Dayton Superior manufactures several lifting systems for Tilt-Up Construction. These systems are made to meet the many designs and job requirements found in the market. The project requirements along with the contractor’s preference dictate which system is utilized on a project. Listed below is a brief description of the various options available to the contractor.

**Superior Lifting System**
This system features the T-110 Superior Lift Insert capable of lifting 24,000 # SWL per insert for face lifting and the T120 Superior Lifting Hardware for erection of the panels. The system is a ground release system typically used on larger, heavier panels with concrete thickness over 8”. The insert is composed of a forged anchor with wire leg assembly for support and a plastic disposable void former. The insert is a directional insert used parallel to the height of the panel. For edge lifts, the Dayton P-92P Erection Anchor with shear plate is utilized. This utilizes the same T-110 Superior Lifting Hardware.

**Ground Release Lifting System**
This system features the T-41 Ground Release Insert capable of lifting 15,000 # SWL per insert for face lifting and the T-43L Ground Release Lifting Hardware for erection of the panels. This system is a ground release system typically used for panels up to 8” in thickness. The insert is a forged “dog bone” style insert with a plastic star base or wire base and a plastic disposable void former. The insert is a directional insert used parallel to the height of the panel. For edge lifts, the Dayton P-52 Swift Lift Anchor with shear bar is utilized. This anchor can utilize the same T-43L hardware during the erection. This system is available in a 22,800 # SWL System. See T-81 Heavy Ground Release Insert.

**Gyro Tilt Plus System**
This system features the T49 Gyro Tilt Plus Face Insert capable of lifting 15,000 # SWL per insert for face lifting and the T-50 Gyro Tilt Plus Lifting Hardware for erection of the panels. This system is a ground release system typically used for panels up to 8” in thickness. The insert is a forged “dog bone” style insert with a wire leg assembly or plastic star base and a plastic disposable void former. This insert is a non-directional insert allowing complete rotation of the lifting hardware. For edge lifts, this system also uses the T-49E Anchor (no base) with shear bar and the T-50 Gyro Hardware during erection. This system is available in a 22,800 # SWL System. See T-52 Heavy Gyro Insert.

**Tilt-Up 3 Lifting System**
This system features the T-90-F Face Lift Insert capable of lifting 15,000 # SWL per insert for face lifting and the T-92 Tilt-Up 3 Lifting Hardware for erection of the panels. This system is a ground release system typically used for panels up to 8” in thickness. The insert is a forged rectangular style insert with a plastic star base and a plastic disposable void former. The insert is a directional insert used parallel to the height of the panel. For edge lifts, the Dayton P92P Erection Anchor with shear plate is utilized. This anchor can utilize the same T-92 Lifting Hardware.

**Coil Lifting System**
This is the basic system employed during the original development years of tilt construction. This system uses the Dayton Superior T-1 Pick Up Insert along with B14 Coil Bolts and a variety of lifting hardware. The T-1 Insert is available in 3/4” to 1-1/2” diameters, capable of lifting 14,000 # SWL per insert. This system is utilized today with smaller buildings and unique limited repetition panels. The T-12 and T-26 Lifting Hardware are used for erection of the panels.
T-110 Superior Lift System

The Dayton Superior T-110 Superior Lift Insert consists of a forged foot anchor, 4-leg wire base and plastic void former. The insert is positioned with the void direction toward the top of the panel and then is tied in place to the rebar cage. The T-120 Superior Lifting Hardware allows quick attachment to the insert and remote ground release after panel has been erected and braced. The T-110 Superior Lift Inserts are shipped assembled, ready to go and are sized 1/8” less than the panel thickness.

<table>
<thead>
<tr>
<th>Structural Panel Thickness</th>
<th>Face Tension 2:1 SF</th>
<th>Face Shear 2:1 SF</th>
</tr>
</thead>
<tbody>
<tr>
<td>5”</td>
<td>11,600 lbs</td>
<td>12,400 Lbs</td>
</tr>
<tr>
<td>5.5”</td>
<td>13,000 lbs</td>
<td>13,400 Lbs</td>
</tr>
<tr>
<td>6”</td>
<td>14,300 lbs</td>
<td>14,400 Lbs</td>
</tr>
<tr>
<td>6.5”</td>
<td>15,700 lbs</td>
<td>15,300 Lbs</td>
</tr>
<tr>
<td>7”</td>
<td>17,000 lbs</td>
<td>16,200 Lbs</td>
</tr>
<tr>
<td>7.25”</td>
<td>17,700 lbs</td>
<td>16,700 Lbs</td>
</tr>
<tr>
<td>7.5”</td>
<td>18,400 lbs</td>
<td>17,100 Lbs</td>
</tr>
<tr>
<td>8”</td>
<td>20,200 lbs</td>
<td>18,100 Lbs</td>
</tr>
<tr>
<td>8.5”</td>
<td>21,600 lbs</td>
<td>19,200 Lbs</td>
</tr>
<tr>
<td>9”</td>
<td>23,000 lbs</td>
<td>20,400 Lbs</td>
</tr>
<tr>
<td>9.25”</td>
<td>23,700 lbs</td>
<td>20,900 Lbs</td>
</tr>
<tr>
<td>9.5”</td>
<td>24,000 lbs</td>
<td>21,500 Lbs</td>
</tr>
<tr>
<td>10”</td>
<td>24,000 lbs</td>
<td>22,900 Lbs</td>
</tr>
<tr>
<td>10.5”</td>
<td>24,000 lbs</td>
<td>22,950 Lbs</td>
</tr>
<tr>
<td>11”</td>
<td>24,000 lbs</td>
<td>23,000 Lbs</td>
</tr>
<tr>
<td>11.25”</td>
<td>24,000 lbs</td>
<td>23,400 Lbs</td>
</tr>
<tr>
<td>11.5”</td>
<td>24,000 lbs</td>
<td>23,800 Lbs</td>
</tr>
<tr>
<td>12”</td>
<td>24,000 lbs</td>
<td>24,000 Lbs</td>
</tr>
</tbody>
</table>

** Safe working load provides approximate safety factor shown in the chart with minimum 2500 psi normal weight concrete.

To Order:
Specify:(1) Quantity, (2) Name, (3) Panel Thickness, (4) bottom face exposed aggregate or form liner thickness
Example:
150, T-110 Superior Lift Inserts, 9” Panel with 1/2” form liner panel

T-120 Superior Lift Hardware

The Dayton Superior T-120 Superior Lift Hardware is designed to easily attach to the insert by engaging the curved clutch handle into the opening in the anchor. The bail of the hardware is designed to readily align itself to the pull of the rigging. Once engaged and under load, it can not be disengaged by remote ground release until the load has been removed in lowering the rigging. The T-120 is used for both face and edge lift system conditions.

To Order:
Specify:(1) Quantity, (2) Name
Example:
8, T-120 Superior Lift Hardware
Minimum Insert Distances

Warning! All T-110 Superior Lift Inserts must be properly located in relation to the center of gravity of the panel. See notes below.

Safety Notes:
Safe use of the Superior Lift System requires the inserts to be positioned so that the arrows on the direction label point to the top and bottom of the panel (parallel to the sides of the panel).

The inserts must be properly located in relation to edges, corners, openings and ledgers, and at distances allowing the development of a full concrete shear cone. Minimum distances are shown in the sketches above. Placing an insert closer to an edge than the minimums shown may reduce the effective concrete shear cone and reduce the insert’s safe working load.

Lifting inserts must be properly wired in place so that the vertical axis of the insert is perpendicular to the panel surface. Care must be taken to avoid displacement of the inserts during concrete placement and screeding operations.

Do not weld to the Superior Lift Anchor as welding causes embrittlement and can result in premature failure.

Exposed Aggregate Panel Inserts

Tilt-up panels with exposed aggregate or formliner thickness are often cast face down. In these panels, the aggregate or form liner thickness and the structural thickness are required to determine correct insert height.

For panels exposed aggregate face up, the overall thickness of the panel determines insert height.

NOTE: If attaching insert to rebar mat, it must be attached on vertical portion of the wire base leg as shown. DO NOT attach rebar to the horizontal portion of the wire base leg.

NOTE: It is not required to attach the insert to rebar.
How to Remove the T-110 Plastic Recess Plug

1. The T-110 Insert’s location in the panel is easily found by locating the antennae which will project through the surface of the concrete.

2. Using an ordinary claw hammer, tap lightly around the antennae, breaking through the thin skin of concrete to expose the insert. Avoid striking the concrete too hard so as not to break through the plastic recess plug.

3. Drive the claws of the hammer down about 3/8" between the end of the recess plug and the concrete.

4. Pry up on the end of the recess plug until one half of it pops up to a point where it is about one third of the way out of the concrete. For the time being, leave it as it is and proceed with step #5.

5. Repeat steps #3 and #4 to loosen the opposite half of the recess plug.

6. Grasp both halves of the recess plug between the thumb and finger and squeeze.

7. Both halves of the recess plug should now be easily removed, exposing the insert.

8. If one half of the recess plug should be hard to remove, drive the claws of the hammer as deeply as possible between the recess plug and the top of the insert, as shown above. Push forward on the hammer with one quick motion. This will remove the recess plug.

9. Use a blower to remove all debris from around the insert and the recess plug. The insert is now ready to receive the lifting hardware.

Note: For proper hardware release do not “round” out void holes.

Proper Hardware Usage

Prior to lifting any tilt-up panel, apply an initial load to the crane lines, making certain that the hardware is properly attached to the head of the T-110 Insert and that the bail of the lifting hardware is aligned with the crane line.

Warning! Do not apply a sideward load to the bail of the lifting hardware.

Warning! Do not modify, weld or alter in any way T-120 Hardware units. Such actions could lead to premature failure of the hardware.
T-110 Superior Lift Hardware Installation Sequence

1) T-120 Hardware in open position centered over the T-110 Insert.
2) The Hardware nestled in the Insert Recess and the Bolt/Release Arm engaged. The Bolt/Release Arm must contact the panel surface as shown in the sketch. Chip away excess concrete, if necessary, to nest the Bolt/Release Arm on the concrete surface. Contact a Dayton Superior Technical Service Center if unable to nest the Bolt/Release Arm on the face of the panel.
3) The installation is complete. Erection may proceed.

