product Code #MB291247 (std.)



Product Code #MBCB2FL075X4 (w/integral washer)

GROUNDING WALL BRACE INSERTS [BIG-75]

WORKING LOADS IN LBS. IN 2500 PSI CONCRETE, 2.0:1 SAFETY FACTOR			
Item Number	Min Conc. Thick. in inches	Allowable Angle	Allowable Load
MBBIG75	5-½"	0 to 60	9,470

*Use of coil bolts other than the MB C2 Coil Bolt may result in loss of brace stability.

MB SLAM ANCHOR

Built for Strength, Safety, Speed...

The Tilt-Up construction industry has long awaited the arrival of the most heralded brace-to-floor connection solution in recent years. The MB Slam Anchor was designed to address the shortcomings of existing brace-to-floor connectors.

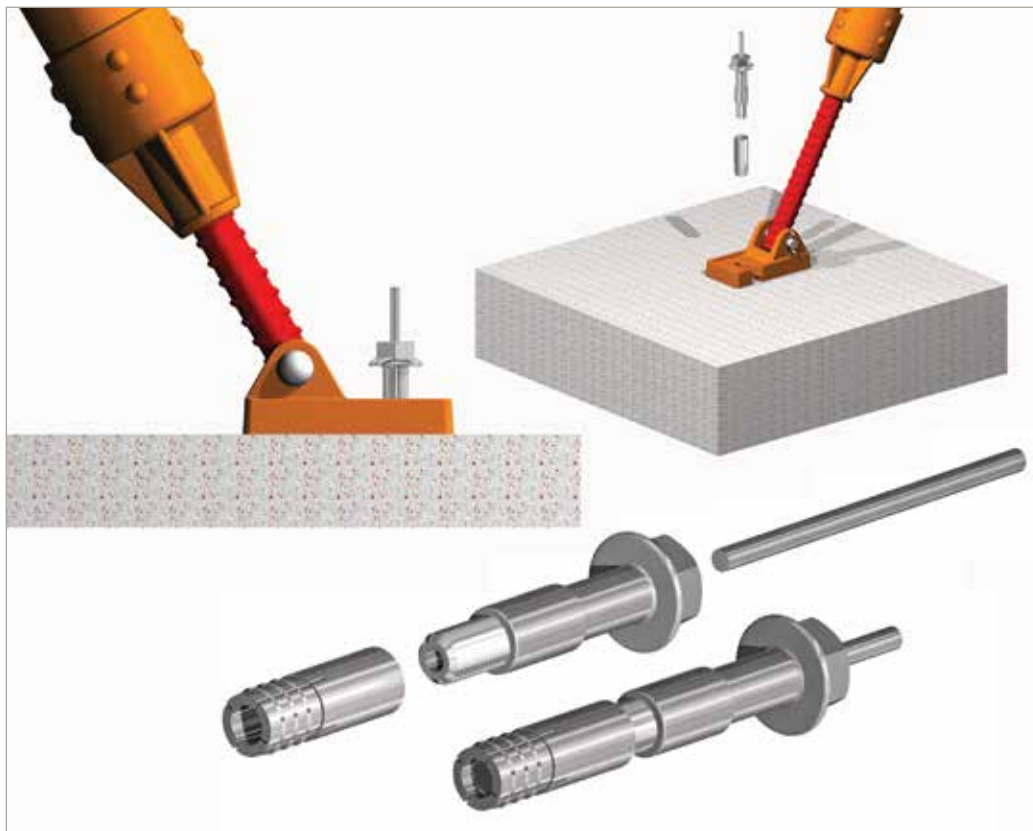
Strength: The objective was simply to create a brace-to-floor connection that will handle the maximum applied brace loads with a single bolt. The MB Slam Anchor carries a 9,000 lbs. load with a 2 to 1 safety factor.

Simplicity and Safety: We recognize that current brace-to-floor connections used in the field today can easily be improperly installed, resulting in serious safety hazards. Another objective with the Slam Anchor was to insure a virtually foolproof installation.

Speed: We know time is money. And with crane and crew waiting, we know that speed of installation is paramount.

No Torque or Retightening Required: The unique expansion mechanism is not a threaded connection, and therefore does not have a torque requirement and does not need to be retightened.

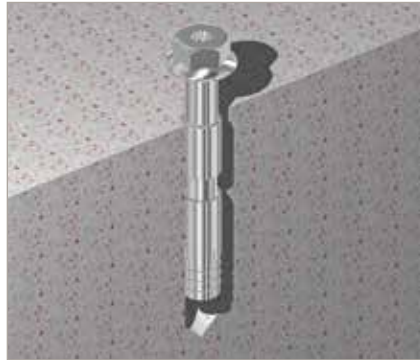
Economical: In addition to the savings in labor, the Slam Anchor is designed to be reusable. Only a small drop-in is expended at each use. We are confident that the Slam Anchor will be the brace-to-floor connection solution.





DRILL HOLE

- Determine the location of the brace shoe on the slab.
- Using a roto hammer, drill a $\frac{7}{8}$ " hole in the slab.
- Make sure that the hole is at least 6" deep or through the slab.
- If the hole does not completely penetrate the slab, make sure to clean it out completely.
- Screw "Drop-in" onto the end of the bolt, making sure to hand-tighten only. Do not over-tighten.

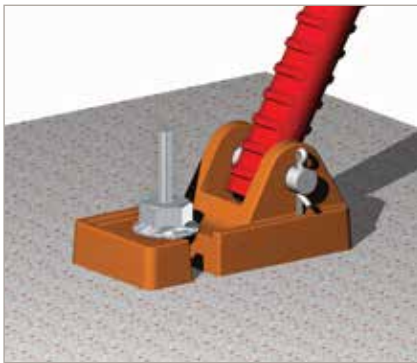


DROP MB SLAM ANCHOR IN HOLE

- Place bolt in the $\frac{7}{8}$ " hole and hammer until only the narrow ($\frac{3}{4}$ ") portion beneath the bolt head is visible.

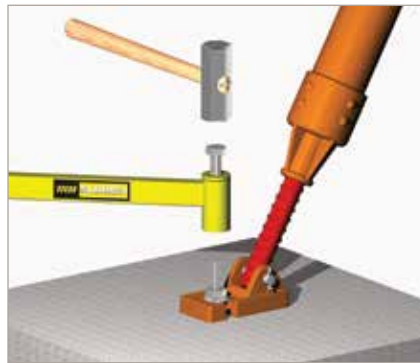


- Slide the brace shoe over the bolt.
- Drive the bolt the rest of the way down.

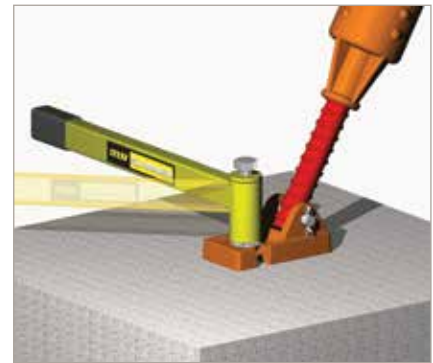


INSTALL SETTING PIN

- Insert pin into the hole in the center of the bolt.



- Place the specially designed MB SLAMMER setting tool over the pin and bolt, and pound the ram on the setting tool all the way down. A flush setting pin is assurance of a properly set anchor.



TIGHTEN BOLT

- Once the ram is driven all the way down, use the MB Slammer setting tool to check that the Slam Anchor is tightened down.
- This should be anywhere from an $\frac{1}{8}$ to $\frac{1}{4}$ of a turn. Remove the setting tool.

Eye protection should be worn during the installation of this product.
Setting pin should only be set using the MB Slammer setting tool.

MB BRACE BOLT

MB Brace Bolt safely and economically secures tilt-up braces to the slab without the inconvenience or uncertainty of cast-in-place inserts or expansion bolts. Pullout strength is equivalent to a cast-in-place insert without the problems of locating inserts and adjusting braces while the crane and crew wait. Convenience combines with economy in this reusable system. Nothing is left in the slab or wasted. When bracing is no longer needed, simply disengage the brace and remove bolt. The MB Brace Bolt can be used multiple times as long as the bolt continues to tighten up to the brace shoe but never more than 5 uses. Quality materials guarantee strength and durability.

INSTALLATION INSTRUCTIONS

1. Mark anchor location and drill a 20mm diameter straight hole at least 10" deep. Clean as much from the hole as possible by periodically lifting bit while drilling. The added depth is required to accommodate dust from drilling and thread cutting.
2. Turn bolt into the concrete to within 1" of the surface using a large $\frac{3}{4}$ " impact wrench with a 30mm socket.
3. Slide the Brace Shoe onto the bolt and continue tightening.

