Circular Stair — EU

Grain Bin Installation and Storage Instructions

Original Instructions

Read this manual before using product. Failure to follow instructions and safety precautions can result in serious injury, death, or property damage. Keep manual for future reference.

Part Number: 198889 R13
Revised: November 2019
New in this Manual

The following changes have been made in this revision of the manual:

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1. Introduction

This manual describes how to assemble a Westeel Circular Stair — EU.

Before assembling, please read this manual. Familiarize yourself with the process and the necessary precautions for efficient and safe assembly.

Everyone present at the assembly site is required to be familiar with all safety precautions.

Keep this manual available for frequent reference and review it with new personnel. Call your local distributor or dealer if you need assistance or additional information.
2. Safety

2.1. Safety Alert Symbol and Signal Words

This safety alert symbol indicates important safety messages in this manual. When you see this symbol, be alert to the possibility of injury or death, carefully read the message that follows, and inform others.

Signal Words: Note the use of the signal words DANGER, WARNING, CAUTION, and NOTICE with the safety messages. The appropriate signal word for each message has been selected using the definitions below as a guideline.

- **DANGER**: Indicates an imminently hazardous situation that, if not avoided, will result in serious injury or death.
- **WARNING**: Indicates a hazardous situation that, if not avoided, could result in serious injury or death.
- **CAUTION**: Indicates a hazardous situation that, if not avoided, may result in minor or moderate injury.
- **NOTICE**: Indicates a potentially hazardous situation that, if not avoided, may result in property damage.

2.2. General Safety

YOU are responsible for the SAFE assembly and installation of the circular stair. YOU must ensure that you and anyone else who is going to assemble/install the circular stair understands all procedures and related SAFETY information contained in this manual.

Remember, YOU are the key to safety. Good safety practices not only protect you, but also the people around you. Make these practices a working part of your safety program. All accidents can be avoided.

- It is the circular stair assembler and installation personnel’s responsibility to read and understand ALL safety instructions, safety decals, and manuals and follow them when assembling, operating, or maintaining the equipment.
- Only experienced personnel who are familiar with this type of assembly and installation should perform this work. Untrained assemblers/installers expose themselves and bystanders to possible serious injury or death.
- Do not modify the circular stair in any way without written permission from the manufacturer. Unauthorized modification may impair the function and/or safety, and could affect the life of the circular stair. Any unauthorized modification of the circular stair will void the warranty.
- Follow a health and safety program for your worksite. Contact your local occupational health and safety organization for information.
2.3. Personal Protective Equipment

The following Personal Protective Equipment (PPE) should be worn when installing the equipment.

**Safety Glasses**
- Wear safety glasses at all times to protect eyes from debris.

**Coveralls**
- Wear coveralls to protect skin.

**Hard Hat**
- Wear a hard hat to help protect your head.

**Steel-Toe Boots**
- Wear steel-toe boots to protect feet from falling debris.

**Work Gloves**
- Wear work gloves to protect your hands from sharp and rough edges.

2.4. Safety Decals

- Keep safety decals clean and legible at all times.
- Replace safety decals that are missing or have become illegible. See decal location figures that follow.
- Replaced parts must display the same decal(s) as the original part.
- Replacement safety decals are available free of charge from your distributor, dealer, or factory as applicable.

2.5. Decal Installation/Replacement

1. Decal area must be clean and dry, with a temperature above 50°F (10°C).
2. Decide on the exact position before you remove the backing paper.
3. Align the decal over the specified area and carefully press the small portion with the exposed sticky backing in place.
4. Slowly peel back the remaining paper and carefully smooth the remaining portion of the decal in place.
5. Small air pockets can be pierced with a pin and smoothed out using the sign backing paper.
2.6. Safety Decal Locations and Details

Replicas of the safety decals that are attached to the circular stair and their messages are shown in the figure(s) that follow. Safe operation and use of the circular stair requires that you familiarize yourself with the various safety decals and the areas or particular functions that the decals apply to, as well as the safety precautions that must be taken to avoid serious injury, death, or damage.

Figure 1. Safety Decals
SAFETY INSTRUCTIONS

• Read operator’s manual and all safety decals before assembling, using, or servicing bin.
• Close/latch all access doors when not in use.
• Do not alter or modify bin structure.
• Replace any damaged components only with factory made components.
• This bin should only be used to store free flowing, granular material, unless specifically designed and marked otherwise.
• When filling, use top filler cap and direct material to center of bin.
• Do not over-fill bin. Material should not be in contact with or place pressure on roof sheets.