T-120 Superior Lift Lifting Hardware Release Sequence

1) After the panel erection is complete and the panel has been properly braced/tied-off, the crane line should be relaxed slightly to permit the release of the lifting hardware.
2) To Release the hardware, apply a quick, even downward force to the release line. The hardware stays attached to the crane line and is moved to the next panel.
T-110-E Edge Lift Insert Selection Chart

<table>
<thead>
<tr>
<th>Structural Panel Thickness</th>
<th>SWL 2:1** Safety Factor</th>
<th>SWL 2.5:1** Safety Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shear</td>
<td>Tension with Anchor Only</td>
</tr>
<tr>
<td>6”</td>
<td>6,760 lbs</td>
<td>11,160 lbs</td>
</tr>
<tr>
<td>7”</td>
<td>7,180 lbs</td>
<td>13,740 lbs</td>
</tr>
<tr>
<td>8”</td>
<td>7,560 lbs</td>
<td>15,550 lbs</td>
</tr>
<tr>
<td>9”</td>
<td>8,000 lbs</td>
<td>16,600 lbs</td>
</tr>
<tr>
<td>10”</td>
<td>8,300 lbs</td>
<td>17,600 lbs</td>
</tr>
<tr>
<td>11”</td>
<td>8,800 lbs</td>
<td>20,000 lbs</td>
</tr>
<tr>
<td>12”</td>
<td>9,200 lbs</td>
<td>22,600 lbs</td>
</tr>
</tbody>
</table>

** Safe working load provides approximate safety factor shown in chart with minimum 2500 psi normal weight concrete
The Ground Release II System is a unique method of tilting concrete tilt-up wall panels into position and allows the hardware to be easily released from the ground. Ladders are normally not required during the hardware release process which greatly increases worker safety and productivity.

Features of the T-41 Ground Release II Insert Are
- **Flexible Plastic Antenna** folds over when screed passes, but springs back to indicate insert location.
- **Plastic Recess Plug** creates a void for attaching the Ground Release II Lifting Hardware to the insert head. The expendable plastic recess plug is easily removed from hardened concrete.
- **Directional Label** indicates correct panel thickness and direction of plastic recess plug in relation to top and bottom of panel.
- **Ground Release II Anchor**. This hot forged anchor permits rapid hardware attachment and allows smooth rotation of the hardware during the releasing operation.
- **Wire Frame** is standard used with T-41 inserts. This provides a stable base that is easy to insert into rebar cage. A **Plastic Support Base** is available in situations where the insert is set on insulation or where there is concern of potential rust problems.
- **Ground Release II Inserts** are shipped assembled, ready to use and are sized 1/8” less than panel thickness.

**To Order:**
Specify: (1) quantity, (2) type, (3) panel thickness, (4) bottom face exposed aggregate or foam form liner thickness.

**Example:**
150 pcs., T-41 Ground Release II insert for 6” panel and 3/4” bottom face exposed aggregate.

### T-41 Single Ground Release II Insert Selection Chart

<table>
<thead>
<tr>
<th>Structural Panel Thickness</th>
<th>5”</th>
<th>5 1/2”</th>
<th>6”</th>
<th>6 1/2”</th>
<th>7”</th>
<th>7 1/2”</th>
<th>8”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground Release II Anchor Length</td>
<td>3 3/4”</td>
<td>4 1/4”</td>
<td>4 3/4”</td>
<td>5 1/4”</td>
<td>5 3/4”</td>
<td>6 1/4”</td>
<td>6 3/4”</td>
</tr>
<tr>
<td>Insert Safe Working Load (lbs.)</td>
<td>8,000</td>
<td>10,000</td>
<td>12,000</td>
<td>13,500</td>
<td>15,000</td>
<td>15,000</td>
<td>15,000</td>
</tr>
</tbody>
</table>

SWL provides a safety factor of approximately 2 to 1 in 2,500 psi normal weight concrete.

**NOTE:** Special inserts are available sized for panel thicknesses other than those listed in the chart above. When these special inserts are supplied, they will have the Ground Release II Anchor suspended from a plastic tipped wire support chair instead of being supported by a plastic base.

**Danger!** Do not use for edge lifting of panels, as insert is not designed for such use. Do not use with top surface seeded exposed aggregate 3/4” or larger as aggregate will pop out during erection resulting in a reduced insert SWL.

See page 6 for reduction factors that must be applied to insert’s SWL when using lightweight concrete.

### Exposed Aggregate Panel Inserts

For panels cast with exposed aggregate face down or those using a formliner, the panel’s structural thickness determines the insert height. In these cases, the exposed aggregate or formliner thickness as well as the panel’s structural thickness are required to determine the proper insert height.

For panels cast with exposed aggregate face up, the panel’s overall thickness determines the insert height for that panel. See the above sketch.
Ground Release II System

T-43-L Ground Release II Lifting Hardware

Our NEW T-43-L Ground Release II Lifting Hardware unit offers you, the tilt-up contractor, the latest and easiest to use tilt-up lifting hardware unit on the market today! This new lifting hardware unit is a simplified design and when combined with our T-41 Ground Release II Insert provides you with a superior system for the quick and efficient erection of tilt-up concrete wall panels.

- **Bail** will accept all conventional crane attachments. Unit moves easily as it follows line of action of crane cable.
- **Lifting Body** attaches to head of insert. Whenever diagonal loads are applied to the bail, the result is a combination of a compressive load applied to the concrete and a tension load applied to the insert.
- **Release Line** is a 1/2” hollow braided Polyethylene Cord of sufficient length to reach the ground.
- **SWL** is 15,000 lbs. with an approximate factor of safety of 5 to 1.

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**Minimum Insert Distances**

Warning! Inserts must be properly located in relation to the center of gravity of the panel. This work should be performed under the direction of a registered professional engineer.

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**Safety Notes:**

Safe use of the Ground Release II System requires the inserts to be positioned so that the arrows on the direction label point to the top and bottom of the panel (parallel to the sides of the panel). The inserts must be properly located in relation to edges, corners, openings and ledgers, and at distances allowing the development of a full concrete shear cone. Minimum distances are shown in the sketches above. Placing an insert closer to an edge than the minimums shown may reduce the effective concrete shear cone and reduce the insert’s safe working load.

Lifting inserts must be properly wired in place so that the vertical axis of the insert is perpendicular to the panel surface. Care must be taken to avoid displacement of the inserts during concrete placement and screeding operations. Do not weld to a lifting insert. Welding causes embrittlement and can result in an insert failure. See related safety information concerning welding on inside front cover.
Ground Release II System

How to use the Ground Release II System - T-43-L Hardware
Do Not Use This System On Top Surface, Seeded, Exposed Aggregate 3/4” or Larger.

Precheck all insert holes with hardware prior to erection date, following instruction steps 2, 3 and 4, so that during tilting, proper hardware action is assured. See page 36 for proper procedure for removal of plastic recess plug.

1. Install the insert so the directional arrow on the plastic recess plug points to the top or bottom of the panel. Wire tie the insert into position using a short length of additional reinforcing steel (rebar) placed tight against each side of the insert. Next, near each end of the plastic void former, secure a tie wire to one of the additional rebars, running the wire over the top of the plastic void former and back down, securing it to the additional rebar on the other side of the insert. Be sure to run the tie wire between the metal ring and the plastic void former as shown in the sketch to the right.

Note: The short length of rebar recommended is an aid to prevent the insert from moving during concrete placement. When this rebar is added for insert stability, it should be placed against the vertical portion of the insert and at least 1” away from the insert’s foot. This extra rebar is not required to develop the insert’s safe working load.

2. The various parts of the T-43-L Ground Release II Lifting Hardware are shown above.

3. To install the lifting hardware onto the insert, hold the hardware by the bail, release arm, and lower it onto the head of the insert. Check to make certain that the release arm points to the top of the panel.

4. Lower the release arm parallel to the face of the panel. Lay the release line along side of the lifting hardware so that the line goes to the bottom of the panel. With the crane lines attached, the panel is now ready for lifting.

5. As the panel is lifted, friction from the load on the insert prevents the lifting hardware from prematurely releasing. Brace and secure the panel into position.

6. The crane line should be slackened slightly to permit the release of the lifting hardware. To release the lifting hardware, apply a single downward force to the release line.

7. The lifting hardware remains in the open position, ready to be lowered to the ground and attached to the next panel.

Danger! The crane line and bail of the lifting hardware must be turned in the direction of the cable forces before the lifting operation begins. The crane line must not be allowed to apply a sideward force on the bail, as this condition is dangerous and could lead to premature failure of the hardware or insert.
Ground Release\textsuperscript{II}
System

How to Remove the Ground Release\textsuperscript{II} Plastic Recess Plug

1. The Ground Release\textsuperscript{II} Insert’s location in the panel is easily found by locating the antennae which will project through the surface of the concrete.

2. Using an ordinary claw hammer, tap lightly around the antennae, breaking through the thin skin of concrete to expose the insert. Avoid striking the concrete too hard so as not to break through the plastic recess plug.

3. Drive the claws of the hammer down about 3/8” between the end of the recess plug and the concrete.

4. Pry up on the end of the recess plug until one half of it “pops up” to a point where it is about one third of the way out of the concrete. For the time being, leave it as it is and proceed with step #5.

5. Repeat steps #3 and #4 to loosen the opposite half of the recess plug.

6. Grasp both halves of the recess plug between the thumb and finger and squeeze.

7. Both halves of the recess plug should now be easily removed, exposing the insert.

8. If one half of the recess plug should be hard to remove, drive the claws of the hammer as deeply as possible between the recess plug and the top of the insert, as shown above. Push forward on the hammer with one quick motion. This will remove the recess plug.

9. Use a blower to remove all debris from around the insert and the recess plug. The insert is now ready to receive the lifting hardware.

Note: For proper hardware release do not “round” out void holes.

Proper Hardware Usage

Prior to lifting any tilt-up panel, apply an initial load to the crane lines, making certain that the hardware is properly attached to the head of the T-41 Ground Release\textsuperscript{II} Insert and that the bail of the lifting hardware is aligned with the crane line.

Warning! Do not apply a sideward load to the bail.

Warning! Do not modify, weld or alter in any way Ground Release\textsuperscript{II} Hardware units. Such actions could lead to premature failure of the hardware.

![Diagram showing correct and incorrect hardware usage]

Load Load

Ball Ball

Right Right

Wrong Wrong
T-42 Double Ground Release™ System

The Dayton Superior T-42 Double Ground Release™ System consists of two T-41 Ground Release™ Inserts, two T-43-L Ground Release™ Hardware units and a T-46 Ground Release™ Spreader Beam with twin 8-1/2 ton shackles.

The two inserts are spaced on 12” centers to mate with the tandem hardware attached to the spreader beam. After lifting and positioning the panel, the hardware is released from the ground in the same manner as the basic system.

<table>
<thead>
<tr>
<th>Double Ground Release™ Insert Selection Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Panel Thickness</td>
</tr>
<tr>
<td>Ground Release™ Anchor Length</td>
</tr>
<tr>
<td>Insert Safe Working Load (lbs.)</td>
</tr>
</tbody>
</table>

Note: The two inserts must be spaced on 12” centers to develop the safe working loads displayed in the Chart.

SWL provides a safety factor of approximately 2 to 1 in 2,500 psi normal weight concrete. See page 4 for reduction factors that must be applied to insert’s SWL when using lightweight concrete.

T-46 Ground Release™ Spreader Beam with Twin Shackles

The Dayton Superior T-46 Ground Release™ Spreader Beam is supplied with two 8-1/2 ton shackles to attach the beam to two ground release inserts. Use of the T-46 spreader beam will simplify rigging change requirements on large or extremely heavy panels. The T-46 has a safe working load of 30,000 pounds with an approximate safety factor of 5 to 1.

