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A double batch of material is made in 5 minutes or less without straining the laborers or compromising the integrity of the mix. No electricity or pressurized water source is needed, just a standard mechanical batch mixer. The silo is transportable. As the job progresses, the crew and silo mixing station follow.

This is how it works:

**Step 1:** To erect the silo on site, make sure the ground is dry, level, and compacted. With a 26 ft., 4,500 lb. capacity standard forklift, insert the forks of the lift into the silo’s fork pockets and raise the unit to the desired height. Four heights are available.

**Step 2:** Using the double-leg pins attached to the frame, secure the upper silo assembly by sliding the leg pins into position. Then secure the pins with the safety locking pins. Next, attach the slide gate handle in its place and get ready to load your TCC product into the silo.

**Step 3:** The bulk bags are easily loaded into the silo by inserting the forks through the bag’s reinforced loops. Once the bag is above the silo and in position, the laborer standing on the safety platform can release the bag’s double discharge chutes.

**Step 4:** After the silo is loaded with the appropriate quantity of bulk bags (for maximum capacities see page 5), place the batch mixer beneath the cone under the silo’s boot. If needed, trim the length of the boot to the top of the mixer. To make product, add the desired amount of water to the mixer and pull back the silo handle to dispense the amount of material needed to achieve the preferred consistency. Any size batch can be made. Let the product mix 4-5 minutes to ensure complete hydration of all materials for optimal workability and board life.

**Step 5:** The silo is easily relocated on site to position your mixing station as close as possible to the work, maximizing job site efficiency. With the silo legs pinned in the up or down position, insert the forks of the lift into the silo’s fork pockets. Then, raise the silo and place it in the preferred location. Make sure the forklift is equipped to safely transport the silo and that the new terrain is dry, level, and stable. Always secure all leg pins and safety pins!
Keeping Safety in Mind

To ensure that a safe working environment is provided to all individuals who are operating or have contact with TCC equipment, the following procedures for working with TCC silos and bulk bags have been formulated:

- Since safety is the responsibility of everyone, we ask that you familiarize yourself with these procedures, and make sure that everyone operating or coming in contact with TCC silos and bulk bags are familiar with and can implement the following procedures.

- It is the responsibility of everyone to be aware of necessary precautions that must be taken to ensure that laborers are provided with a safe working environment; that they implement safe handling and operating procedures for their own safety as well as others.

**Note:** These warnings do not constitute all possible safety hazards encountered in the use of such products on a construction site. All applicable OHSA regulations must be followed in the setup, relocation, cleaning, or use of the silo and product.
## Five-Bag Silo

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Footprint</strong></td>
<td>8 ft. 2 in. x 8 ft. 2 in.</td>
</tr>
<tr>
<td><strong>Capacity</strong></td>
<td>UP TO 5 BULK BAGS</td>
</tr>
<tr>
<td><strong>Weight Empty</strong></td>
<td>2,900 lb.</td>
</tr>
<tr>
<td><strong>Weight Full</strong></td>
<td>UP TO 18,000 lb.</td>
</tr>
<tr>
<td><strong>Shipping Height</strong></td>
<td>8 ft. 6 in. COLLAPSED</td>
</tr>
<tr>
<td><strong>Shipping Measurement</strong></td>
<td>8 ft. 6 in. x 10 ft.</td>
</tr>
<tr>
<td><strong>Job Site Heights</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LOW SETTING: 15 ft. 6 in.</td>
</tr>
<tr>
<td></td>
<td>HIGH SETTING: 16 ft. 6 in.</td>
</tr>
<tr>
<td><strong>Forklift Requirements</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>26 ft. DOUBLE STAGE LIFT</td>
</tr>
<tr>
<td></td>
<td>(or) TELESCOPIC LIFT</td>
</tr>
</tbody>
</table>