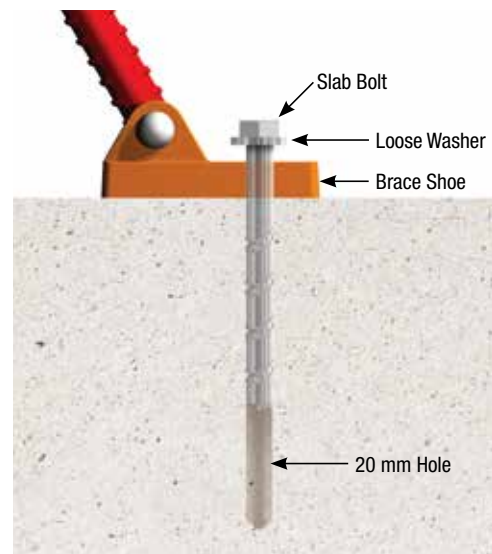
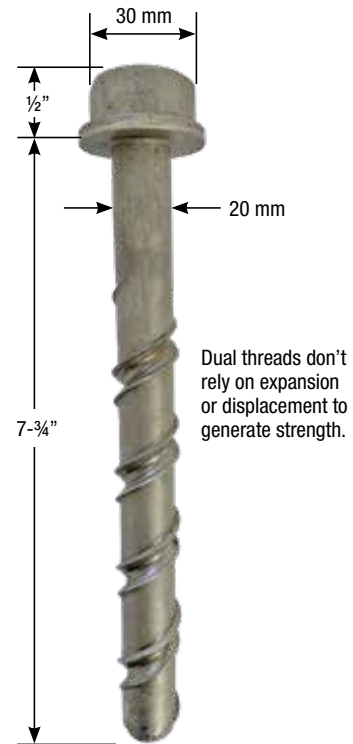
NOTES

1. If it is necessary to remove the bolt and re-install it, hand thread the bolt to start it in the original threads. This way new threads will not be cut through the original ones.
2. The Brace Bolt does not rely on expansion or displacement to generate its strength and is, therefore, not dependent on torque applied during installation to set it. Once it is tight, it is set.
3. It is not necessary to re-tighten the bolt after high winds unless it is visibly loose.
4. The use of excessively worn or undersized drill bits may prevent the bolt from threading.
5. The use of oversized drill bits may result in incomplete threading and premature failure.
6. Use of under-powered drills +/- impact wrenches may slow or prevent proper installation.

SLAB BRACE BOLT DATA

Item Number	Description	Shear Safety Factor 2:1*	Tension Safety Factor 2:1*	Unit Weight [lbs.]
MB45474	MB Slab Brace Bolt	14,435 lbs.	8,950 lbs.	1.15 lbs.

*Values for shear and tension in 3,000 psi standard weight concrete at 6" thick.





MB RAPID BOLT

MB Rapid Bolt safely and economically secures tilt-up and precast braces to the slab or other anchor points. It eliminates the inconvenience or uncertainty of cast-in-place inserts or expansion bolts. MB Rapid Bolt is designed for quick and easy installation in single-use applications for tilt-up and precast concrete panels.

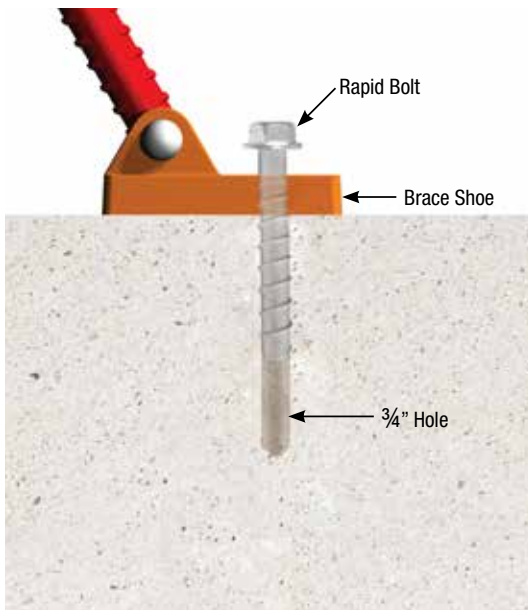
INSTALLATION INSTRUCTIONS

1. Mark anchor location and drill $\frac{3}{4}$ " diameter straight hole. Hole depth should accommodate full bolt penetration by the following methods:
 - a. 7" deep hole with hole cleaned to remove concrete fines.
 - b. Drill through slab.
2. Install the bolt through the brace shoe and drive the anchor down with a 200 FT-LB torque

WARNING: Over torquing can damage the anchor and reduce the capacities

NOTES

1. Refer to TCA Bracing Guidelines which suggest inspections of brace connections after jobsite experiences 35+MPH winds
2. The use of excessively worn or undersized drill bits may prevent the bolt from threading.
3. The use of oversized drill bits may result in incomplete threading and premature failure.
4. Use of under-powered drills +/- impact wrenches may slow or prevent proper installation.



Single Use MB Rapid Bolt ($\frac{3}{4}$ "x6")

Item Number	Description	Slab Thickness	Brace Load at 3,000 psi concrete	Brace Load at 4,000 psi concrete	Unit Weight
MB45484	MB Rapid Bolt	4"	4,300 lbs	4,950 lbs	1.05 lbs
		5"	6,300 lbs	7,300 lbs	
		6"	8,100 lbs	9,300 lbs	

1. Values are based on a 2:1 SF
2. 12" minimum edge distance
3. Resultant determined with a 60° brace angle.
4. Requires use of MB Brace Shoe & MB Brace.
5. This bolt is approved for single use only

MB BRACE BADGER HELICAL ANCHOR SYSTEM

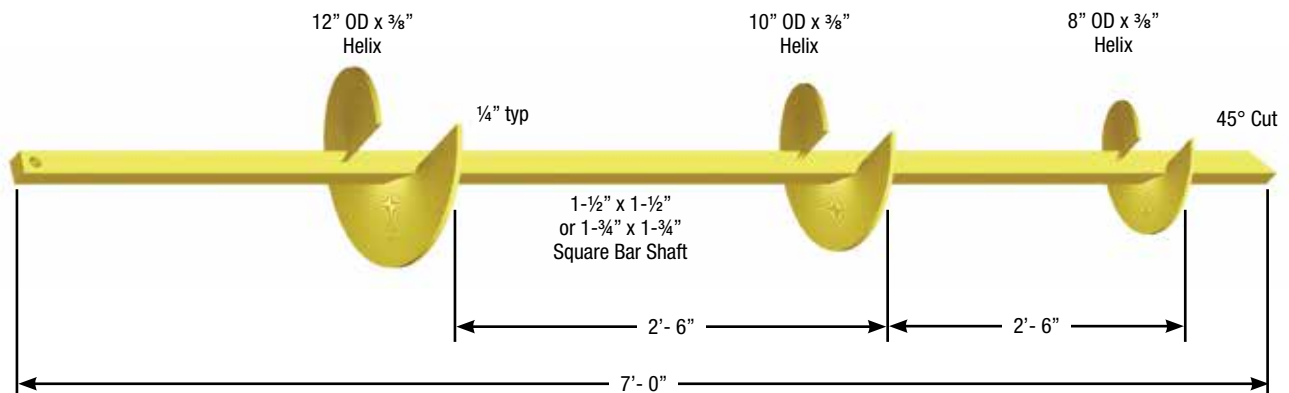
There are times in tilt-up construction when conventional bracing to floor slabs is not desired. Concrete deadmen can be expensive, time-consuming, or impractical due to jobsite conditions. The Meadow Burke Brace Badger(TM) provides contractors with an economical and efficient alternative.

MB BADGER ADVANTAGES INCLUDE:

- eliminates concrete deadmen
- environmentally friendly
- offers quick installation and removal
- the strongest brace anchor available
- verifiable load capacity in all soil conditions
- works with **ALL** Meadow Burke braces
- reusable

PRODUCT SPECIFICATIONS:

The MB Brace Badger is pre-engineered for superior results in tilt-up applications. It consists of three helix plates welded to a 1-1/2" or 1-3/4" square bar shaft. Each helix plate is specially formed from 3/8" x 44 ksi steel plate. Our shaft steel has a typical yield strength of 95 ksi, and a typical tensile strength of 130 ksi, making it the strongest helical anchor available in the industry!



BRACE BADGER DATA

	Brace Badger	5' Extension	6' Extension
1 1/2" Diameter Shaft	MB580002	MB580006	N/A
1 3/4" Diameter Shaft	MB580002EHD	MB580006EHD5 PLN	MB580006EHD-6PLN

CAPACITY TO TORQUE RATIO

Helical anchor installation involves screwing the anchor into the ground and applying a constant downward force. The holding capacity of the anchor is proportionate to the final installation torque. The following equation can be used to determine holding capacity.

$$\text{Badger Capacity} = K \times T$$

where K = Torque constant
 T = Final installation torque

The K value is reliant on the geometry of the helix pier. For helical anchors with square shaft dimensions less than 2", a value of 10 is suggested by Hoyt and Clemence (1989) and the Tilt-Up Concrete Association. This K value is applicable for all 1.50" square shaft anchors.