<table>
<thead>
<tr>
<th>T-45 Ground Release™ Patch Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Dayton Superior T-45 Ground Release™ Patch Cap is manufactured from ABS paintable plastic and provides a cosmetic alternative for patching insert holes. The T-45 patch cap is available in concrete gray color only. It is easy to install by pushing it into the void. Friction holds the cap in place and the beveled flange assures a tight, flush fit. No grouting is required.</td>
</tr>
</tbody>
</table>

To Order: Specify: (1) quantity, (2) name.

Example: Two T-46 Ground Release™ Spreader Beams.

T-45 Ground Release™ Patch Cap

To Order: Specify: (1) quantity, (2) name.

Example: 150, T-45 Ground Release™ Patch Caps.
Ground Release® II System

T-81 Heavy Duty Ground Release® II Insert

The Dayton Superior T-81 Heavy Duty Ground Release® II Insert is similar to the T-41 insert but is designed to utilize a 1” diameter anchor. The insert is furnished with the anchor, wire base and plastic void former assembled and ready to use. The T-81 insert is sized 1/8” less than the panel thickness and is equipped with antennae for quick locating.

**To Order:**
Specify: (1) quantity, (2) name, (3) panel thickness, (4) bottom face exposed aggregate or foam formliner thickness, if required.

**Example:**
150, T-81 Heavy Duty Ground Release® II inserts for 10” panel with 3/4” exposed aggregate.

<table>
<thead>
<tr>
<th>Structural Panel Thickness</th>
<th>8”</th>
<th>8-1/2”</th>
<th>9”</th>
<th>9-1/2”</th>
<th>10”</th>
<th>10-1/2”</th>
<th>11”</th>
<th>11-1/2”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground Release® II Anchor Length</td>
<td>6-3/4”</td>
<td>7-1/8”</td>
<td>7-1/8”</td>
<td>7-1/8”</td>
<td>7-1/8”</td>
<td>7-1/8”</td>
<td>10”</td>
<td></td>
</tr>
<tr>
<td>Insert Safe Working Load (lbs.)</td>
<td>15,500</td>
<td>18,200</td>
<td>18,200</td>
<td>19,100</td>
<td>20,000</td>
<td>20,900</td>
<td>21,800</td>
<td>22,800</td>
</tr>
</tbody>
</table>

**T-83 Heavy Duty Ground Release® II Hardware**

The Dayton Superior T-83 Heavy Duty Ground Release® II Hardware is used with the T-81 insert to lift and handle large tilt-up panels. The high strength, efficient system offers quickness and safety.

**Note:** It is a good practice to have an extra hardware unit on the job site in case there is a need to replace one in use.

**To Order:**
Specify: (1) quantity, (2) name.

**Example:**
9, T-83 Heavy Duty Ground Release® II Hardware units.

T-83 Heavy Duty Ground Release® II Hardware

Available exclusively through Certified Dayton Tilt-Up Dealers.

**Safety Notes:**
Safe use of the Ground Release® II System requires the inserts to be positioned so that the arrows on the direction label point to the top and bottom of the panel (parallel to the sides of the panel). The inserts must be properly located in relation to edges, corners, openings and ledgers, and at distances allowing the development of a full concrete shear cone. Minimum distances are shown in the sketches above. Placing an insert closer to an edge than the minimums shown may reduce the effective concrete shear cone and reduce the insert's safe working load. Lifting inserts must be properly wired in place so that the vertical axis of the insert is perpendicular to the panel surface. Care must be taken to avoid displacement of the inserts during concrete placement and screeding operations.

Do not weld to a lifting insert. Welding causes embrittlement and can result in an insert failure. See related safety information concerning welding on inside front cover.
How to use the Ground Release II System - T-83 Hardware

Do Not Use For Edge Lifting
Do Not Use This System On Top Surface, Seeded, Exposed Aggregate 3/4” or Larger.

Precheck all insert holes with hardware prior to erection date, following instruction steps 2, 3 and 4, so that during tilting, proper hardware action is assured. See page 36 for proper procedure for removal of plastic recess plug.

1. Install the insert so the directional arrow on the plastic recess plug points to the top or bottom of the panel. Wire tie the insert into position using a short length of additional reinforcing steel (rebar) placed tight against each side of the insert. Next, near each end of the plastic void former, secure a tie wire to one of the additional rebars, running the wire over the top of the plastic void former and back down, securing it to the additional rebar on the other side of the insert. Be sure to run the tie wire between the metal ring and the plastic void former as shown in the sketch to the right.

Note: The short length of rebar recommended is an aid to prevent the insert from moving during concrete placement. When this rebar is added for insert stability, it should be placed against the vertical portion of the insert and at least 1” away from the insert’s foot. This extra rebar is not required to develop the insert’s safe working load.

2. The various parts of the T-83 Ground Release II Lifting Hardware are shown above.

3. To install the lifting hardware onto the insert, hold the hardware by the bail and release arm, and lower it onto the head of the insert. Check to make certain that the release arm points to the top of the panel.

4. Lower the release arm until the arm comes in contact with the panel. Lay the release line along side of the lifting hardware so that the line goes to the bottom of the panel. With the crane lines attached, the panel is now ready for lifting.

5. As the panel is lifted, the release arm is trapped between the panel and the crane line, which insures that the lifting hardware cannot be prematurely released. Brace and secure the panel into position.

6. The crane line should be slackened slightly to permit the release of the lifting hardware. To release the lifting hardware, apply a single downward force to the release line.

7. The lifting hardware remains in the open position, ready to be lowered to the ground and attached to the next panel.

Warning! The crane line and bail of the lifting hardware must be turned in the direction of the cable forces before the lifting operation begins. The crane line must not be allowed to apply a sideward force on the bail, as this condition is dangerous and could lead to premature failure of the hardware or insert.
Ground Release II System

P-52 Swift Lift Anchor - Edge Lift Anchor

The Dayton Superior P-52 Swift Lift Anchor is a hot forged insert available in 9/16” and 3/4” shaft sizes. The spherical head engages with the P-51 hardware, on page 61, to lift and handle precast panels. The standard lengths available for the 9/16” unit are 6-3/4” and 11”. The standard lengths available for the 3/4” unit are 9-1/2” and 19”. Other lengths are available on special order.

Caution: The Swift Lift anchor is designed to be used in conjunction with the P-54 plug and P-59 shear bar combination. Failure to use this combination may result in concrete spalling or premature failure.

To Order:
Specify: (1) quantity, (2) name, (3) shaft diameter, (4) length.
Example:
200, P-52 Swift Lift Anchors, 9/16” dia. x 11” long.

P-54 Swift Lift Recess Plug

The Dayton Superior P-54 Swift Lift Recess Plug is fabricated from high density polyethylene plastic in two sizes to accommodate the P-52 anchor, above. The two-piece design snaps together to securely hold the anchor. Built-in tabs are provided on the plug to hold the P-59 Swift Lift Shear Bar, shown below.

Caution! The Swift Lift recess plug is designed to be used in conjunction with the P-52 insert and P-59 shear bar combination. Failure to use this combination may result in concrete spalling or premature failure.

To Order:
Specify: (1) quantity, (2) name, (3) shaft diameter.
Example:
200, P-54 Swift Lift Recess Plugs for 9/16” shaft diameter.

P-59 Swift Lift Shear Bar

The Dayton Superior P-59 Swift Lift Shear Bar is designed for use with the P-54 recess plug shown above.

To Order:
Specify: (1) quantity, (2) name, (3) size.
Example:
200, P-59 Swift Lift Shear Bars 3/4” diameter.
The **Swift Lift System** is a quick connect-disconnect system that allows tilt-up panels to be edge lifted with speed, safety and economy. The system is a non-welded system and avoids threaded connections, that are time-consuming, subject to thread wear and damage and the further risk of not being fully engaged, with consequent reduction of the safe working load. The reusable **SL Lifting Eye** is free of these disadvantages and by virtue of its quality and heavy duty construction will give years of use.

The efficiency of the system has been proven by years of successful use as well as exhaustive laboratory tests. The components are subjected to regular batch testing during manufacture.

The **SL System** is an ideal method to use when large tilt-up panels must hang plumb for setting.

### Tension Safe Working Load Per Anchor (lbs.)

<table>
<thead>
<tr>
<th>Corner Distance</th>
<th>Minimum Anchor Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>20&quot;</td>
<td>30&quot;</td>
</tr>
</tbody>
</table>

#### 9/16" Dia. x 6-3/4" Long

<table>
<thead>
<tr>
<th>Panel Structural Thickness</th>
<th>Tension Safe Working Load Per Anchor (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>3,500</td>
</tr>
<tr>
<td>5&quot;</td>
<td>4,400</td>
</tr>
<tr>
<td>6&quot;</td>
<td>5,300</td>
</tr>
<tr>
<td>7&quot;</td>
<td>6,100</td>
</tr>
<tr>
<td>8&quot;</td>
<td>7,000</td>
</tr>
</tbody>
</table>

#### 9/16" Dia. x 11" Long

<table>
<thead>
<tr>
<th>Panel Structural Thickness</th>
<th>Tension Safe Working Load Per Anchor (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>5,000</td>
</tr>
<tr>
<td>5&quot;</td>
<td>6,300</td>
</tr>
<tr>
<td>6&quot;</td>
<td>7,900</td>
</tr>
<tr>
<td>7&quot;</td>
<td>8,000</td>
</tr>
</tbody>
</table>

#### 3/4" Dia. x 9-1/2" Long

<table>
<thead>
<tr>
<th>Panel Structural Thickness</th>
<th>Tension Safe Working Load Per Anchor (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>4,700</td>
</tr>
<tr>
<td>5&quot;</td>
<td>5,900</td>
</tr>
<tr>
<td>6&quot;</td>
<td>7,000</td>
</tr>
<tr>
<td>7&quot;</td>
<td>8,200</td>
</tr>
<tr>
<td>8&quot;</td>
<td>9,200</td>
</tr>
</tbody>
</table>

#### 3/4" Dia. x 14" Long

<table>
<thead>
<tr>
<th>Panel Structural Thickness</th>
<th>Tension Safe Working Load Per Anchor (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>7,200</td>
</tr>
<tr>
<td>5&quot;</td>
<td>9,000</td>
</tr>
<tr>
<td>6&quot;</td>
<td>10,900</td>
</tr>
<tr>
<td>7&quot;</td>
<td>12,700</td>
</tr>
<tr>
<td>8&quot;</td>
<td>14,400</td>
</tr>
</tbody>
</table>

SWL’s provide an approximate 2 to 1 factor of safety in 2,500 psi normal weight concrete.