## One-Bag Silo

### 2 Component System

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Footprint</strong></td>
<td>6 ft. 6 in. x 7 ft. 1 in.</td>
</tr>
<tr>
<td><strong>Capacity</strong></td>
<td>UP TO 1 BULK BAG</td>
</tr>
<tr>
<td><strong>Top Component</strong></td>
<td>400 lb.</td>
</tr>
<tr>
<td><strong>Bottom Component</strong></td>
<td>740 lb.</td>
</tr>
<tr>
<td><strong>Weight Empty</strong></td>
<td>1,100 lb.</td>
</tr>
<tr>
<td><strong>Weight Full</strong></td>
<td>4,200 lb.</td>
</tr>
<tr>
<td><strong>Shipping Height</strong></td>
<td>8 ft. 3 in. COLLAPSED</td>
</tr>
<tr>
<td><strong>Shipping Measurement</strong></td>
<td>8 ft. x 6 ft. 5 in.</td>
</tr>
<tr>
<td><strong>Job Site Heights</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LOW SETTING: 10 ft. 10 in.</td>
</tr>
<tr>
<td></td>
<td>HIGH SETTING: 13 ft. 3 in.</td>
</tr>
<tr>
<td><strong>Forklift Requirements</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4,000 lb. LIFT CAPACITY</td>
</tr>
<tr>
<td></td>
<td>10 ft. IN THE AIR</td>
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</table>
TCC’s silo systems are engineered and fabricated to increase all aspects of job site safety. The most common daily practice when operating a silo is loading the unit with bulk bags. To ensure the safety of the laborer that is opening the discharge chute(s) of the bulk bag being dispensed during this process, we strongly recommend individuals only work from the silo’s safety platform. Moreover, the individual should use the metal bag hook (gaff) shipped with each new silo to open the B-lock closure.

The TCC silo safety platform is engineered based on the OSHA safety standards specified for scaffolding listed below. Our silos meet these requirements:

1. Guard rails are required on welded frame scaffolds (or silos) that are 10 ft. high or more.
2. Top rail height shall be at least 36 in. to a maximum of 45 in.
3. Top rail strength must be at least 200 lb. for welded frame scaffolds.
4. Mid-rails must be positioned below the top rail and the work platform and the strength on a welded frame scaffold must be at least 150 lb.
5. Scaffold (or silo) legs must bear on base plates and shall rest on either firm foundation or mud sills.

In the event a person needs to climb on top of the silo, an OSHA fall protection lanyard is required and should be used. OSHA states that the following regarding scaffolding (or silo safety) work platforms: “If a scaffold (or work platform) is more than 10 ft. above a level (or ground), workers must have fall protection.”

Fall Arrest Systems: A fall arrest system consists of a full-body harness, a lanyard short enough to limit a fall to six feet, and an anchorage. Welded on the top of the silo, to the left side of the slide-hatch top of each silo, is a D-shaped anchorage point. This is where an individual’s lanyard should be attached. The fall arrest system must be capable of resisting the shock load caused by a fall. Both OSHA and ANSI rules require that these anchorages be able to support at least 5,000 lb. per worker attached. Our anchorage point meets this specification.

Below are some suggestions for individuals using a fall protection lanyard to ensure job site safety:

- Fall arresting devices should be periodically inspected for damage by a qualified person, and faulty equipment should be immediately removed from service. Additionally, employees required to wear fall protection should inspect their own equipment before the start of each job.
- Personal protective equipment should be able to withstand the harshest conditions to which it may be subjected to on any given job. Many materials, including nylon, can be easily damaged in the presence of extreme heat. For this reason, nylon lanyards should not be used where they might be exposed to conditions that could include extreme heat. Rather, steel mesh or wire core lanyards would be more suitable. Personal protective equipment should be evaluated before being used on any job to ensure that it can withstand the harshest conditions to which it may be subjected without sustaining damage that would jeopardize the safety of a worker.
- OSHA requires that workers working from float or ship scaffolds (scaffolds suspended from overhead supports) be protected by an approved safety lifebelt, lanyard, and lifeline secured above the point of operation to an anchor point or structural member.
The silo ladder is engineered based on the OSHA safety standards specified for fixed ladders listed below. Our silos meet these key requirements:

1. If the total length of the climb on a fixed ladder equals or exceeds 24 ft. (7.3 m), the ladder must be equipped with ladder safety devices.

2. Fixed ladders must be provided with cages where the length of climb is less than 24 ft. (7.3 m) but the top of the ladder is greater than 24 ft. (7.3 m) above lower levels.

3. Fixed ladders must support two loads of 250 lb. (114 kg) each.

4. Individual rung/step ladders must extend at least 42 in. (1.1 m) above a landing platform, or by providing vertical grab bars that must have the same lateral spacing at the vertical legs of the ladder rails.