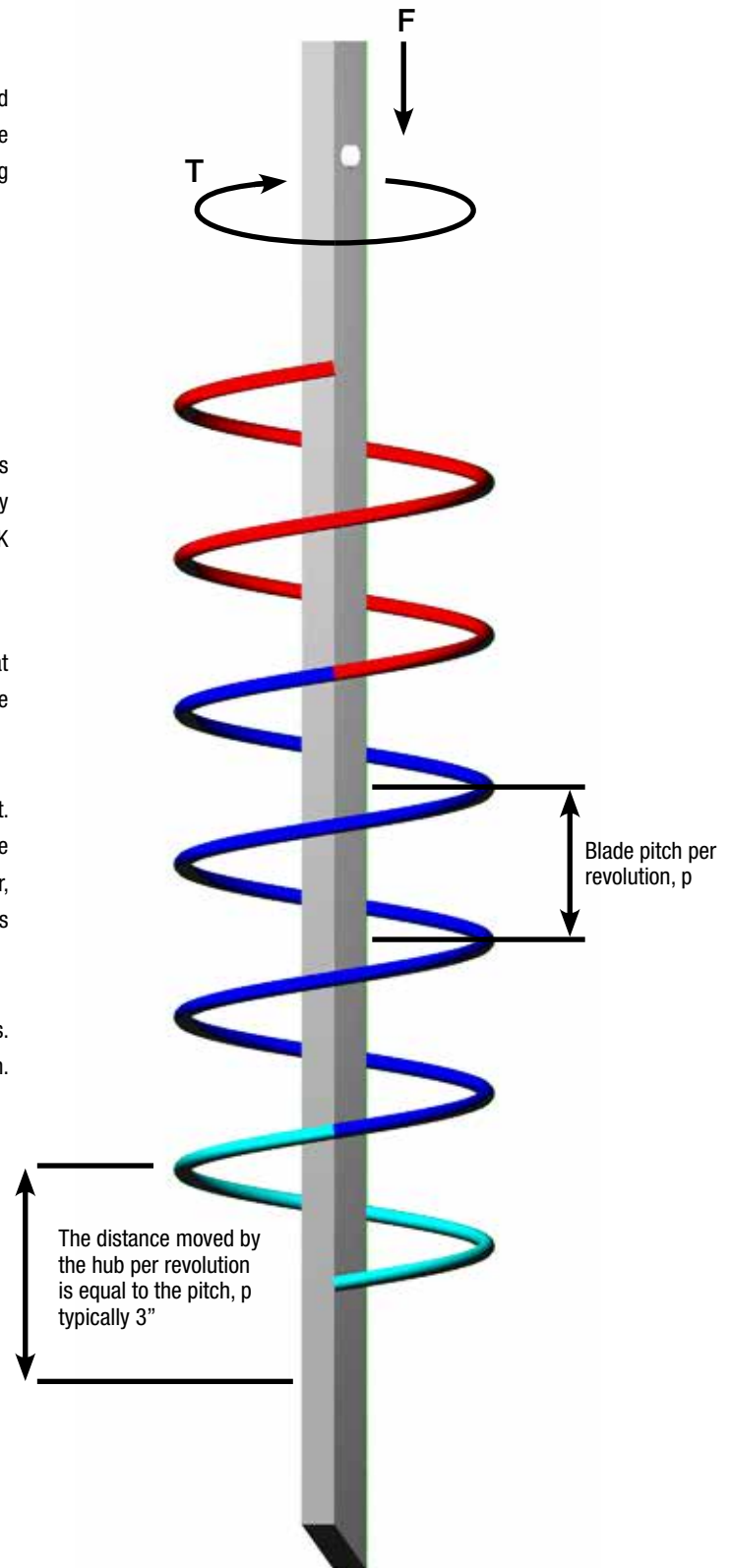
The T value must be measured during installation. In general, soil that requires more torque to penetrate will hold the brace badger more strongly once installed.

Before using the Brace Badger, it is good practice to consult a soil report. Suitable soil has a Standard Penetration Test (SPT) blow counts value (N) between 10 and 30. If suitable soil is below the topmost 10' layer, extensions may be required reach suitable soil. Up to two extensions may be used with the Brace Badger.

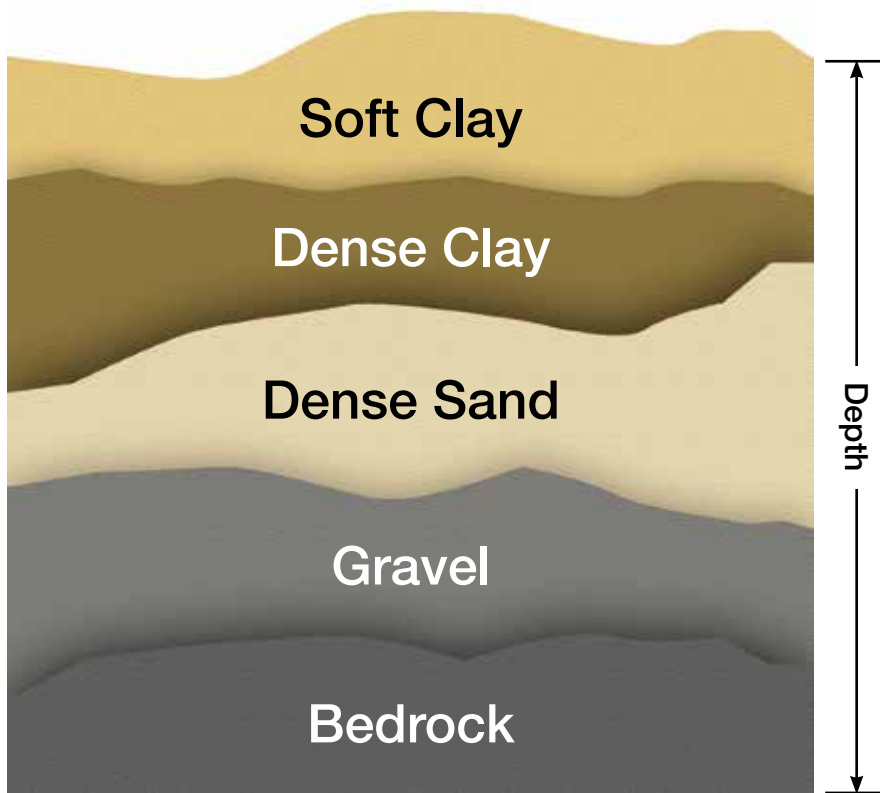
See the Installation Requirements section on page 97 for more details. To discuss specific cases, Leviat engineers are available for consultation.



Typical MB Brace Badger Installation



SOIL MECHANICS



The capacity of the MB Brace Badger is the result of the strength of the surrounding soil because the loading force is transferred to the soil. There are typically two types of soils: cohesive and cohesionless. Cohesive soils are defined as soils whose internal angle of friction is approximately zero ($\phi = 0$) while cohesionless soils are those whose internal angle of friction is greater than zero ($\phi > 0$).

Soil naturally tends to develop in layers or strata, each with individual strength characteristics, and the figure above illustrates this stratification. As the Badger is drilled into the ground, it will pass through different layers. Because each layer has different characteristics, different torque values will be observed as the anchor passes through each layer. During an ideal installation, the torque values will be constantly increasing, indicating the anchor is being inserted into more dense soil. If a drop in torque is recorded, it is most likely that a soft layer (such as soft clay) was found. The Badger must then be installed through the soft layer until a more dense soil (i.e. higher torque) is found.

Tilt-up construction using the MB Brace Badger Helical Anchor System



INSTALLATION



A variety of rotary hydraulic equipment can be used to install the MB Brace Badger including but not limited to: skidsteers, excavators, and boom mounted utility trucks.

The installer should maintain a continuous downward pressure on the MB Brace Badger to avoid auguring during installation.

Throughout the installation of each MB Brace Badger the torque is continuously monitored and recorded. There is a direct relationship between installation torque and Badger capacity. Continuous monitoring and recording of torque throughout installation gives a profile of the soil conditions.

Up to two extensions can be added to install the Badger deeper to reach the stronger soils and attain the required load capacity. After the Badger is installed, a Badger Connector is bolted to the top of the Badger. The Super Brace shoe is removed and the Doka rod of the Super Brace is bolted between the ears of the connector. To remove the Badger, simply reverse the hydraulic motor and back it out of the ground. It is ready for immediate inspection and reuse.

INSTALLATION REQUIREMENTS

1. Installation is performed by a MB Brace Badger Systems trained installer.
2. Using a hydraulic drive head, Brace Badgers (Item # MB580002 or MB580002EHD) are installed to a torque of 2,200 ft-lbs. If the minimum required torque is not achieved with a single anchor, please contact Meadow Burke engineering for assistance. Up to two extensions (Item #MB58006, MB58006EHD5 PLN, or MB58006EHD-6PLN) may be added until the torque minimum torque requirement is achieved. It is recommended that preliminary soil logs at the site be obtained to help predict project requirements. In softer soils with Standard Penetration Test (SPT) blow counts (N) less than 10, an extension may be required. Installation in rocky soils with blow counts (N) greater than 30 is not recommended. Also, frozen soils may require pre-auguring so that the anchor can reach below the frost line.
3. Maximum allowable installation torque is 7,000 ft-lbs.
4. Records of required installation torque for each Badger are required.
5. Badgers to be installed in-line with the axis of the brace (+/- 5°).
6. Welding, cutting, or any modification of the Badger or its components is prohibited.
7. MB Badger Connector (item # MB580004 for 1-1/2" Badger or MB58004EHD for 1-3/4" Badger) must be used for brace connection. To connect to brace, remove brace shoe and reuse 5/8" bolt for connector. Connector to Badger requires one 3/4"Ø x 3 1/2" grade 5 bolt.