**Danger!** See page 6 for lightweight concrete SWL reduction factors.
Ground Release II System

Swift Lift Anchor Shear (Edge Lifting) SWL’S

The Swift Lift System is very useful for raising tilt-up panels from the horizontal casting position to a vertical position. When the P-52 SL Anchor is used under this shear loading condition, special shear bars must be positioned tightly against the recess plug as shown in the illustrations below to prevent the concrete from spalling. The P-59 Shear Bars must be used to develop the safe shear working loads shown.

To develop the shear capacity of the P-52 SL Anchor the minimum spacing between two anchors is two times the corner distance. When raising panels to a vertical position, always check both shear SWL and tension SWL.

**Anchor Shaft Diameter x Anchor Length**

<table>
<thead>
<tr>
<th>Anchor Shaft Diameter x Anchor Length</th>
<th>Panel Structure Thickness</th>
<th>Minimum Corner Distance</th>
<th>Shear Safe Working Load Per Anchor (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-1/16” Dia. x 6-3/4” or Longer</td>
<td>5”</td>
<td>20”</td>
<td>3,500</td>
</tr>
<tr>
<td></td>
<td>5-1/2”</td>
<td>20”</td>
<td>4,400</td>
</tr>
<tr>
<td></td>
<td>6”</td>
<td>20”</td>
<td>5,200</td>
</tr>
<tr>
<td></td>
<td>7”</td>
<td>20”</td>
<td>5,400</td>
</tr>
<tr>
<td></td>
<td>8”</td>
<td>20”</td>
<td>5,600</td>
</tr>
<tr>
<td>3/4” Dia. x 9-1/2” or Longer</td>
<td>5-1/2”</td>
<td>24”</td>
<td>4,200</td>
</tr>
<tr>
<td></td>
<td>6”</td>
<td>24”</td>
<td>4,400</td>
</tr>
<tr>
<td></td>
<td>7”</td>
<td>24”</td>
<td>5,200</td>
</tr>
<tr>
<td></td>
<td>8”</td>
<td>24”</td>
<td>5,600</td>
</tr>
</tbody>
</table>

SWL provides a factor of safety of approximately 2 to 1 in 2,500 psi concrete.

The above Shear Safe Working Loads are based on the use of P-51 SL Lifting Eye only! DO NOT ATTEMPT to use any other type of lifting hardware when edge lifting of tilt-up wall panels using P-52 Swift Lift Anchors.

**Danger!** See page 4 for lightweight concrete SWL reduction factors

**Danger!** Dayton Superior does not recommend the use of P-52 SL Anchors without shear bars for edge lifting tilt-up panels. Spalling of the concrete above the anchor will result and the anchor could pull out of the concrete at lower than anticipated loads.

**Suggested Rigging Method**

Dayton Superior recommends the use of this type of rigging when using the Swift Lift System to edge lift tilt-up panels. 4-point rigging would be similar to the 2-point rigging shown.

**Warning!** The use of angular rigging will apply loads greater than those anticipated and should be avoided.
Ground Release II
System

How To Install the Swift Lift Anchor

1. Assemble the P-54 Recess Plug by placing the head of the P-52 Swift-Lift Anchor inside any two halves of the recess plug. Then snap the two halves together. It is very difficult to assemble the unit with the foot of the anchor inside the P-54 Recess Plug and still get the two halves to close together correctly. If the two halves of the P-54 Recess Plug do not fit closely together, it could be because the anchor is in upside down. In such a case, reverse the anchor and try again.

2. A correctly assembled P-54 Recess Plug and anchor.

3. Attach the assembled P-54 Recess Plug and anchor to the formwork in its predetermined location with the recess plug seam in the vertical position. Use common (not double headed) nails in the upper three tabs of the recess plug. The plug and anchor assembly can also be attached to the formwork by using a 2 ton stud and wingnut if desired. Provide bar supports around the anchor as shown to prevent displacement during the casting process.

4. Slip the preformed shear bar onto the P-54 Recess Plug as shown. The receiving tabs of the P-54 Recess Plug will correctly position the shear bar. Usually, additional support wiring is not needed to hold the shear bar in place. However, prudent users will provide an additional wire tie or two to make certain the shear bar will not dislodge during concrete placement. Wire tie the P-52 Swift-Lift Anchor to reinforcing steel as shown.
P-53 Swift Lift Eye Anchor - Edge Lifting

The Dayton Superior Swift Lift Eye Anchor (P-53) is similar to the P-52 anchor but has an eye at the foot to accept P-60 Tension Bars. The P-53 anchor is used primarily in thin sections, thin panels of lightweight concrete or shapes that must be handled at concrete compressive strengths below 2,000 psi. P-53 anchors are available in 1, 2, 3, 4, 8 and 16 T capacities and each has its load rating embossed on the head. **NOTE:** P-60 Tension Bar must be used with this anchor to achieve loads.

**To Order:**
Specify: (1) quantity, (2) name, (3) system size, (4) length

**Example:**
200, P-53 Swift Lift Eye Anchors, 5 ton, 9-1/2" long

P-53 Swift Lift Eye Anchor for Lifting and Handling

The P-53 Swift Lift Eye Anchor is designed for use with the P-60 Tension Bar placed through the eye of the anchor. This combination of Swift Lift Eye Anchor and P-60 Tension Bar allows the anchor's full rated tensile load to be developed in thin, narrow wall applications. The anchor should be located at the center line of the wall. When two or more anchors are required, the minimum spacing between anchors must be equal to the minimum panel width.

The combination of P-53 Swift Lift Eye Anchor and P-60 Tension Bar is an excellent system to use for lifting, handling and setting precast columns.

P-53 Swift Lift Eye Anchor Selection Chart

<table>
<thead>
<tr>
<th>Anchor Rated Load (Tons)</th>
<th>Anchor Length L</th>
<th>Minimum Thickness or Depth</th>
<th>Actual Edge Distance</th>
<th>Minimum Corner Distance</th>
<th>Minimum Panel Width</th>
<th>Tensile Safe Working Load per Anchor 2,000 PSI *</th>
<th>Tensile Safe Working Load per Anchor 2,500 PSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2-1/2&quot;</td>
<td>3&quot;</td>
<td>1-1/2&quot;</td>
<td>8&quot;</td>
<td>16&quot;</td>
<td>3,000 lbs.</td>
<td>3,300 lbs.</td>
</tr>
<tr>
<td>2</td>
<td>3-1/2&quot;</td>
<td>3&quot;</td>
<td>1-1/2&quot;</td>
<td>4&quot;</td>
<td>8&quot;</td>
<td>6,000 lbs.</td>
<td>6,600 lbs.</td>
</tr>
<tr>
<td>4</td>
<td>4-3/4&quot;</td>
<td>3-3/4&quot;</td>
<td>1-7/8&quot;</td>
<td>5&quot;</td>
<td>10&quot;</td>
<td>12,000 lbs.</td>
<td>12,200 lbs.</td>
</tr>
<tr>
<td>8</td>
<td>7-1/16&quot;</td>
<td>4-3/4&quot;</td>
<td>2-3/8&quot;</td>
<td>7&quot;</td>
<td>14&quot;</td>
<td>24,000 lbs.</td>
<td>26,400 lbs.</td>
</tr>
<tr>
<td>16</td>
<td>9-7/8&quot;</td>
<td>6-3/8&quot;</td>
<td>6-3/4&quot;</td>
<td>8-1/2&quot;</td>
<td>17&quot;</td>
<td>60,000 lbs.</td>
<td>66,000 lbs.</td>
</tr>
</tbody>
</table>

*Safe Working Load provides a factor of safety of approximately 2 to 1 in 2,000 psi normal weight concrete. The P-53 Eye Anchor must be used in conjunction with the P-60 Tension Bar in order to develop its published rated working loads. **Note:** Contact Dayton Superior Technical Service Department for safe working loads when the P-53 Eye Anchor is used with straight lengths of rebar.
P-60 Swift Lift Tension Bar

The Dayton Superior Swift Lift Tension Bar (P-60) is designed to be used with the P-53 Eye Anchor in order for the eye anchor to develop its published rated working loads. See P-60 sizes and dimensions below.

<table>
<thead>
<tr>
<th>Anchor Rated Load (Tons)</th>
<th>Grade 60 Rebar Size</th>
<th>Rebar Overall Length</th>
<th>A Standard</th>
<th>A Maximum</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.306” Wire</td>
<td>40”</td>
<td>14”</td>
<td>---</td>
<td>3/4”</td>
</tr>
<tr>
<td>2</td>
<td>#3</td>
<td>24”</td>
<td>5”</td>
<td>7-1/2”</td>
<td>1-1/8”</td>
</tr>
<tr>
<td>4</td>
<td>#5</td>
<td>24”</td>
<td>6-1/4”</td>
<td>10”</td>
<td>1-7/8”</td>
</tr>
<tr>
<td>8</td>
<td>#6</td>
<td>48”</td>
<td>9-1/2”</td>
<td>15”</td>
<td>2-1/4”</td>
</tr>
<tr>
<td>20</td>
<td>#9</td>
<td>86”</td>
<td>12-1/2”</td>
<td>20”</td>
<td>3”</td>
</tr>
</tbody>
</table>

Note: Wire style is for use with 1.3 ton P-53 Eye Anchors only.

P-60 Swift Lift Tension Bar Installation

The proper installation of a tension bar is as follows:

1) Place the tension bar through the eye of the anchor in such a manner that the tension bar contacts the bottom of the eye.
2) Make certain the legs of the tension bar are equal on either side of the anchor.
3) Wire the tension bar into position so that the tension bar stays in contact with the bottom of the eye. (See sketch below.)

DO NOT attempt to use field-bent bars as a replacement for the Dayton Superior P-60 Tension Bar. Field bending may result in an improperly shaped tension bar, an incorrect radius and/or a cracked bar. A problem, such as this, can cause the field-bent tension bar to fail prematurely.

To Order:
Specify: (1) quantity, (2) name, (3) anchor size

Example:
200, P-60 Swift Lift Tension Bar, 10-ton anchor
P-51 SL Lifting Eye - Edge Lifting in Shear Condition

The Dayton Superior P-51 SL Lifting Eye is a high quality steel casting. The P-51 lifting eye fits into the recess formed by the recess plug and engages the spherical head of the P-52 Swift Lift Anchor. The connection of the eye to the anchor can only be accomplished with the ball of the lifter facing the surface of the concrete. Accidental disengagement is prevented by a gravity actuated safety pin. The P-51 SL Lifting Eye is available in two sizes that are recommended for tilt-up edge lift applications. The 2 Ton unit that mates with the 9/16” diameter Swift Lift anchor and the 4 Ton unit that utilizes the 3/4” diameter anchor.

To Order:
Specify: (1) quantity, (2) name, (3) size.
Example:
5, P-51 SL Lifting Eyes, 4 Ton units.

How to Use the P-51 SL Lifting Eye:
1. Engage the lifting eye and the anchor.
2. Rotate the lifting eye into the lifting position and attach the crane hook. See sketch above. When the lifting eye is rotated to the working position, the safety pin will drop into position to prevent accidental release of the lifter.
Do not use the P-51 SL Lifting Eye for face lift insert applications.