5. Each step or rung of a fixed ladder must be able to support a load of at least 250 lb. (114 kg) applied in the middle of each step.

6. Rungs of individual rung/step ladders must be shaped to prevent slipping off the end of the rungs.

7. Rungs and steps of fixed metal ladders must be corrugated, knurled, dimpled, coated with skid-resistant material, or treated to minimize slipping.

8. Minimum perpendicular clearance between fixed ladder rungs and any obstruction behind the ladder must be 7 in.

9. Minimum perpendicular clearance between the centerline of fixed ladder rungs and any obstruction on the climbing side of the ladder must be 30 in. (76 cm).

10. Fixed ladders must be used at a pitch no greater than 90 degrees from the horizontal, measured from the back side of the ladder.
1. Inspect silo to make sure that it has been emptied.

   **WARNING:** Do not enter the interior of the silo cone for any inspection or maintenance. If absolutely necessary, personnel must follow confined space entry procedures (OSHA).

2. Lower or remove and secure safety ring to silo cone.

   **WARNING:** Connect safety line and fall arrestor device to tie off hook before climbing onto silo top. This device must comply with the 5,400 lb. tensile strength as required by OSHA 1926.104 (b).

3. Secure top hatch handle with bolt and nut or lock-pin.

4. Remove slide gate handle assembly and pin in holding ring.

5. To lift silo, insert forklift forks into fork pockets at full depth.

6. To lower silo, slightly raise silo and remove leg pins and lynch pins from legs. Lower silo while manually raising ladder to avoid damage. Secure ladder with chains.

7. Once lowered to the transportation mode, re-install leg pins and lynch pins to their original position.

8. Fold ladder to collapsed position and secure with chain.

9. Secure third contact point between silo and forklift using chain or strap with minimum tensile strength of 5,000 lb. life working load, i.e., from lifting eye or tie down ring to fork mast or backstop.

10. Slowly and carefully load silo onto the trailer following accepted U.S. DOT procedures.

11. Secure silo to trailer using DOT-approved chains and binders or strap and ratchets with a minimum of 5,000 lb. tensile strength.

12. Remove any debris or material from silo or trailer bed before traveling.
1. Select a position on the job site where the ground is dry, compacted, level, and stable.

   **Note:** To ensure the stability of the erected silo, dry, compacted, level ground must be available for set up or the silo should not be erected. Also, turn foot pad to the outward position.

2. Softer soil will require the use of either footings or concrete pads of 24 x 24 x 6 in. of reinforced concrete with a minimum compressive strength of 3,500 psi.

3. Foot pads should be constructed of three separate pieces of 24 x 24 in. treated plywood that are \( \frac{3}{4} \) inch thick and laminated together with screws or of 24 x 24 x 1 in. steel pads. Discard foot pad when punctured. Each silo requires four foot pads.

4. To lift silo, insert forks completely into fork tubes.

   **Note:** A proper capacity forklift must be utilized to lift the standard weights of the silo and material being used. (See silo specifications on page 3).

5. Secure third contact point between silo and forklift using chain or strap with minimum tensile strength of 5,000 lb. live working load, i.e., from lifting eye or tie down ring to fork mast or backstop.

   **Note:** The third contact point is necessary for preventing the silo from sliding off the forklift forks during any job site transportation.

6. Slowly lift and recline forklift position while clearing silo from trailer.

7. Place the tower on the best approved location.

8. Lower ladder allowing admittance to the safety railed platform when accessed.

   **Warning:** Both safety chains must be securely attached across the entry point when on the safety railed platform.

   **Warning:** Connect safety line and fall arrestor device to tie off hook before climbing onto silo top. (This device must comply with the 5,400 lb. tensile strength as required by OSHA 1926.104(b).)

9. Check material flow basket for positioning, obstructions, slide gate handle assembly and/or assorted hardware.

   **Warning:** Do not enter interior of the silo cone for any inspection or maintenance. If absolutely necessary, personnel must follow confined space entry procedures (OSHA).

10. Place and secure fasten safety ring on top of silo using safety locking pins.

11. Attach dust curtain to safety ring.
12. By slightly raising the silo, you can remove all four leg pins allowing silo legs to telescope to full adjustment.