SAFETY NOTES

1. The contractor shall locate all the subsurface structures and utilities. Any subsurface structure or utility in the vicinity of the Badger locations shall be clearly marked. Horizontal Clearance of anchor from any subsurface structure or utility shall be no less than 5'-0" at the depth of the utility Installation of Badgers underneath utilities or subsurface structures is strictly prohibited.
2. Do not use damaged or worn Brace Badgers. Failure to inspect and replace damaged anchors may result in anchor failure.
3. The contractor is to undergo preventive measures to mitigate soil erosion adjacent to installed anchors.
4. Any changes resulting from actual installation conditions of the Badger requires that the contractor contact Meadow Burke Engineering for further assistance to determine adequacy of anchor system.

CORRECT CONNECTION

Remove the brace shoe. Use the approved MB Badger Connector (item # MB580004 or MB580004EHD) to attach bracing to the MB Brace Badger.

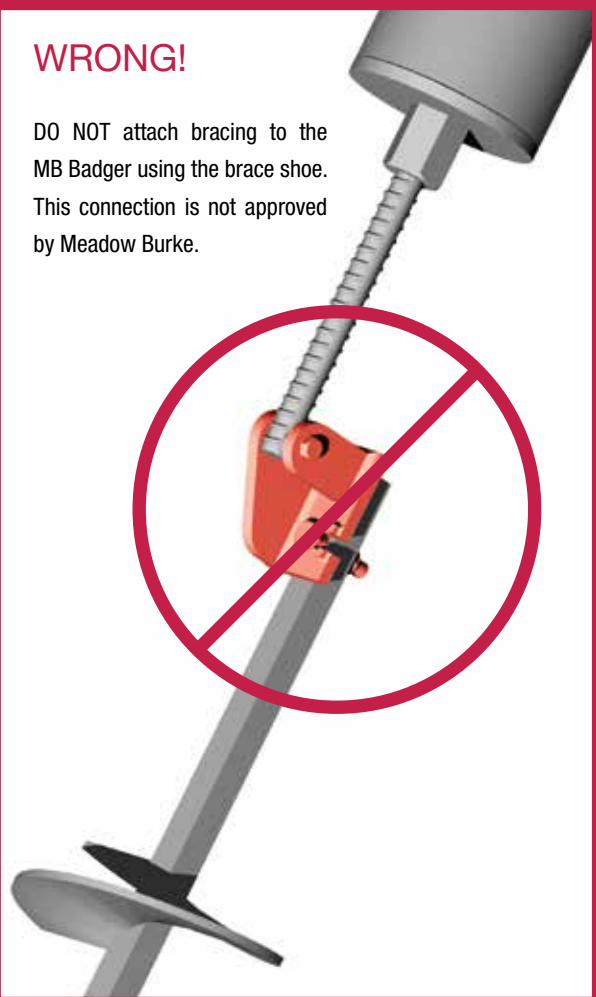
MB Super Brace

MB Badger Connector
(item # MB580004 or
MB580004EHD)

MB Brace Badger

WRONG!

DO NOT attach bracing to the MB Badger using the brace shoe. This connection is not approved by Meadow Burke.



Panel Connections



Super Lynk

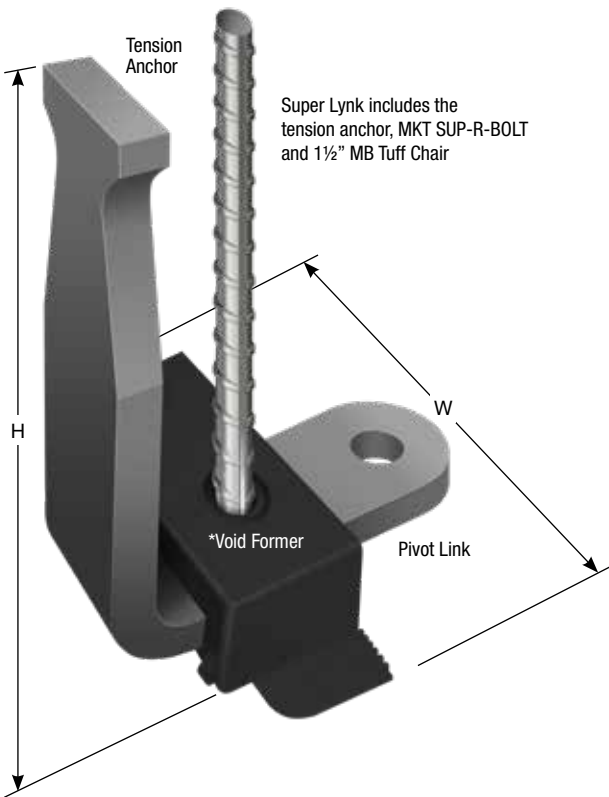
SUPER LYNK IS A PANEL-TO-FOUNDATION CONNECTION SYSTEM THAT ELIMINATES THE NEED FOR EPOXY OR GROUTED ANCHORS AND FIELD WELDS

HEIGHTENED PERFORMANCE AND REDUCED VISIBILITY

Super Lynk is a fast, strong and discrete way to permanently connect concrete panels to footings. It requires only a single bolt to make the connection and can easily be concealed within the normal grout line process.

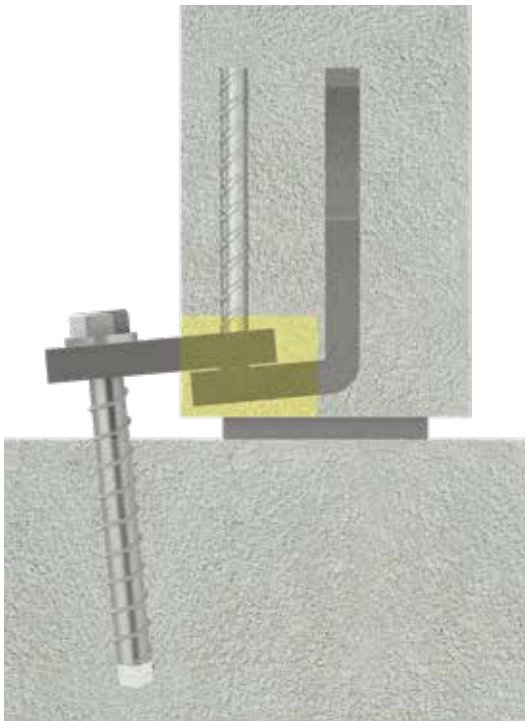
FEATURES:

- **Saves time and money:** The single bolt connection is simple and quick to install while eliminating the need for epoxy, grout and in-field welding,saving you time and money.
- **Improved performance:** The engineered, patented connection system has been developed by Meadow Burke's team of Tilt-Up experts to meet ACI 318-14 16.2.4.3 (b).
- **Improved aesthetics:** With a profile less than 2½" , the Super Lynk is discrete relative to alternative connection systems and can easily be concealed by normal backfill and landscaping.



SUPER LYNK DATA					
Item Number	Tension Load	Width (in)	Height (in)	Min. Panel Thickness (in)	Weight per Unit (lbs)
MBSLYNK	10,000 lbs	8"	10"	6"	10.5 lbs

1. Published Ultimate Load is based on 2,500 psi concrete
2. 8" Minimum edge distance for MKT SUP-R-Bolt.
3. Minimum edge distance to end of panel is 12". Minimum o.c. spacing is 24".
4. Super Lynk shipment includes one 1 ½" tall MB Tuff Chair, one ¾" x 10" MKT SUP-R-BOLT, and black void former



US PATENT 10,577,789

Super Lynk Installation



STEP 1 – Attach to the form

- Attach the anchor to the bottom corner of the concrete panel form with the use of screws or nails through the side tabs of the void and into the wood form.
- Use a plastic 1 ½" MB Tuff Chair to support the weight of the anchor and hold embossed side of the void flat to the bottom of the panel and tight to the form.



STEP 2 – Remove Void Cover

- Following panel erection, remove the void cover, revealing the Pivot Link.



STEP 3 – Access Pivot Link

- Rotate the Pivot Link until it protrudes outside of the panel face.



STEP 4 – Drill the anchor hole

- Mark the location for the drill hole beneath the eye of the Pivot Link.
- Using the proper drill bit size, drill a ¾" hole into the base material to the required depth of 9". The tolerances of the drill bit used should meet the requirements of ANSI standard B212.15.
- Remove dust and debris from hole during drilling (e.g. dust extractor, hollow bit) or following drilling (e.g. suction, forced air) to extract loose particles created during drilling.



STEP 5 – Anchor into the foundation

- Using a maximum torque of 150 ft-lbs, an impact wrench rating not exceeding 380 ft-lbs, and 1 ½" hex socket/driver, mount the Screw Anchor head into the socket.
- Drive the MKT SUP-R-BOLT until the head of the anchor comes in contact with the Lynk. The screw anchor washer head must be snug after installation. Do not spin the hex socket off the anchor head when disengaging.



STEP 6 – Panel is permanently connected to the foundation

- The normal grouting process around the bottom of the panel should be followed to include the Super Lynk and bolt head. This grout encasement will fill any gap between the Super Lynk and footing to provide a uniform finish, and avoid any potential for lateral movement.