Inspection: The general condition and degree of wear of the P-51 lifting eye should be checked on a regular basis, at least every three months. Areas of careful exam are shown as dimensions “H” and “M” in the sketch above. The maximum width of “H” and the minimum thickness of “M” are shown in the chart below. If either of these limits is exceeded, the unit must be removed from service and discarded. Also, check the safety pin to ensure that it is in good condition and moves freely. If the pin is worn or does not move freely, it must be replaced. Replacement pins are available.

Maintenance: The only maintenance on the P-51 SL Lifting Eye is the replacement of the safety pin. No other repairs, alterations or welding are permitted.

Warning! Do not attempt to lift with the P-51 SL Lifting Eye if the unit has rotated from the correct working position (facing the concrete). Lifting with the hardware rotated will overload the anchor and may result in a premature failure.

### Limiting Dimensions On P-51 SL Lifting Eye (Inches)

<table>
<thead>
<tr>
<th>Anchor Shaft Diameter</th>
<th>H Maximum Width</th>
<th>M Minimum Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/16</td>
<td>0.709</td>
<td>0.236</td>
</tr>
<tr>
<td>3/4</td>
<td>0.984</td>
<td>0.315</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General Information Dimensions of P-51 SL Lifting Eye (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>2.64</td>
</tr>
<tr>
<td>3.00</td>
</tr>
</tbody>
</table>

### Ground Release II System

**Warning!** Do not attempt to lift with the P-51 SL Lifting Eye if the unit has rotated from the correct working position (facing the concrete). Lifting with the hardware rotated will overload the anchor and may result in a premature failure.
Gyro Tilt Plus™ System

Gyro Tilt Plus™ System*

The Gyro Tilt Plus™ System is designed to quickly and efficiently lift and handle tilt-up panels and to be easily released from the ground. Ladders are seldom required when utilizing this system.

T-49 Gyro Tilt Plus™ Face Lift Insert

The Dayton Superior T-49 Gyro Tilt Plus Face Lift Insert is a 3/4" diameter insert manufactured from high quality steel. The hot forged head is engaged by the system hardware. The insert assembly is complete with plastic void and plastic protected wire base. The insert assembly is easily positioned and tied to the rebar mat and requires no special orientation.

To Order:
Specify: (1) quantity, (2) name, (3) panel thickness, (4) bottom face exposed aggregate or form liner thickness.

Example:
150, T-49 Gyro Tilt Plus™ Face Lift Inserts, 6” panel with 3/4” bottom face exposed aggregate.

Exposed Aggregate Panel Inserts

Tilt-up panels with exposed aggregate or formliner thickness are often cast face down. In these panels, the aggregate or form liner thickness, as well as the structural thickness are required to determine correct insert height.

For panels cast with exposed aggregate face up, the overall thickness of the panel determines insert height.

*U.S. Patent No. 4,703,595; 4,368,914 and 4,769,960.
Gyro Tilt Plus™ System

T-49-E Gyro Tilt Plus Edge Lift Insert

The Dayton Superior T-49-E Gyro Tilt Plus Edge Lift Insert is the same basic insert as the face lift insert, but is furnished without the wire base. This allows the plastic void to be nailed directly to the panel form. Standard T-49-E insert is 3/4” x 9-1/2”, other lengths are available on request.

Typical Edge Lift Application

To Order:
Specify: (1) quantity, (2) name, (3) insert length.
Example:
100, T-49-E Gyro Tilt Plus Edge Lift Insert, 9-1/2” long.

T-49-E Gyro Tilt Plus Edge Lift Insert - Safe Working Loads (lbs.)

<table>
<thead>
<tr>
<th>Spacing Between Anchors</th>
<th>Panel Thk.</th>
<th>4-1/2”</th>
<th>5”</th>
<th>6”</th>
<th>7”</th>
<th>8”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sd_e</td>
<td>2-1/4”</td>
<td>2-1/2”</td>
<td>3”</td>
<td>3-1/2”</td>
<td>4”</td>
</tr>
<tr>
<td>20°</td>
<td>Shear*</td>
<td>4,000</td>
<td>4,500</td>
<td>4,920</td>
<td>5,340</td>
<td>6,400</td>
</tr>
<tr>
<td></td>
<td>Tension</td>
<td>4,000</td>
<td>5,000</td>
<td>6,000</td>
<td>6,800</td>
<td>8,000</td>
</tr>
<tr>
<td>30°</td>
<td>Shear*</td>
<td>4,000</td>
<td>4,500</td>
<td>4,920</td>
<td>5,340</td>
<td>6,400</td>
</tr>
<tr>
<td></td>
<td>Tension</td>
<td>5,200</td>
<td>6,600</td>
<td>8,100</td>
<td>9,200</td>
<td>10,600</td>
</tr>
<tr>
<td>40°</td>
<td>Shear*</td>
<td>4,000</td>
<td>4,500</td>
<td>4,920</td>
<td>5,340</td>
<td>6,400</td>
</tr>
<tr>
<td></td>
<td>Tension</td>
<td>6,200</td>
<td>7,800</td>
<td>9,700</td>
<td>11,100</td>
<td>12,500</td>
</tr>
<tr>
<td>50°</td>
<td>Shear*</td>
<td>4,000</td>
<td>4,500</td>
<td>4,920</td>
<td>5,340</td>
<td>6,400</td>
</tr>
<tr>
<td></td>
<td>Tension</td>
<td>7,050</td>
<td>8,800</td>
<td>10,800</td>
<td>12,700</td>
<td>14,000</td>
</tr>
<tr>
<td>60°</td>
<td>Shear*</td>
<td>4,000</td>
<td>4,500</td>
<td>4,920</td>
<td>5,340</td>
<td>6,400</td>
</tr>
<tr>
<td></td>
<td>Tension</td>
<td>7,800</td>
<td>9,300</td>
<td>11,300</td>
<td>13,400</td>
<td>15,150</td>
</tr>
</tbody>
</table>

Safe Working Loads reflect approx. 2:1 safety factor in normal weight 2,500 psi concrete.
See page 4 for lightweight concrete reduction factors.

Note: Edge lift applications require the use of the Gyro Tilt Plus T-51 Shear Bar to develop the shear loads displayed in the chart.
Shear loads are based on mandatory use of shear bar.
Gyro Tilt Plus™ System

T-50 Gyro Tilt Plus™ Hardware
The Dayton Superior T-50 Gyro Tilt Plus Hardware is designed to accomplish the task of lifting and handling tilt-up panels quickly and efficiently. High safe working load, ease of operation and positive ground release provide tilt-up effectiveness.

To Order:
Specify: (1) quantity, (2) name.
Example: 8, T-50 Gyro Tilt Plus Hardware.

T-51 Gyro Tilt Plus Shear Bar
The Dayton Superior T-51 Gyro Tilt Plus Shear Bar provides added shear strength to the tilt-up panel by spreading the shear loads over a wider area. The T-51 shear bar is mandatory on Gyro Tilt Plus edge lift applications.

To Order:
Specify: (1) quantity, (2) name.
Example: 200, T-51 Gyro Tilt Plus Shear Bars.

T-52 Heavy Duty Gyro Tilt Plus Insert
The Dayton Superior T-52 Heavy Duty Gyro Tilt Plus Insert is similar to the design of the proven T-49 insert. The T-52 insert’s load capacity is made possible by the 1” diameter hot forged anchor. The insert assembly is furnished complete with plastic void and plastic protected wire base. The assembly is easily positioned and wired to the rebar mat and requires no special orientation.

To Order:
Specify: (1) quantity, (2) name, (3) panel thickness.
Example: 200, T-52 Heavy Duty Gyro Tilt Plus Face Lift Inserts for 10” panel thickness.

<table>
<thead>
<tr>
<th>Structural Panel Thickness</th>
<th>8”</th>
<th>8-1/2”</th>
<th>9”</th>
<th>9-1/2”</th>
<th>10”</th>
<th>10-1/2”</th>
<th>11”</th>
<th>11-1/2”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor Length</td>
<td>6-3/4”</td>
<td>6-3/4”</td>
<td>7-1/8”</td>
<td>7-1/8”</td>
<td>7-1/8”</td>
<td>7-1/8”</td>
<td>7-1/8”</td>
<td>10”</td>
</tr>
<tr>
<td>Insert Safe Working Load (lbs.)</td>
<td>15,500</td>
<td>16,400</td>
<td>18,200</td>
<td>19,100</td>
<td>20,000</td>
<td>20,900</td>
<td>21,800</td>
<td>22,800</td>
</tr>
</tbody>
</table>

T-53 Heavy Duty Gyro Tilt Plus Hardware
The Dayton Superior T-53 Heavy Duty Gyro Tilt Plus Hardware is a strong, easy to use unit used in conjunction with the T-52 insert to lift, handle and place heavy concrete tilt-up panels.

To Order:
Specify: (1) quantity, (2) name.
Example: 8, Heavy Duty Gyro Tilt Plus Hardware units.

Note: It is a good practice to have an extra hardware unit on the job site in case there is a need to replace one in use.
How to use the Gyro Tilt Plus™ System
Do Not Use Face Lift Insert For Edge Lifting
Do Not Use This System On Top Surface, Seeded, Exposed Aggregate 3/4” or Larger.

Precheck all insert holes with hardware prior to erection date, following instruction steps below, so that during tilting, proper hardware action is assured. See page 51 for proper procedure for removal of plastic recess plug.

1. **Inserts Installation** — T-49 Gyro Tilt Plus™ Inserts are simply wired to the rebar mat at designated points. No special orientation is required, but reasonable care should be taken to assure that the insert is the correct height for the panel and remains perpendicular to the panel face during concrete placement.

   **Note:** The short length of rebar recommended is an aid to prevent the insert from moving during concrete placement. When this rebar is added for insert stability, it should be placed against the vertical portion of the insert and at least 1” away from the insert’s foot. This extra rebar is not required to develop the insert’s safe working load.

Hardware Installation — After proper concrete cure, the T-50 Gyro Tilt Plus™ Hardware is attached to the crane rigging and moved to the panel to be lifted. The plastic void cap is removed from the insert assembly and the void checked for foreign matter. The hardware is placed in the void in the “open” position that allows the hardware to nest over the head of the insert. Moving the hardware ring to the “closed” position captures the head of the insert and allows the lifting sequence to begin. Visual inspection will confirm proper hardware installation.

**Warning!** The crane line and bail of the lifting hardware must be turned in the direction of the cable forces before the lifting operation begins. The crane line must not be allowed to apply a sideward force on the bail, as this condition is dangerous and could lead to premature failure of the hardware or insert.

Stripping — After the panel has been lifted, placed and properly braced, the Gyro Tilt Plus™ Hardware is released by slackening the crane line and a simple, solid pull on the ground release lanyard. With the hardware released, the crane may move to the next panel and repeat the sequence.
How to Remove the Gyro Tilt Plus™ Plastic Recess Plug

1. The Gyro Tilt Plus™ Insert’s location in the panel is easily found by locating the antennae which will project through the surface of the concrete.