**Warning:** Keep legs, feet, and hands clear of silo legs as they are lowered.

13. Raise tower to desired height until holes in silo leg match holes in receiver tube assembly.

14. Secure silo by inserting all four leg pins at the desired height, then insert the safety locking pins in the holes of the four leg pins to lock the leg pins in place.

15. Hand tighten stabilizer bolts then fully tighten with a wrench.

16. Attach handle and handle supports to slide gate assembly matching the short handle to gate door and the long handle to pivot point located on cross brace.

17. Check slide gate for easy operation and complete closure allowed access for padlock. For swivel gates, check rotation and grease zerts.

**Note:** Under windy conditions, it is advisable to also utilize a wind tarp that attaches to the legs on two sides of the silo.
1. While standing on the ground, slide the outer plastic cover down to the pallet level of the material bulk bag. At this time, inspect the condition of the bulk bag, giving special attention to the bag’s lifting loops. Check for fraying on both sides. If the strap appears stressed, set the bag and pallet aside for replacement and recover to protect the material inside.

2. Save the product identification card or batch ticket located inside the plastic cover. This will verify the product delivered matches the product ordered, which may be useful during the construction process.

3. Once the bag has passed the visual inspection, insert the forklift forks through the four lifting loops. The forks should easily slide to a position where all four loops are on the forks as far as possible. It is important that the loops do not leave this position before lift tension is applied.

4. To improve flow, open the top spout of the bag.

5. From an area opposite the side of the silo safety rail platform, carefully raise the bag to the silo hatch. At no time should personnel be under the bulk bag. The forks should be at a reclined position while raising the bag to a distance of 3-4 ft. above safety ring. The bag can now be slowly lowered to within 2-3 in. of the safety ring. Hand communication signals should be used to indicate when the bag has been lowered the appropriate distance.

**Warning:** Do not allow the bag to rest on safety ring or silo top.

6. The operator can now climb the ladder to the safety railed platform once the bag is in this position.

**Warning:** The person on the platform must securely attach both safety chains across the entry point when on the safety railed platform.

7. The design of the silo and bags is such that the material charging of the silo can be done without accessing the silo top.

**Warning:** Stay off the silo top. All silo charging to be done from the safety railed platform only.
8. After the bag is positioned over the safety ring, slide open the silo hatch.

9. Using the safety hook grasp and pull the B-LOK closure or plastic closure pin located on the outer tie on the bottom of the bag. This will open the protective outer flap encompassing the bag’s discharge chute.

10. With the same hook, pull the tagline on the chute downward allowing it to unravel into the silo hatch.

**Warning:** Products may contain hydraulic or Portland cement. Contact with freshly mixed product can cause severe burns. Avoid direct contact with skin and eyes if this product should contact eyes, immediately flush with water for at least 15 minutes and consult a physician. For skin exposure, wash promptly with plenty of soap and water. Remove soaked clothing promptly. If this product burns your skin, see a physician immediately.

**Note:** This product may contain silica. Silica dust, if inhaled, may cause respiratory or other health problems. Prolonged inhalation may cause delayed lung injury, including silicosis and possibly cancer. A N-95 approved dust mask, eye protection, and rubber boots and gloves are recommended when using this product.

**Note:** TCC products contain Portland cement and lime, masonry cement, mortar cement, additives, sand, and/or color pigment.

11. Wash hands thoroughly after handling.


13. Repeat these exact procedures for each bag emptied into the silo for charging.

**Required Equipment:** Hard hat, gloves, safety harness, safety goggles, dust mask (N-95 recommended).
1. Position mixer under silo to facilitate dumping of mixed product into mud box or tub.

2. Place discharge chute as close as possible to mixer protective grate or orifice.

3. Start the mechanical mixer.

4. Introduce $\frac{2}{3}$ of needed mixing water into mixer. Next, locate the handle that controls the flow of TCC preblended material into the mixer. This handle extends down and away from the silo, just above the chute. Pull the handle away from the mixer to open and push to close.

5. Open the slide gate slowly allowing a small but steady stream of material to flow into the mixer.

   **Note:** Avoid charging the mixer by opening the gate fast and wide. This surging creates inappropriate amounts of dust and stress on the mixer. A smaller, steady stream puts less strain on the mixer and produces much less dust.