Super Lynk SR with Shear Resistance

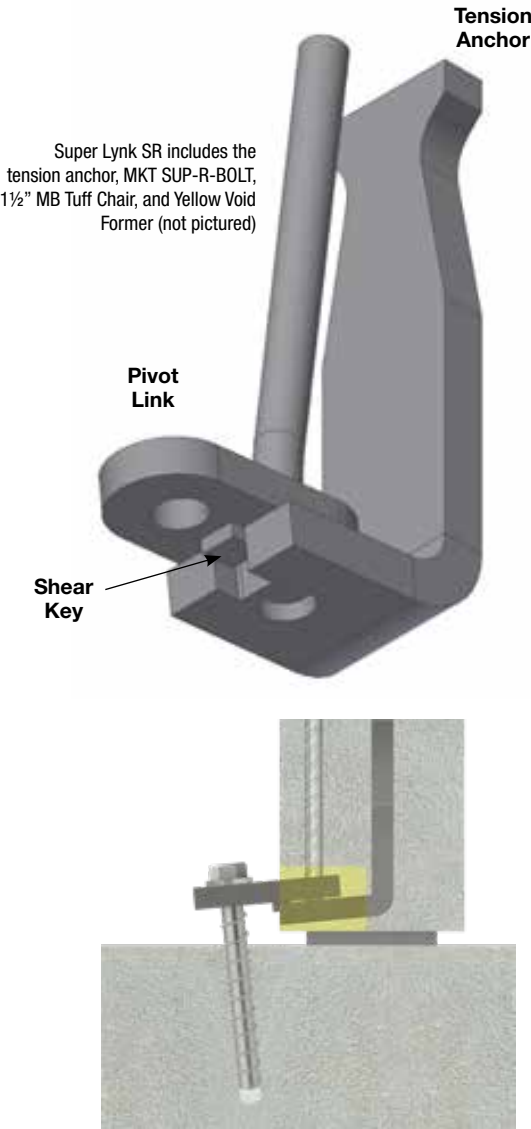
SUPER LYNK SR IS A PANEL-TO-FOUNDATION CONNECTION SYSTEM THAT ELIMINATES THE NEED FOR EPOXY OR GROUTED ANCHORS AND FIELD WELDS

HEIGHTENED PERFORMANCE AND REDUCED VISIBILITY

Super Lynk SR is a fast, strong, and discrete way to permanently connect concrete panels to footings. It requires only a single bolt to make the connection and can easily be concealed within the normal grout line process.

FEATURES:

- **Shear Resistance:** The advanced Shear Key design resists shear loads.
- **Saves time and money:** The single bolt connection is simple and quick to install while eliminating the need for epoxy, grout, and in-field welding, saving you time and money.
- **Improved performance:** The engineered, patented connection system has been developed by Leviat's team of Tilt-Up experts to meet ACI 318-14 16.2.4.3 (b).
- **Improved aesthetics:** With a profile less than 2½", Super Lynk SR is discrete relative to alternative connection systems and can easily be concealed by normal backfill and landscaping.

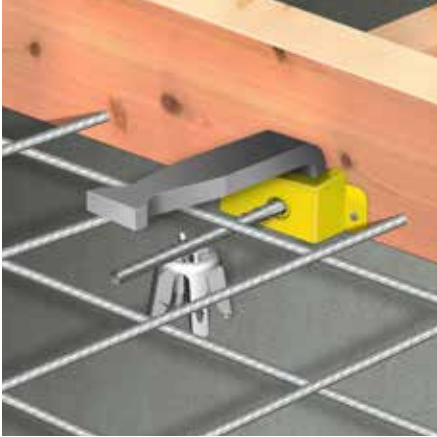


SUPER LYNK SR DATA						
Item Number	Void Former Color	Tension Load	In-plane Shear Load	Out-of-plane Shear Load	Min. Panel Thickness	Weight per Unit
MBSLYNKSR	YELLOW	10,000 lbs	7,000 lbs	7,000 lbs	6"	10 ½ lbs

1. Published Ultimate Load is based on 3,000 psi concrete
2. Published Ultimate Shear Loads are resultant capacity loads.
3. 8" Minimum edge distance for MKT SUP-R-Bolt.
4. Minimum edge distance to end of panel is 12". Minimum o.c. spacing is 24".
5. Super Lynk SR shipment includes one 1½" tall MB Tuff Chair, one ¾" x 10" MKT SUP-R-BOLT, and yellow void former.
6. Recommended strength reduction factor (Φ) for LRFD design: $\Phi = 0.65$ for both Tension and Shear.

US PATENT 10,577,789

Super Lynk SR Installation



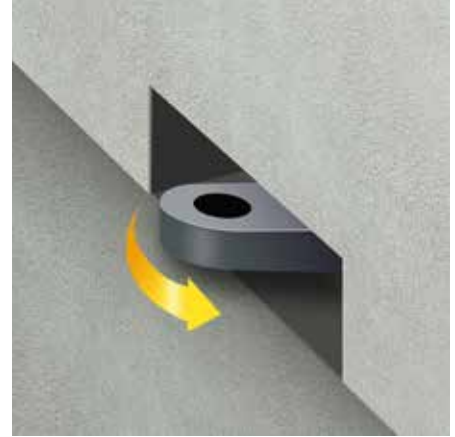
STEP 1 – Attach to the form

- Attach the anchor to the bottom corner of the concrete panel form with the use of screws or nails through the side tabs of the void and into the wood form.
- Use a plastic 1½" MB Tuff Chair to support the weight of the anchor and hold embossed side of the void flat to the bottom of the panel and tight to the form.



STEP 2 – Remove Void Cover

- Following panel erection, remove the void cover, revealing the Pivot Link.



STEP 3 – Access Pivot Link

- Rotate the Pivot Link until it protrudes outside of the panel face and the shear key has fallen into place.
- Verify shear key is in place.



STEP 4 – Drill the anchor hole

- Mark the location for the drill hole beneath the eye of the Pivot Link.
- Using the proper drill bit size, drill a ¾" hole into the base material to the required depth of 9". The tolerances of the drill bit used should meet the requirements of ANSI standard B212.15.
- Remove dust and debris from hole during drilling (e.g. dust extractor, hollow bit) or following drilling (e.g. suction, forced air) to extract loose particles created during drilling.



STEP 5 – Anchor into the foundation

- Using a maximum torque of 150 ft-lbs, an impact wrench rating not exceeding 380 ft-lbs, and a 1½" hex socket/driver, mount the MKT SUP-R-BOLT head into the socket.
- Drive the MKT SUP-R-BOLT until the head of the anchor comes in contact with the Lynk. The screw anchor washer head must be snug after installation. Do not spin the hex socket off the anchor head when disengaging.



STEP 6 – Panel is permanently connected to the foundation

- The normal grouting process around the bottom of the panel should be followed to include the Super Lynk SR and bolt head. This grout encasement will fill any gap between the Super Lynk SR and footing to provide a uniform finish, and avoid any potential for lateral movement.

Burke Slot Insert

MX-55 BURKE SLOT INSERT

The MX-55 Burke Slot Insert is a high strength precast insert designed for use with threaded straps. The unit has a sealed nut box to prevent concrete from leaking into the insert. Removal of the perforated slot-seal exposes the slot for quick connection of the strap. The insert is available furnished with a $\frac{3}{4}$ " NC threaded nut with a hot dip galvanize finish.

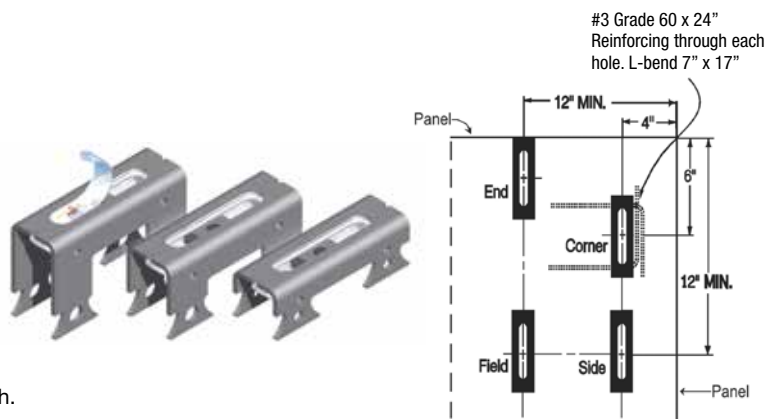
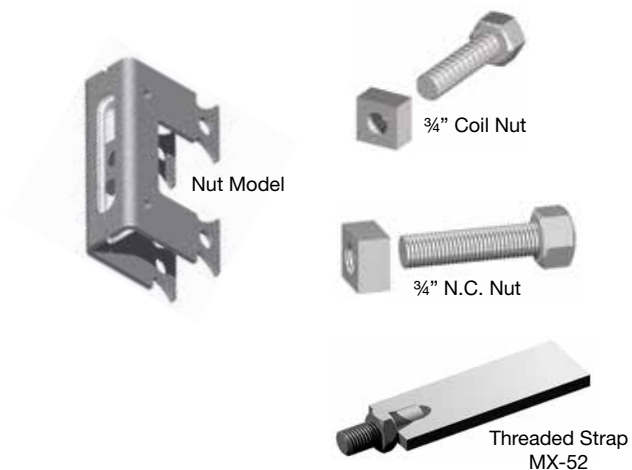
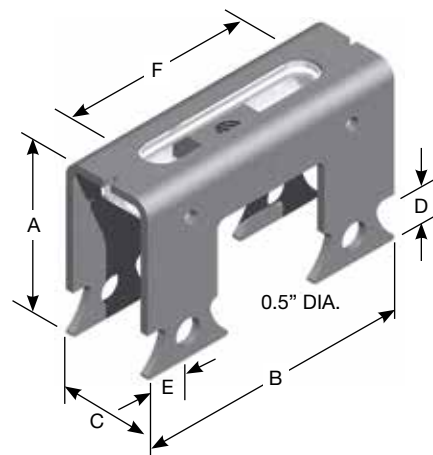
MX-55 SLOT INSERT DIMENSIONS						
Item Base Number	A	B	C	D	E	F
MB79621	2"	6.5"	2.125"	0.625"	1.0"	4.5"
MB79631	3"	6.5"	2.125"	0.625"	1.0"	4.5"
MB79641	4"	6.5"	2.125"	0.625"	1.0"	4.5"