2. Using an ordinary claw hammer, tap lightly around the antennae, breaking through the thin skin of concrete to expose the insert. Avoid striking the concrete too hard so as not to break through the plastic recess plug.

3. Drive the claws of the hammer down about 3/8” between the end of the recess plug and the concrete.

4. Pry up on the end of the recess plug until one half of it “pops up” to a point where it is about one third of the way out of the concrete. For the time being, leave it as it is and proceed with step #5.

5. Repeat steps #3 and #4 to loosen the opposite half of the recess plug.

6. Grasp both halves of the recess plug between the thumb and finger and squeeze.

7. Both halves of the recess plug should now be easily removed, exposing the insert.

8. If one half of the recess plug should be hard to remove, drive the claws of the hammer as deeply as possible between the recess plug and the top of the insert, as shown above. Push forward on the hammer with one quick motion. This will remove the recess plug.

9. Use a blower to remove all debris from around the insert and the recess plug. The insert is now ready to receive the lifting hardware.

Proper Hardware Usage

Prior to lifting any tilt-up panel, apply an initial load to the crane lines, making certain that the hardware is properly attached to the head of the T-49 Gyro Tilt Plus™ Insert and that the bail of the lifting hardware is aligned with the crane line.

Warning! Do not apply a sideward load to the bail of the lifting hardware.

Warning! Do not modify, weld or alter in any way Gyro Tilt Plus™ Hardware units. Such actions could lead to premature failure of the hardware.
Warning! All Gyro Tilt Plus™ Inserts must be properly located in relation to the center of gravity of the panel. See notes below.

Safety Notes:
The inserts must be properly located in relation to edges, corners, openings and ledgers, and at distances allowing the development of a full concrete shear cone. Minimum distances are shown in the sketches above. Placing an insert closer to an edge than the minimums shown may reduce the effective concrete shear cone and reduce the insert’s safe working load.

Lifting inserts must be properly wired in place so that the vertical axis of the insert is perpendicular to the panel surface. Care must be taken to avoid displacement of the inserts during concrete placement and screeding operations.

Do not weld to a lifting insert. Welding causes embrittlement and can result in an insert failure. See related safety information concerning welding on inside front cover.
Tilt-Up 3 Lifting System

TILT-UP 3 LIFTING SYSTEM

The Dayton Superior Tilt-Up 3 Lifting System is a quality high strength, economical method for lifting, handling and placing concrete tilt-up wall panels. The System features hardware applicable to face lift and edge lift applications.

T-90-F Face Lift Insert

The Dayton Superior T-90-F Face Lift Insert is furnished as an assembly, complete with a strong forged-foot anchor, wide-spread stable plastic base and plastic locator setting plug. The T-90-F insert is easy to position and tie into the rebar mat, plus an optional rebar clip is available to facilitate tying the insert to the mat.

To Order:
Specify: (1) quantity, (2) name, (3) panel structural thickness.

Example:
150 T-90-F Tilt-Up 3 Face Lift Inserts, 7" panel structural thickness.

T-90-C Tilt-Up 3 Rebar Clip

The T-90-C Tilt-Up 3 Rebar Clip is available to provide a quick, positive method of fastening the T-90-F insert to the rebar mat. The clip slips onto the body of the anchor where it “floats” with any movement of the rebar mat. Thus, preventing misalignment of the insert due to fluctuations of the rebar mat. T-90-C Rebar Clips should be included when ordering T-90-F Face Lift Inserts.

To Order:
Specify: (1) quantity, (2) name, (3) panel structural thickness.

Example:
150 T-90-F Tilt-Up 3 Face Lift Inserts with T-90-C Rebar Clip, 7" panel structural thickness.

<table>
<thead>
<tr>
<th>Structural Panel Thickness</th>
<th>5&quot;</th>
<th>5-1/2&quot;</th>
<th>6&quot;</th>
<th>6-1/4&quot;</th>
<th>6-1/2&quot;</th>
<th>7&quot;</th>
<th>7-1/4&quot;</th>
<th>7-1/2&quot;</th>
<th>8&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insert Safe Working Load</td>
<td>8,000 lbs.</td>
<td>10,000 lbs.</td>
<td>12,000 lbs.</td>
<td>12,500 lbs.</td>
<td>13,000 lbs.</td>
<td>15,000 lbs.</td>
<td>15,000 lbs.</td>
<td>15,000 lbs.</td>
<td></td>
</tr>
</tbody>
</table>

Safe working load provides a safety factor of approximately 2 to 1 in 2,500 psi normal weight concrete. DO NOT use with top seeded aggregate 1/2" or larger as aggregate may “pop out” during the erection process, resulting in a reduced insert safe working load.
Tilt-Up 3 Lifting System

T-90-E Tilt-Up 3 Edge Lift Insert

The Tilt-Up 3 Edge Lift Insert has an integral shear plate for maximum transfer of shear loads into the concrete. The T-90-E insert uses FL148 4T x 11.88” Anchor and a P-99-D 4 Ton Disposable Recess Plug that attaches the insert assembly to the panel form. This Recess Plug is ordered separately.

To Order:
Specify: (1) quantity, (2) name
Example:
200 T-90-E Tilt-Up 3 Edge Lift Inserts.

<table>
<thead>
<tr>
<th>Structural Panel Thickness</th>
<th>Shear Safe Working Load</th>
<th>Tension Safe Working Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>4”</td>
<td>4,300 lbs.</td>
<td>4,700 lbs.</td>
</tr>
<tr>
<td>5”</td>
<td>5,250 lbs.</td>
<td>5,900 lbs.</td>
</tr>
<tr>
<td>6”</td>
<td>6,200 lbs.</td>
<td>7,000 lbs.</td>
</tr>
<tr>
<td>7”</td>
<td>7,050 lbs.</td>
<td>8,200 lbs.</td>
</tr>
</tbody>
</table>

Safe working load provides a safety factor of approximately 2 to 1 in 2,500 psi

Note: The proper method of attaching the hardware to the T-90-E insert is shown in the sketch. Make certain that the crane applies the lifting load in a direction toward the top of the panel or perpendicular to the casting bed. DO NOT allow the crane to apply a load toward the bottom of the panel.

T-92 Tilt-Up 3 Lifting Hardware

The T-92 Tilt-Up 3 Lifting Hardware consists of a clutch body, curved bolt/release arm and high strength bail. The bail is designed to readily align itself to the pull of the rigging. Once the hardware is properly engaged and under load, the hardware cannot be disengaged. Release of the hardware from ground level is easily accomplished after the load has been relaxed. The T-92 hardware is designed to service both face lift and edge lift System applications.

To Order:
Specify: (1) quantity, (2) name
Example:
5 T-92 Tilt-Up 3 Lifting Hardware

Note: It is a good practice to always have an extra lifting unit on hand in case the need for a spare presents itself.
### How to Remove the Tilt-Up 3 Plastic Recess Plug

1. The Tilt-Up 3 Insert’s location in the panel is easily found by locating the antennae which will project through the surface of the concrete.

2. Using an ordinary claw hammer, tap lightly around the antennae, breaking through the thin skin of concrete to expose the insert. Avoid striking the concrete too hard so as not to break through the plastic recess plug.

3. Drive the claws of the hammer down about 3/8” between the end of the recess plug and the concrete.

4. Pry up on the end of the recess plug until one half of it pops up to a point where it is about one third of the way out of the concrete. For the time being, leave it as it is and proceed with step #5.

5. Repeat steps #3 and #4 to loosen the opposite half of the recess plug.

6. Grasp both halves of the recess plug between the thumb and finger and squeeze.

7. Both halves of the recess plug should now be easily removed, exposing the insert.

8. If one half of the recess plug should be hard to remove, drive the claws of the hammer as deeply as possible between the recess plug and the top of the insert, as shown above. Push forward on the hammer with one quick motion. This will remove the recess plug.

9. Use a blower to remove all debris from around the insert and the recess plug. The insert is now ready to receive the lifting hardware.

#### Proper Hardware Usage

Prior to lifting any tilt-up panel, apply an initial load to the crane lines, making certain that the hardware is properly attached to the head of the T-90-F Tilt-Up 3 Insert and that the ball of the lifting hardware is aligned with the crane line.

**Warning!** Do not apply a sideward load to the bail of the lifting hardware.

### Warning!
Do not modify, weld or alter in any way Tilt-Up 3 Hardware units. Such actions could lead to premature failure of the hardware.
**Tilt-Up 3 Hardware Installation Sequence**

1) Tilt-Up 3 Hardware in open position centered over the T-90-F Insert.

2) The Hardware nestled in the Insert Recess and the Bolt/Release Arm engaged. The Bolt/Release Arm must contact the panel surface as shown in the sketch. Chip away excess concrete, if necessary, to nest the Bolt/Release Arm on the concrete surface. Contact a Dayton Superior Technical Service Center if unable to nest the Bolt/Release Arm on the face of the panel.

3) The installation is complete. Erection may proceed.

---

**T-92 Tilt-Up 3 Lifting Hardware Release Sequence**

1) After the panel erection is complete and the panel has been properly braced/tied-off, the crane line should be relaxed slightly to permit the release of the lifting hardware.

2) To Release the hardware, apply a quick, even downward force to the release line. The hardware stays attached to the crane line and is moved to the next panel.
Minimum Insert Distances

Warning! All Tilt-Up 3 Inserts must be properly located in relation to the center of gravity of the panel. See notes below.

Safety Notes:
Safe use of the Tilt-Up 3 System requires the inserts to be positioned so that the arrows on the direction label point to the top and bottom of the panel (parallel to the sides of the panel).

The inserts must be properly located in relation to edges, corners, openings and ledgers, and at distances allowing the development of a full concrete shear cone. Minimum distances are shown in the sketches above. Placing an insert closer to an edge than the minimums shown may reduce the effective concrete shear cone and reduce the insert’s safe working load.

Lifting inserts must be properly wired in place so that the vertical axis of the insert is perpendicular to the panel surface. Care must be taken to avoid displacement of the inserts during concrete placement and screeding operations.

Do not weld to a lifting insert. Welding causes embrittlement and can result in an insert failure. See related safety information concerning welding on inside front cover.
Coil Inserts

T-1 Single Pick-up Insert

- Available with plastic tipped feet or stainless steel tips.
- Available with insert locator plug installed.
- Uses standard coil threaded bolts.
- Uses T-12 or T-26 lifting plate.
- Insert provides 3/8” setback from panel face.
- Recommended minimum edge distance is 15”.
- For proper bolt length see page 62.

Only the 1-1/4” and 1-1/2” diameter inserts are recommended for use as pick-up inserts. The 1” diameter inserts are used for attachment of strong backs to a panel while the 3/4” diameter is used as a brace anchor.