6. Adjust mix as needed by adding either more water or product in order to obtain a workable or desired consistency.

7. Mix each batch to the full five minutes as required by ASTM.

   **Warning:** Injurious to eyes, lungs, and skin. TCC products contain Portland cement and lime, masonry cement, mortar cement, additives, sand and/or color pigment.

8. Avoid eye contact, prolonged breathing of dust or contact with skin.

9. Recommended wearing of NIOSH approved dust mask or respirator that meets minimum performance of N-95, appropriate eye protection, gloves and the proper clothing to protect from prolonged exposure.

10. Wash hands thoroughly after handling. In case of eye contact, immediately flush with plenty of water for at least 15 minutes and consult a physician.
One of the many advantages of the silo system is the easy relocation of the silo. The ability to move the silo around the job site enables the forklift operator to deliver mortar quickly and efficiently.

2. Select a position on the job site where ground is dry, compacted, level and stable. (See additional requirements in “ASSEMBLING TCC SILOS”.)

3. Empty silo as much as possible. (Material may be re-loaded into an empty bag if necessary.)
   **Note:** Silos can weigh between 1,100 to 3,700 lb. (See specifications on page 3.)

4. Remove mixer and any obstructions that may hinder the freedom of movement, including any hardened material around base of silo legs and foot pads.

5. Run forklift forks into fork tubes full depth.
   **Note:** A proper capacity forklift must be utilized to lift the standard weights of the silo and material being used. (See silo specifications on page 3.)

6. Slightly raise silo and remove lynch pins and leg pins from legs. Lower silo while manually raising ladder to avoid damage.

7. Once lowered to the transportation mode re-install leg pins and lynch pins to their original positions.

8. Connect the third contact point to forklift using either chain or strap with minimum tensile strength of 5,000 lbs.
   **Note:** The third contact point is necessary for preventing the silo from sliding off the forklift forks during any job site transportation.

9. Slowly transport silo to new location.

10. Follow the same guidelines for initial erection of silo paying attention to soil conditions as before.

11. Recharge silo following the loading instructions.
1. Maintenance begins on the day the silo is delivered.
   • Silo should be coated with release agent as supplied by Arrow/Mag-Nolin, Zep, or other
     manufacturer.
   • Install all warning signs and decals in appropriate locations on silo and work platform.
   • Check slide/swivel gate for all parts, alignment, and ease of operation.
   • Check all leg pins, lynch pins, cables, stabilizer nuts and bolts, slide/swivel gate, hatches, and
     safety chains for ease of operation and proper locations.
   • Upon silo erection at job site, cover legs with poly, form release agent or utilize another method
     to protect leg assemblies and foot pads from material collection.

2. Daily maintenance to be performed by contractor:
   • Keep top hatch free of excess material in order to facilitate ease of opening and closing.
   • Check safety chains for stress.
   • Check discharge chute for proper height rips or tears. Replace as needed.
   • Check to make sure all warning signs are visible and in their proper location.
   • Check to ensure that all non-skid tapes are in place.
   • Check to make sure that all handles, chains, leg pins, lynch pins, and cables are in place and not
     bent, cut, or damaged. If so, replace immediately.
   • Inspect silo legs for alignment, dents or bending. Replace silo immediately if necessary.
   • Check silo for plumb and level.
   • Check position of all four 24 x 24 inch foot pads.

3. Upon return to TCC or distributor, check the following and correct or replace as needed.
   • All signs are clean and visible.
   • All safety chains and clasp are operational.
   • Dust cover is intact.
   • Slide/swivel gate is clean and operates easily.
   • Discharge chute is not cut, torn, or weathered.
   • Material flow basket is intact, clean, and operational.
   • Legs are free of mortar build-up.
   • Top of silo is free of excessive mortar build-up.
   • Top hatch integrity is sound and free of defects, broken welds or supports and free of mortar
     build up.
   • Safety ring connections are clean and free of hardened mortar or grout.

**Note:** Damaged silo legs affecting the integrity of the silo must be replaced immediately before
silo set up or any continued use.

**Note:** There is no replacement schedule for the silo lynch pins, unless a manufacture defect is
evident.

**Warning:** Do not enter the interior of the silo cone for any inspection or maintenance. If
absolutely necessary, personnel must follow confined space entry procedures (OSHA).