MX-55 SLOT INSERT MODELS			
Item Base Number	$\frac{3}{4}$ " N.C. NUT MODEL		
	A	Finish	Weight
MB79621Y	2"	Mill	1.6 lbs
MB79621YG	2"	Galv	1.7 lbs
MB79631Y	3"	Mill	2.3 lbs
MB79631YG	3"	Galv	2.4 lbs
MB79641Y	4"	Mill	3.1 lbs
MB79641YG	4"	Galv	3.2 lbs

MX-55 SLOT INSERT LOAD CAPACITIES				
Insert Position	Type of Force	Ultimate Loads in Pounds		
		2" Depth	3" Depth	4" Depth
Field	Tension	13,400 lbs	15,550 lbs	19,230 lbs
Field	Shear	18,170 lbs	20,000 lbs	20,000 lbs
Slide	Tension	8,430 lbs	13,460 lbs	15,260 lbs
Slide	Shear	9,080 lbs	10,500 lbs	10,500 lbs
Corner	Tension	7,950 lbs	13,790 lbs	17,950 lbs
Corner	Shear	9,000 lbs	9,930 lbs	11,320 lbs
End	Tension	4,200 lbs	10,610 lbs	14,011 lbs
End	Shear	15,453 lbs	16,583 lbs	18,000 lbs

Ultimate loads based on 5000 psi minimum concrete strength.

To order, specify: quantity, name and item number.

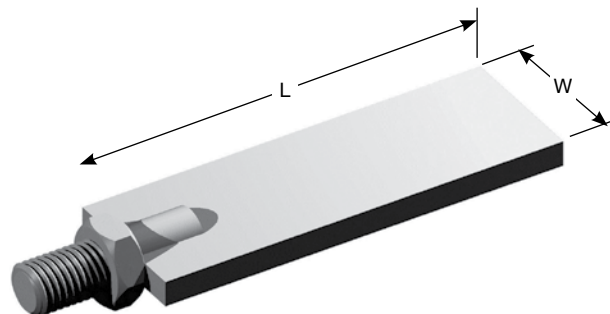


Burke Slot Insert Strap

MX-52 BURKE SLOT INSERT STUD STRAP

The MX-52 Slot Insert Stud Strap is used in conjunction with the Slot Insert supporting a $\frac{3}{4}$ " NC threaded nut. The Stud Strap is screwed into the insert's nut, rotated to the correct angle and then securely locked in position by the strap's free-running jam nut.

MX-52 BURKE STUD STRAP				
Item Number	Length	Width	Thickness	Weight
MB79706 (G)	6"	2"	.375"	1.3 lbs
MB79708 (G)	8"	2"	.375"	1.7 lbs
MB79710 (G)	10"	2"	.375"	2.2 lbs
MB79712 (G)	12"	2"	.375"	2.6 lbs

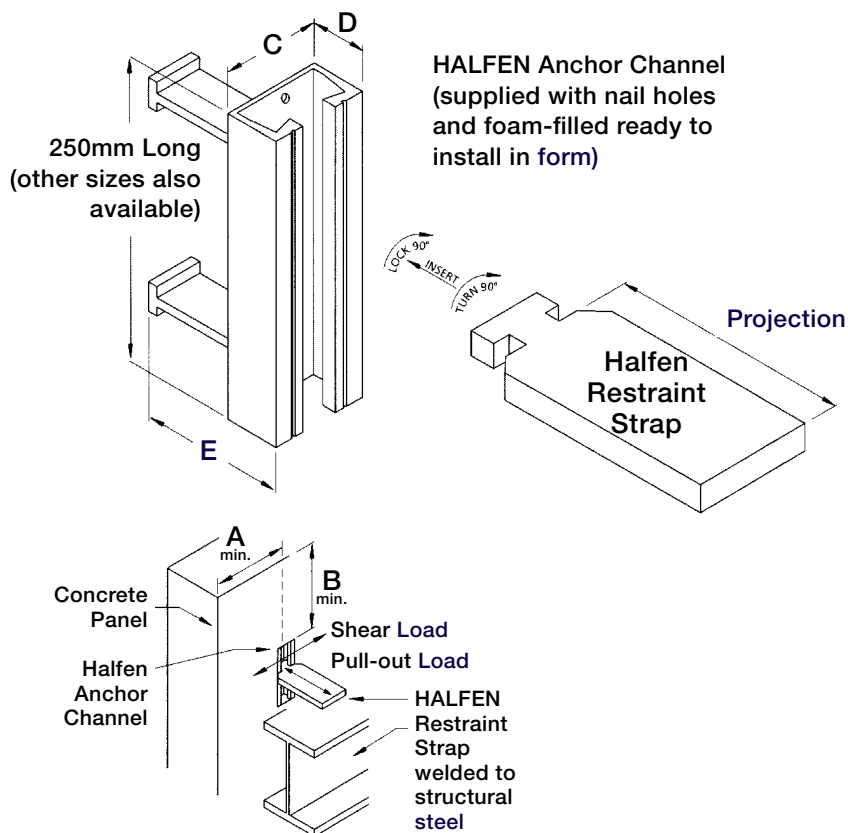


To order, specify: quantity, name and item number.

Adjustable Panel Connection

HALFEN Cast-In Anchors provide simple adjustable connections for the restraint of concrete panels. When used with the hardware illustrated, sliding or fixed connections can be selected.

Restraint Strap Selection Chart			
For use with HTA		50/30	
Allowable Tension Load lb (kN)		7,900 (35.1)	
Allowable Shear Load lb (kN)		4,550 (20.2)	
Projection		Part Numbers	
Inches	(mm)	Mill Finish	Hot Dipped Galv.
6	(152)	MBHR5060	MBHR5062
8	(203)	MBHR5080	MBHR5082
10	(254)	MBHR5100	MBHR5102
12	(305)	MBHR5120	MBHR5122



Adjustable Bolted Corner Connection

LEVIAT'S BEST-IN-CLASS PORTFOLIO OF HALFEN ANCHOR CHANNELS AND T-BOLTS SPECIFICALLY ENGINEERED FOR PANEL CORNER CONNECTIONS.

BENEFITS OF ADJUSTABLE BOLTED CONNECTION:

- **REDUCED LABOR COST** – as bolted connections can be installed by the same crew members that erected the panels
- **NON-WELDABLE CONNECTION** – no need for a certified welder or welding inspection as only a torque wrench is required for installation
- **ADJUSTABLE CONNECTION** – which counteracts construction problems caused by foundation elevation issues or panel placement inconsistencies.
- **SIMPLIFIED CONNECTION** – channel connections are easily adjustable and can be made in any weather condition
- **REDUCED OVERALL CONSTRUCTION TIMES** – by eliminating the labor-intensive installation and time-consuming inspection procedures associated with traditional weld plates and field welding.

Halfen adjustable channel corner connection kits are available in two standard profiles for minimum wall panel thicknesses of 6" and 8".