T-21 Insert Locator Plugs

- The T-21 plastic setting plugs may be ordered installed in free standing inserts such as the T-1 and be ready for concrete placement to save time.
- Bottom portion of plug has a large barrel shape which allows B-14 coil bolt to penetrate into the void.
- Made of flexible but durable plastic and top portion is removed from coil insert by prying out with screwdriver.
- The locator tip projects above the surface of the concrete; it bends without breaking off during screeding and returns to its original position once the screed has passed over.
- The distinctive bright color of the plug makes it easy to locate inserts in the slab.
- The coil bolt used to attach lifting, bracing or other hardware will crush the bottom half of the plug as it is screwed into the insert and normal penetration beyond the end of the coil will be achieved with ease.

To Order:
Specify: (1) quantity, (2) type, (3) diameter of bolt to be used, (4) panel a thickness and insert heights, (5) with or without Insert Locator Plug, (6) plastic coated feet or stainless steel tips.

Example:
300 pcs. T-1 Single Pick-Up Insert, 1-1/2” diameter for 7-1/2” slab 7-1/8” insert height with insert Locator Plugs and plastic coated feet.

<table>
<thead>
<tr>
<th>Panel Thickness and Safe Working Load per Insert (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coi l Bolt Diameter</td>
</tr>
<tr>
<td>3/4”</td>
</tr>
<tr>
<td>1”</td>
</tr>
<tr>
<td>1-1/4”</td>
</tr>
<tr>
<td>1-1/2”</td>
</tr>
</tbody>
</table>

Safe working load provides a safety factor of approximately 2 to 1 in 2,500 psi concrete.
DANGER! DO NOT use as an edge lifting insert, as insert is not designed for such use.
See page 6 for lightweight concrete load reduction factors.

To Order:
Specify: (1) quantity, (2) type, (3) diameter of bolt to be used, (4) panel a thickness and insert heights, (5) with or without Insert Locator Plug, (6) plastic coated feet or stainless steel tips.

Example:
100 sets T-21 Insert Locator Plugs, 1-1/4” diameter.
Coil Inserts

T-2 Double Pick-up Insert

- Available to fit 1” or 1-1/2” diameter coil bolts.
- Available with plastic tipped feet or stainless steel tipped feet.
- Available with insert locator plugs installed.
- Designed for use with T-8 lifting angle.
- Insert is setback 3/8” from panel face.
- For proper bolt length see page 62.

<table>
<thead>
<tr>
<th>Panel Thickness and Safe Working Load per Insert (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coil Diameter</td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td>1”</td>
</tr>
<tr>
<td>1-1/2”</td>
</tr>
</tbody>
</table>

Safe working load provides a safety factor of approximately 2 to 1 in 2,500 psi concrete.

DANGER! DO NOT use as an edge lifting insert, as insert is not designed for such use.
See page 6 for lightweight concrete load reduction factors.

To Order:
Specify: (1) quantity, (2) type, (3) diameter of bolt to be used, (4) panel a thickness and insert heights, (5) with or without Insert Locator Plug, (6) plastic coated feet or stainless steel tips.

Example:
250 pcs. T-2 Double Pick-Up Insert, 1” diameter for 5-1/2” slab 5-1/8” insert height with insert Locator Plugs and plastic coated feet.

Insert Placement

Danger! All T-2 Inserts must be positioned with the two coils in a horizontal line. If placed perpendicular, the shear loading (when the panel is raised to a vertical position) may be concentrated on one bolt only and severe strain will occur at the cable clevis and the lifting angle gusset.

T-7S, T-7P Slotted Setting Plugs

- Made of steel, or plastic continuous threaded rod.
- Used with standard coil threaded inserts to provide void for B-14 coil bolts.
- Top is cut off square so screed can pass over, also slotted to accept screwdriver.
- Threads and slot should be coated with non-staining lubricant to prevent bonding.
- Loosen studs within 8-24 hours for easier removal when ready to lift.
- Steel - standard sizes are 3/4”, 1”, 1-1/2” and 1-1/4” diameter x 4” length. Special lengths available.
- Plastic - standard sizes are 3/4”, 1”, and 1-1/4” diameter x 3” length.

To Order:
Specify: (1) quantity, (2) type, (3) diameter

Example:
100 sets T-7S Slotted Setting Plugs, 1-1/4” diameter
Exposed Aggregate Details

Exposed Aggregate Face Down

For exposed aggregate panels cast face down, the height of the coil insert should be 3/8” less than the structural panel thickness. If inserts are ordered for overall panel thickness, they will be too high when placed on aggregate.

Exposed Aggregate Face Up

For exposed aggregate panels cast face up, the height of the coil insert should be the same as the structural panel thickness and not protrude up into the exposed aggregate.

Lifting Exposed Aggregate Face Up

When lifting exposed aggregate panels cast face up, if aggregate is carefully tamped and leveled during aggregate placing, it may not be necessary to place a grout or bearing pad under lifting plate. If aggregate surface is uneven, a plywood bearing pad is recommended under the lifting plate.

When used with large exposed aggregate face up panels, a grout pad is required to provide a bearing surface for the plate. Longer length bolts will be required for these panels. See page 62 and 63 and the illustration below for determining overall length of required bolts.

Safety Information

<table>
<thead>
<tr>
<th>Coil Bolt Diameter</th>
<th>Minimum Coil Penetration</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4”</td>
<td>2-1/4”</td>
</tr>
<tr>
<td>1”</td>
<td>2-1/2”</td>
</tr>
<tr>
<td>1-1/4”</td>
<td>2-1/2”</td>
</tr>
<tr>
<td>1-1/2”</td>
<td>3”</td>
</tr>
</tbody>
</table>

Danger! Incorrect penetration of coil bolts through the coil may result in premature failure.
How to use Coil Face Inserts

1. Position insert in place and wire securely to rebar. Make sure coil is perpendicular to panel face.

2. Place concrete, vibrate carefully in region of insert, and use screeding techniques which will prevent crowns in slab. Excessive slab thickness will increase setback dimensions and will require the use of longer bolts.

3A. After plastic plug has been located, chip concrete cover off and with a pair of pliers pull the plug out of the coil. Remove T-21 Plastic plug by prying it out with a screwdriver.

3B. Hole should be small and concise and if not used immediately should be plugged to prevent debris and water from entering.

4. Clean hole with compressed air, then place lift plate directly over insert hole.

5. Slip bolt through hole in lift plate and start bolt into coil by hand.

6. Slip bolt through hole in lift plate and start bolt into coil by hand.

7. Turn bolt clockwise with a wrench until bolt is secured tight against lift plate.

8. Attach crane line (use double clevises or swivels to take out twists in crane line) to lifting bail. Apply initial tension to crane lines and make sure bail is aligned in direction of applied load.

9. To remove lift plate after panel is erected turn bolt counter clockwise with a wrench until bolt is free.

Danger! Crane line loads and bail of double-swivel lift plate must be turned in direction of crane forces before lifting operation begins. Crane line loads must not be allowed to apply sideways loads to bail as this condition is dangerous and could lead to premature failure of hardware.
Coil Inserts

Edge Pick-up

<table>
<thead>
<tr>
<th>Insert Type</th>
<th>Coil Bolt Dia.</th>
<th>Concrete Strength</th>
<th>Load Condition</th>
<th>4&quot; Panel</th>
<th>5&quot; Panel</th>
<th>5-1/2&quot; Panel</th>
<th>6&quot; Panel</th>
<th>6-1/2&quot; Panel</th>
<th>7&quot; Panel</th>
<th>7-1/2&quot; Panel</th>
<th>8&quot; Panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-3-A</td>
<td>3/4&quot; Single</td>
<td>2,500</td>
<td>Tension</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>T-3-A</td>
<td>1&quot; Single</td>
<td>2,500</td>
<td>Tension</td>
<td>6,000</td>
<td>6,600</td>
<td>7,200</td>
<td>7,800</td>
<td>8,400</td>
<td>9,000</td>
<td>9,000</td>
<td></td>
</tr>
<tr>
<td>T-3</td>
<td>3/4&quot; Double</td>
<td>2,500</td>
<td>Tension</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>T-3</td>
<td>1&quot; Double</td>
<td>2,500</td>
<td>Tension</td>
<td>8,000</td>
<td>8,800</td>
<td>9,600</td>
<td>10,400</td>
<td>11,200</td>
<td>12,000</td>
<td>12,800</td>
<td></td>
</tr>
</tbody>
</table>

Approximate safety factor 2 to 1 in normal weight concrete. SWL's are based on the insert set back 1/2" from face of concrete. Warning! See page 6 for reduction factors for use with lightweight concrete.

Proper Placement of “Edge” T-3 or T-3-A Inserts

When using EDGE inserts a 1/2" thick wood washer or cut washers must be used against the ends of the loops when bolting the insert in place prior to placing concrete. This is necessary so that when the lifting plate is drawn down tightly it will bear against the concrete and not against the loop ends. This procedure is necessary to develop the loads shown in the table. EDGE inserts must be located in the center of the panel structural thickness.
Coil Inserts

Total System and Safe Working Loads
The user must be aware of the capacity of the total lifting system since the determination of the safe working load involves concrete strength and safe working loads of the insert, bolt and lifting hardware. All must be evaluated with the lowest safe load component determining the safe working load of the system. This handbook has such values listed in tabular form for all components including the minimum concrete compressive strengths that must exist at time of use. Therefore, do not assume that an insert’s safe working load is that of the system, since the SWLs of the bolt or lifting hardware may be less than that of the insert. Examine the values of all components.

Coils

<table>
<thead>
<tr>
<th>Bolt Diameter</th>
<th>A</th>
<th>B</th>
<th>Wire Diameter</th>
<th>Threads Per Inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2”</td>
<td>1-1/8”</td>
<td>25/32”</td>
<td>.162”</td>
<td>6</td>
</tr>
<tr>
<td>3/4”</td>
<td>1-9/16”</td>
<td>1-3/32”</td>
<td>.218”</td>
<td>4-1/2</td>
</tr>
<tr>
<td>1”</td>
<td>2”</td>
<td>1-7/16”</td>
<td>.281”</td>
<td>3-1/2</td>
</tr>
<tr>
<td>1-1/4”</td>
<td>2”</td>
<td>1-11/16”</td>
<td>.281”</td>
<td>3-1/2</td>
</tr>
<tr>
<td>1-1/4”</td>
<td>3-3/16”</td>
<td>1-11/16”</td>
<td>.281”</td>
<td>3-1/2</td>
</tr>
<tr>
<td>1-1/2”</td>
<td>2-5/16”</td>
<td>1-15/16”</td>
<td>.281”</td>
<td>3-1/2</td>
</tr>
<tr>
<td>1-1/2”</td>
<td>3-7/16”</td>
<td>1-15/16”</td>
<td>.281”</td>
<td>3-1/2</td>
</tr>
</tbody>
</table>

Warning! Do not use coils without strut or leg wires welded to them as they will not develop sufficient load carrying capabilities.