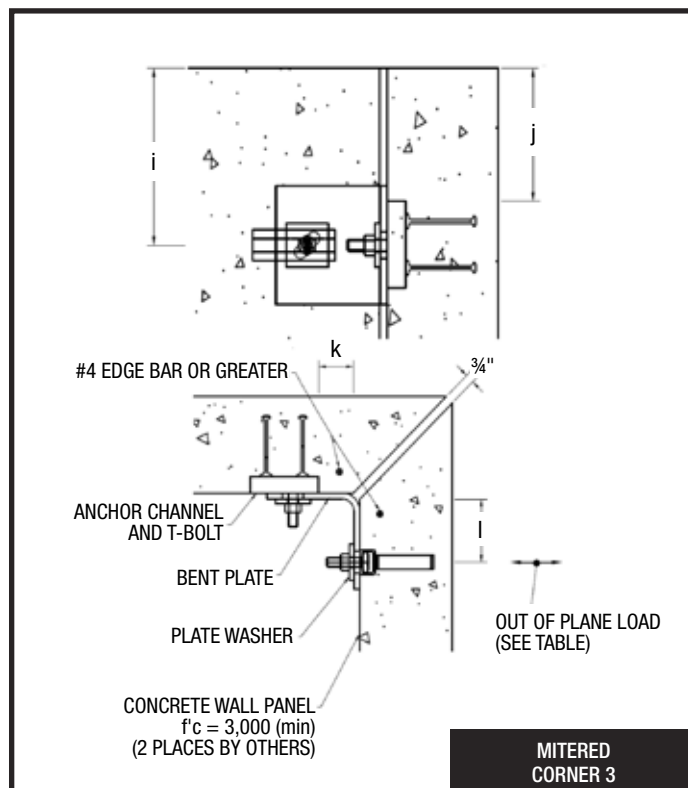
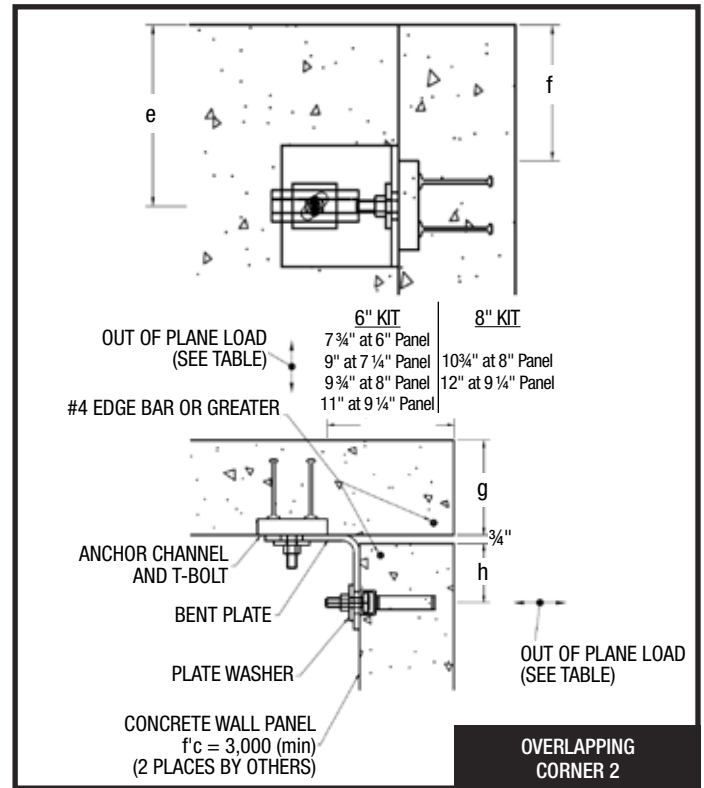
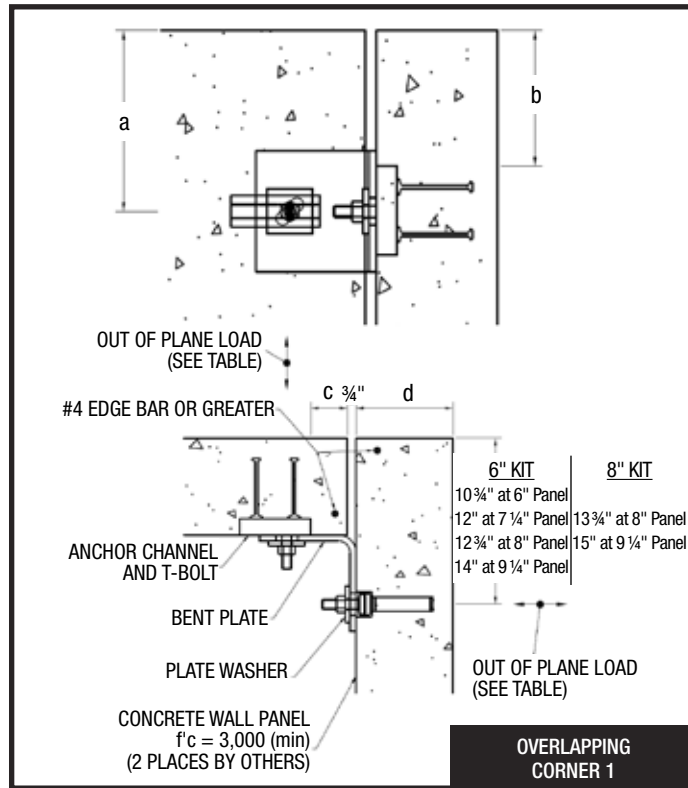
**HZA DYNAGRIP®
Toothed Anchor
Channel**



Kit Item Name	Concrete Strength	Design Capacity	Kit Part Number	Kit Items	Kit Qty	Item Number
Corner Assembly 90 Degree 6" (Kit)	3,000 psi	1,500 lbs	0105.899-00006	L7x7x3/8x7" Bent Plate	1	0105.899-00010
	4,000 psi	1,750 lbs		3x3x3/8" plate washer, M16	2	0105.899-00020
	5,000 psi	2,000 lbs		HZA-BA 38/23-HDG- 150/2	2	2002.020-00502
				HZS 38/23 M16x 60 HDG 8.8 (US)	2	0352.068-00202
Corner Assembly 90 Degree 8" (Kit)	3,000 psi	2,600 lbs	0105.899-00008	8x8x1/2x 8" Bent Plate	1	0105.899-00015
	4,000 psi	3,000 lbs		3x3x3/8" plate washer, M20	2	0105.899-00022
	5,000 psi	3,400 lbs		HZA 53/34 HDG-150 (US)	2	0002.050-00501
				HZS 53/34 M20 x 65 GV-S8.8	2	0352.080-00003

For more information contact engineeringssupport@leviat.us

Standard Corner Connections



Dimension	6" Kit	8" Kit
a	9" (min)	12" (min)
b	6" (min)	9" (min)
c	2"	3"
d	6" (min)	8" (min)
e	9" (min)	12" (min)
f	6" (min)	9" (min)
g	6" (min)	9" (min)
h	4"	5"
i	9" (min)	12" (min)
j	6" (min)	9" (min)
k	2"	3"
l	4 1/4"	5 1/4"

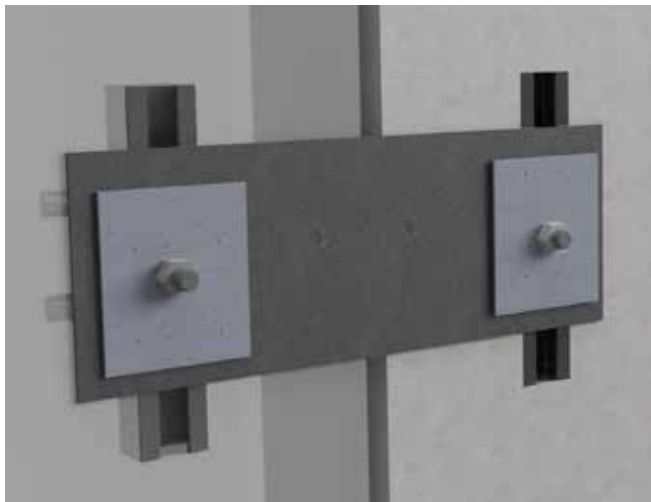
Engineer of Record to specify number of connections per joint and max connection spacing (min. connection spacing = 18" O.C. for 6" panel kit, 24" O.C. for 8" panel kit)

#4 Edge bar or greater required between anchor channel and edge.

NOTES:

1. Out of plane loads are assumed to act on one side of corner at any point in time.
2. Horizontal Anchor Channel allows for +/- 1" left/right tolerance.
3. Vertical Anchor Channel allows for +/- 2" up/down tolerance.
4. Each side of bracket allows for +/- 0.5" left/right & up/down tolerance.

For more information contact engineeringssupport@leviat.us



Adjustable Bolted Inline Panel to Panel Connection

LEVIAT'S BEST-IN-CLASS PORTFOLIO OF HALFEN ANCHOR CHANNELS AND T-BOLTS SPECIFICALLY ENGINEERED FOR INLINE PANEL TO PANEL CONNECTIONS.

Occasionally, loading on the building envelope requires adjacent wall panels to be connected. Traditionally, this is accomplished through expensive and time-consuming welding operations.

BENEFITS OF ADJUSTABLE BOLTED CONNECTION:

- **REDUCED LABOR COST** – as bolted connections can be installed by the same crew members that erected the panels
- **NON-WELDABLE CONNECTION** – no need for a certified welder or welding inspection as only a torque wrench is required for installation
- **ADJUSTABLE CONNECTION** – which counteracts construction problems caused by foundation elevation issues or panel placement inconsistencies.
- **SIMPLIFIED CONNECTION** – channel connections are easily adjustable and can be made in any weather condition
- **REDUCED OVERALL CONSTRUCTION TIMES** – by eliminating the labor-intensive installation and time-consuming inspection procedures associated with traditional weld plates and field welding.