How to Determine Bolt Length

- Standard length coils are available for 3/4”, 1”, 1-1/4” and 1-1/2” diameter bolts.
- Longer length coils for 1-1/4” or 1-1/2” diameter bolts are used in T-1, T-24 Single Pick-up Inserts.

Note! Always check to make certain that you have the proper clearance void to prevent the Lifting Bolt from bottoming out. You must be able to tighten the bolt down tight to prevent the lifting hardware from slipping and applying unexpected loads to the insert.

Note! Face insert lifting bolt lengths are calculated in a similar manner to that shown above.
B-14 Coil Bolts and Minimum Coil Penetration Information

- B-14 coil bolts have fast-acting, self-cleaning threads and are available in 3/4", 1", 1-1/4" and 1-1/2" diameter bolts.
- Bolts are furnished with integrally formed heads.
- May be reused—but will wear and must be regularly inspected.
- Must be kept clean and lubricated.
- When determining overall length of lifting bolt see example on page 62—you must consider:
  A. Height of hardware
  B. Insert Setback
  C. Minimum coil penetration
- Minimum coil penetration shown in the charts below applies to all coil products.

B-14 Coil Bolts High Strength with Integrally Formed Hex Heads
(Fabricated from Blanks Meeting ASTM A-325 Standards)

<table>
<thead>
<tr>
<th>Bolt Length</th>
<th>Minimum Thread Length</th>
<th>Tension</th>
<th>Safe Working Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4&quot;</td>
<td>2-3/4&quot;</td>
<td>8,000 lbs.</td>
<td>14,500 lbs.</td>
</tr>
<tr>
<td>1&quot;</td>
<td>3&quot;</td>
<td>5,300 lbs.</td>
<td>9,600 lbs.</td>
</tr>
<tr>
<td>1-1/4&quot;</td>
<td>2-3/4&quot;</td>
<td>14,500 lbs.</td>
<td>20,300 lbs.</td>
</tr>
<tr>
<td>1-1/2&quot;</td>
<td>3&quot;</td>
<td>9,600 lbs.</td>
<td>13,500 lbs.</td>
</tr>
</tbody>
</table>

Minimum Coil Penetration

- Minimum coil penetration shown in the charts below applies to all coil products.

To Order:
Specify: (1) Quantity, (2) Type, (3) Diameter of Bolt, (4) Length of Bolt, (5) Type

Example:
300 pcs., B-14 Coil Bolts, 1" diameter, 5" long with welded on B-25 Coil Nut Head

Approximate safety factor 5 to 1, for tilt-up hardware.
Coil Inserts

T-8 Lifting Angle
- Designed for use with T-2 Double Pick-Up Inserts.
- Shorter bolts are required than those used with swivel lifting plates, normally 4" lengths.
- May be used for face lifting inserts and also edge lifting inserts when panel thickness exceeds 6".
- Cut washers are required under head of all bolts.
- Made from structural steel angle 6" x 6" x 3/4" x 21" long with 1/2" diameter hole for clevis attachment.
- Safe working load is 18,000 lbs.

T-12 Swivel Lift Plate
- Designed for use with single pick-up inserts.
- Can be used for face lifting or edge lifting
- Available for use with 3/4" or 1" diameter bolts.
- Complete unit made of forged steel.
- Safe working loads: 3/4" diameter is 7,200 lbs. and 1" diameter is 9,000 lbs.

<table>
<thead>
<tr>
<th>Type</th>
<th>Bolt Size</th>
<th>Bearing Plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-12</td>
<td>3/4&quot; Diameter</td>
<td>1/2 x 2-1/2 x 5&quot;</td>
</tr>
<tr>
<td>T-12</td>
<td>1&quot; Diameter</td>
<td>1/2 x 2-1/2 x 5&quot;</td>
</tr>
</tbody>
</table>

SWL provides a factor of safety of approximately 5 to 1.

Safety Notes
- All plates must have full bearing on flat, smooth surfaces
- Lifting angle and plates must not be used with out a bolt fastener of sufficient strength to develop the required loads.
- Lifting angle and plates are to be used only with the bolt diameter for which they were designed. For example use a 3/4" bolt with a 3/4" Swivel Lifting Plate, do not use a 3/4" bolt with a 1", 1-1/4" or 1-1/2" T-12 Swivel Lifting Plate
- All plates must be securely fastened to the slabs.
- For exposed aggregate panels, a groute pad is required too provide for the bearing plate
- Coil bolt penetration must agree with minimums.

Danger! Crane line loads & bails of swivel and double swivel lifting plates must be turned in direction of crane forces before lifting operations begin. Crane line loads must not be allowed to apply sideward loads to bails of Swivel Lifting Plates or Clevis Attachment Plates of Lifting Angle or Lifting Plate, as this condition is dangerous and could lead to failure of hardware.

T-26 Double Swivel Lifting Plate
- Designed for use with 1", 1-1/4" and 1-1/2" diameter coil bolts.
- Rotates 360 degrees in horizontal plane and 180 degrees in vertical plane.
- Round bearing plate provides maximum safety when used with any coil bolt lifting system.
- Heavy forged bail is made of hi-strength material.
- Double swivel action allows bail to rotate in direction of applied load.
- Safe working load is 9,000 lbs. for 1" diameter.
- Safe working load is 13,500 for 1-1/4" and 1-1/2" diameter.

<table>
<thead>
<tr>
<th>Type</th>
<th>Bolt Size</th>
<th>H</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-26</td>
<td>1&quot; Diameter</td>
<td>2-11/16&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>T-26</td>
<td>1-1/4&quot; or 1-1/2&quot; Diameter</td>
<td>2-3/4&quot;</td>
<td>7&quot;</td>
</tr>
</tbody>
</table>

To Order:
T-12 or T-26: (1) Quantity, (2) Type, (3) Size
Example:
24 pcs., T-26 Double Swivel Lifting Plate for 1-1/4" bolts.

To Order:
T-8 or T-27: (1) Quantity, (2) Type, (3) Size
Example:
8 pcs., T-8 Lifting Angles.
Coil Inserts

Continuous Coil Threaded Rod

- Available in 3/4", 1", 1-1/4" and 1-1/2" diameters.
- Available in hi tensile strengths.
- May be cut with carborundum blades without damaging the threads.
- Do not use cutting torch to cut coil rod to length.
- Used with B-13 or B-25 Coil Nuts for making special Coil Bolts.
- B-12 requires two B-13 or one B-25 Coil Nut in order to develop safe working loads.
- B-12 standard length is 12'-0"— available in any length up to 20'-0" on special order.

<table>
<thead>
<tr>
<th>Coil Rod Diameter</th>
<th>B-12 Hi Tensile Designation</th>
<th>Safe Working Load Tension (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4&quot;</td>
<td>24M</td>
<td>7,200</td>
</tr>
<tr>
<td>1&quot;</td>
<td>50M</td>
<td>15,000</td>
</tr>
<tr>
<td>1-1/4&quot;</td>
<td>75M</td>
<td>22,500</td>
</tr>
<tr>
<td>1-1/2&quot;</td>
<td>90M</td>
<td>27,000</td>
</tr>
</tbody>
</table>

Approximate safety factor of 5 to 1 for tilt-up hardware.

Example:
500 pcs. 24M, B-12 High Tensile, 1" dia. for 8-1/2" Long

B-13 Coil Nut and B-25 Heavy

- B-13 Coil Nut is made with 3/4", 1", 1-1/4" or 1-1/2" Diameter Coil Threads
- B-25 Heavy Coil Nut is made with 3/4" or 1" Diameter Coil Threads

To Order:
Specify: (1) quantity, (2) type, (3) diameter, (4) length

Example: 200 pcs. B-13 Coil Nut, 3/4"

B-11 Flat Washer

- For use with all types & sizes of bolts and coil rod.
- Made from carbon steel.
- Sizes shown will effectively transfer loads to wooden strongbacks.
- Maximum space between strongbacks should not exceed bolt diameter, plus 1/4".

<table>
<thead>
<tr>
<th>Type</th>
<th>Bolt Diameter</th>
<th>Safe Working Load</th>
<th>Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-11 Standard</td>
<td>1/2&quot;</td>
<td>2,250 lbs.</td>
<td>3&quot; x 4&quot; x 1/4&quot;</td>
</tr>
<tr>
<td>B-11 Heavy</td>
<td>1/2&quot;</td>
<td>3,375 lbs.</td>
<td>4&quot; x 5&quot; x 1/4&quot;</td>
</tr>
<tr>
<td>B-11 Standard</td>
<td>3/4&quot;</td>
<td>3,375 lbs.</td>
<td>4&quot; x 5&quot; x 3/8&quot;</td>
</tr>
<tr>
<td>B-11 Heavy</td>
<td>3/4&quot;</td>
<td>9,000 lbs.</td>
<td>5&quot; x 5&quot; x 3/8&quot;</td>
</tr>
<tr>
<td>B-11 Standard</td>
<td>1&quot;</td>
<td>9,000 lbs.</td>
<td>5&quot; x 5&quot; 1/2&quot;</td>
</tr>
<tr>
<td>B-11 Heavy</td>
<td>1&quot;</td>
<td>18,750 lbs.</td>
<td>7&quot; x 7&quot; x 3/4&quot;</td>
</tr>
<tr>
<td>B-11 Standard</td>
<td>1 - 1/4&quot;</td>
<td>12,000 lbs.</td>
<td>5&quot; x 5&quot; 5/8&quot;</td>
</tr>
<tr>
<td>B-11 Heavy</td>
<td>1 - 1/4&quot;</td>
<td>18,750 lbs.</td>
<td>7&quot; x 7&quot; 3/4&quot;</td>
</tr>
<tr>
<td>B-11 Standard</td>
<td>1 - 1/2&quot;</td>
<td>18,750 lbs.</td>
<td>5&quot; x 5&quot; 3/4&quot;</td>
</tr>
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<td>B-11 Heavy</td>
<td>1 - 1/2&quot;</td>
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<td>7&quot; x 7&quot; 3/4&quot;</td>
</tr>
</tbody>
</table>

SWL provides a factor of safety of approximately 5 to 1, for tilt-up hardware.
Strongback System

Strongbacks

When openings are required in a tilt-up panel, they often create extreme bending stresses in the remaining concrete sections. If additional reinforcing steel is not an option, strongbacks can be used effectively to stiffen the panel. Strongbacks may be fabricated from lumber, aluminum or steel and are usually reusable.

Strongback-Shore

The strongback-shore system is used to reduce stresses during the lifting process and stabilize the panel during and after erection. Generally, this system should be utilized on panels where an offset opening is equal to or greater than 1/2 the panel width. The concrete leg section must be checked for stresses to determine if additional reinforcing steel or strongbacks are needed.

Strongback size should be of sufficient width and depth to carry erection loads and consist of material strong enough to withstand repeated use. The shore depth should be the same nominal size as the panel thickness, i.e., a 6" panel would require a 4x6 or 6x6 shore.