Halfen Inline Panel to Panel Connection Kit is available in a standard profile for minimum wall panel thicknesses of 6". Kit

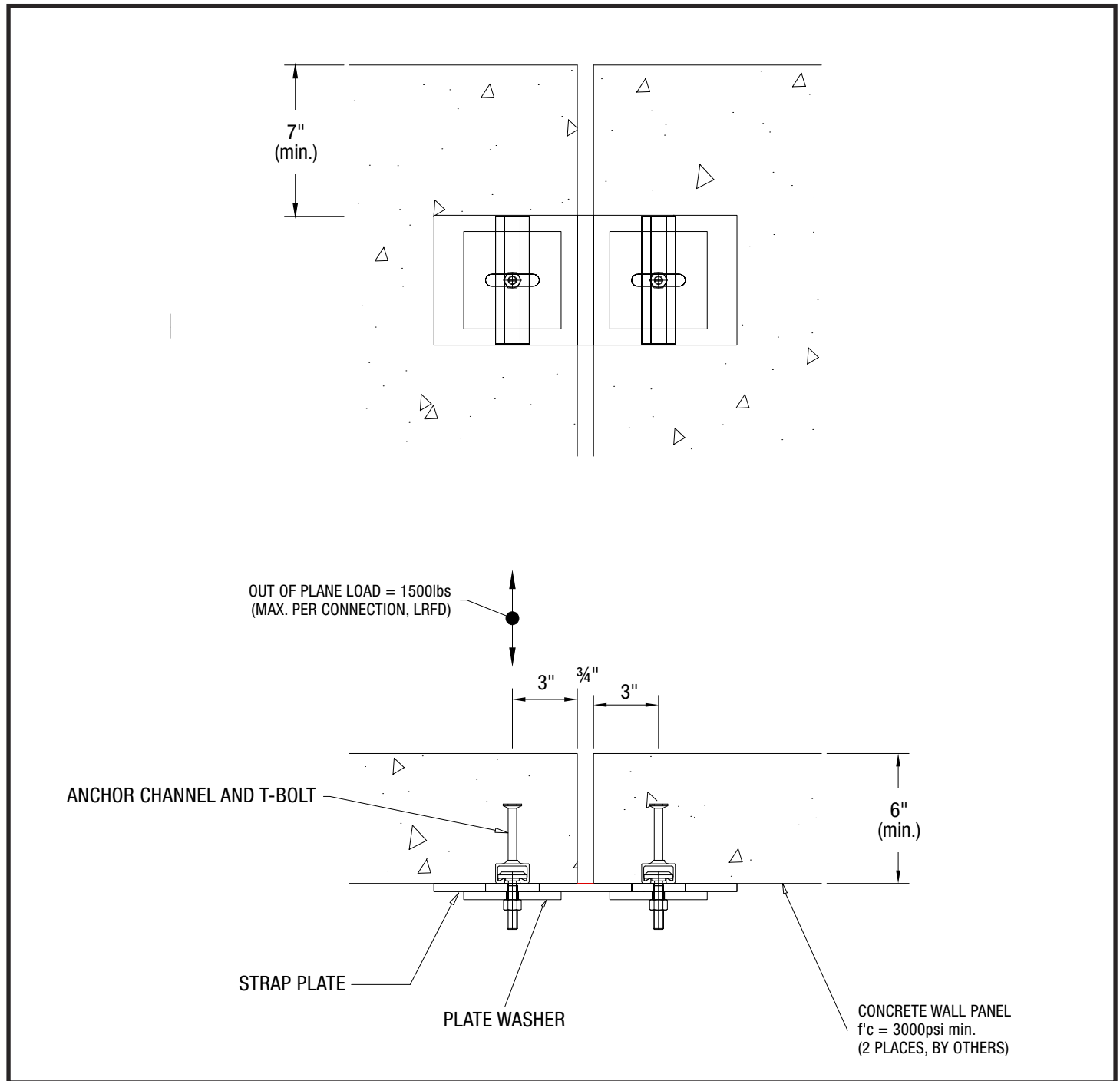
HTA Anchor Channel



Kit Item Name	Kit Part Number	Component Item Name	Qty	Item Codes
Panel to Panel 6" (Kit)	0105.899-00030	14x6x $\frac{3}{8}$ " Plate, 14mm x 63mm Slot, A5 (HDG)	1	0105.899-00018
		4.5x4.5x $\frac{3}{8}$ " Plate Washer, M12 ASTM A36 (HDG)	2	0105.899-00025
		HTA-BA 40/22-HDG- 150 (US)	2	2001.730-00502
		HS 40/22 M12x 60 HDG 8.8 (US) (T-Bolt)	2	0350.078-00201

For more information contact engineeringssupport@leviat.us

Standard Corner Connections



Engineer of Record to specify number of connections per joint and max. connection spacing
(min. connection spacing = 18" O.C. for 6" panel kit)

NOTES:

1. Out of plane loads are assumed to act on one side of corner at any point in time.
2. Anchor Channel allows for +/- 2" up/down tolerance.
3. Each side of bracket allows for +/- 1" left/right tolerance.

For more information contact engineeringsupport@leviat.us

Notes

Tilt-Up Accessories



Accessories and Options

MB STUD EXTENDER

The MB Stud Extender is designed as an adjustable height support chair for embed/weld plates.

The Stud Extender eliminates the tedious, labor-intensive wood forming or risky “wet setting” of embed plates in the top-face of a concrete panel.

STUD EXTENDER ADVANTAGES:

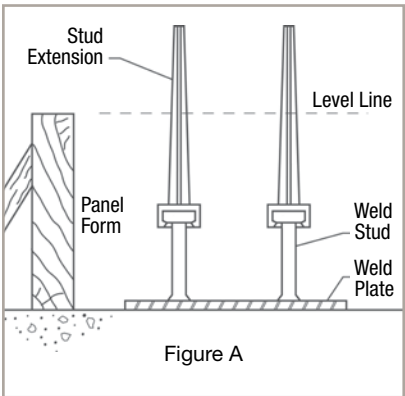
- easy to use
- eliminates wood framing
- saves time
- saves materials
- consistent accuracy
- screed and finish panels easily

The MB Stud Extender is a simple, easy to use solution for setting weld plates. This easy to use product is inexpensive, yet produces enormous savings of time and materials.

Item Number	Description	Overall Length	Extension Length	Box Quantity	Weight
MB291830	¾" (1-¼" head)	5-7/8"	5-¼"	500	8.60 lbs
MB291832	½" (1" head)	5-¾"	5-¼"	500	7.65 lbs

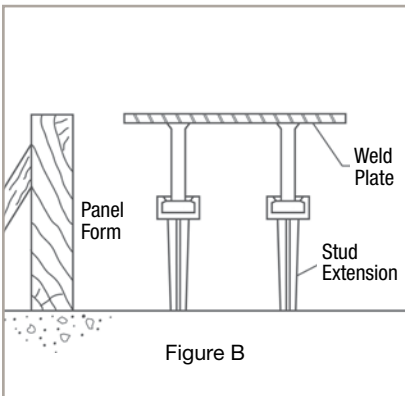


TYPICAL MB STUD EXTENDER INSTALLATION SEQUENCE



INSTALLING THE MB STUD EXTENDER ON AN EMBED PLATE OR WELD PLATE (SEE FIGURE A)

- press the MB Stud Extender onto the head of the weld stud
- place the weld plate next to the panel form
- run a level line from the top of the form across the MB Stud Extenders
- cut off the MB Stud Extender at the level line



INSTALLING THE EMBED PLATE OR WELD PLATE IN THE FORM (SEE FIGURE B)

- turn the weld plate upright and place in the proper predetermined position
- secure the weld plate studs to the rebar mat or edgeform

NOTES:

This product comes in two different sizes: 1" and 1-¼", which are the two most common button sizes used on studs in the field. This product is ideal for insulated panels. By adding the thickness of the insulation, the stud extension simply sticks down through the foam, increasing the stability of the Stud Extender. Generally, each weld plate must have at least four (4) Stud Extenders. Large weld plates may require additional Stud Extenders to support the heavier weight.

MB Tuff Chair

MB TUFF CHAIR

MB Tuff chair is manufactured from a proprietary composite blend of polymers molded in “concrete grey” that provide exceptional strength and durability, have specially designed feet that that does not damage formwork and remain invisible when concrete is exposed. Tuff Chair are available in a range of cover heights from $\frac{3}{4}$ ” to 10” in $\frac{1}{4}$ ” increments to accommodate most concrete cover requirements.



MB PLASTIC SLAB BOLSTER

MB Plastic Slab Bolster are manufactured from a proprietary composite blend of polymers molded in “concrete grey” that provide exceptional strength, are easy to assemble to any length required and are designed to fully encapsulate during the concrete pour without forming air pockets. And like our Tuff Chair, have specially designed feet that that does not damage formwork and remain invisible when concrete is exposed.

MESH BAR CHAIR WITH BASE

Mesh Chair With Base is a light duty composite chair with plate. It is used to support the top mat wire mesh or rebar on foam insulation to maintain proper cover height while properly distributing the mat weight to prevent damage to insulation. The Mesh Chair with Base is molded in “concrete grey” and available in cover heights from 1” to 6”.



Highlighted Tilt-Up Projects



8600 Redstone Gateway
Huntsville, Kentucky



Berkeley Electric Cooperative
Johns Island, South Carolina



Ben Lomond HS Athletic Center
Ogden, Utah



Toho Water Authority
Kissimmee, Florida



Mead Hunt
Middleton, Wisconsin



Evie Garrett Dennis Campus
Denver, Colorado



Rich Products
Houston, Texas



ThermoWorks
American Fork, Utah



5801 University Research Court
College Park, Maryland



Wallis State Bank
Houston, Texas



St. Clare Catholic Church
O'Fallon, Illinois



Yates Pavilion at Kent Denver
Englewood, Colorado

North American Locations

California

3611 E La Palma Ave
Anaheim CA 92806

Iowa

1000 Technology Drive
Boone IA 50036

Texas

7000 Will Rogers Blvd
Fort Worth TX 76140

Florida Corporate

6467 S Falkenburg Road
Riverview FL 33578

Oregon

155 SE Hazel Dell Way
Canby OR 97013

Texas

6500 N Interstate 35
San Antonio TX 78218

Georgia

3080 N Lanier Parkway
Decatur GA 30034

Pennsylvania

565 Oak Ridge Road
Hazle Township PA 18202

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