WARNING

Keep clear of all augers. DO NOT ENTER this bin!
If you must enter the bin:
1. Shut off and lock out all power.
2. Use a safety harness and safety line.
3. Station another person outside the bin.
4. Avoid the center of the bin.
5. Wear proper breathing equipment or respirator.

Failure to heed these warnings could result in serious injury or death.

Part Number: 8110–00112

ENTRAPMENT HAZARD

Never enter the bin when loading or unloading grain.
If you must enter the bin:
1. Shut off and lock out all power.
2. Use a lifeline, safety harness, and have an observer outside before entering the bin.
3. Wear proper breathing equipment or a respirator.
4. Avoid the center of the bin.

Failure to heed these warnings could result in serious injury or death.

Part Number: 8110–00012

Part Number: 8110–00013
**To prevent serious injury or death:**
- Do not climb ladder if damaged, wet, icy, greasy, or slippery.
- Maintain good balance by having at least three points of contact at all times.

**FALLING HAZARD**

**WARNING**

- When equipped with aeration system, to prevent roof and/or bin damage:
  - Use a minimum 1 square foot (0.1m²) opening for each 1000ft³/min (30m³/min) of air.
  - Ensure all roof vents are open and unobstructed.
  - Discontinue use of aeration fan if roof vents become obstructed with ice.

Part Number: 8110–00066

**NOTICE**

- Use a minimum 1 square foot (0.1m²) opening for each 1000ft³/min (30m³/min) of air.
- Ensure all roof vents are open and unobstructed.
- Discontinue use of aeration fan if roof vents become obstructed with ice.

Part Number: 8110–00136

**FALL RERAINT**

**ANCHOR POINT**

**MAX WORKING LOAD:**

1,000 lb [453 kg]

SEE MANUFACTURER ROOF MANUAL FOR DETAILED INSTRUCTIONS REGARDING ANCHOR POINT LOCATIONS

Part Number: 8110–01090
3. Before You Begin

3.1. Bin Design and Capacity

Standard Westeel Grain Bins are designed for:

1. Non-corrosive free-flowing materials up to 55 lbs/ft³ (880 kg/m³) average compacted bulk density.
2. Maximum horizontal gusted wind speed of 94 mph (151 km/h)
3. Zero seismic activity

Note
Seismic resistance in grain bins varies with height and diameter. Many standard designs have significant seismic capabilities. Designs can be reviewed and/or modified to reflect local seismic requirements.

4. Roof loading capabilities vary with diameter, peak load and snow load.
   a. Peak Loads – standard peak loads follow. **Upgrades are available.**

   Table 1. Peak Loads for Various Roofs

<table>
<thead>
<tr>
<th>Size</th>
<th>Type of Roof</th>
<th>Load (lbs)</th>
<th>Load (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15' to 24'</td>
<td>non-structural</td>
<td>4000 lbs</td>
<td>1814 kg</td>
</tr>
<tr>
<td>27' to 48'</td>
<td>non-structural</td>
<td>5000 lbs</td>
<td>2268 kg</td>
</tr>
<tr>
<td>51' &amp; 54'</td>
<td>non-structural</td>
<td>8000 lbs</td>
<td>3629 kg</td>
</tr>
<tr>
<td>48' to 108'</td>
<td>structural</td>
<td>20,000 lbs</td>
<td>9072 kg</td>
</tr>
</tbody>
</table>

   b. Roof Snow Loads (RSL) – at the above stated standard peak loads, standard RSLs vary with diameter and range from 16 psf (78 kg/m²) to 45 psf (220 kg/m²). **Upgrades are available.**

   Note
   The correlation between ground snow load (GSL) and roof snow load (RSL) for grain bin designs vary with jurisdictions. In the US GSL = 2 x RSL. In Europe GSL = 1.25 x RSL. In Canada the correlation between GSL and RSL varies and is site specific.

3.2. Foundation Design and Loads

The foundations for the stiffened bin models are based on 4000 lbs. per sq. ft. (192 kPa) soil bearing capacity. All foundation designs use 3000 lbs. per sq. in. (21 MPa) ultimate compressive strength (after 28 days) for concrete and 43,500 lbs. per sq. in. (300 MPa) re-bar. The foundation designs included in this manual are suggestions only, and will vary according to local soil conditions. Westeel will not assume any liability for results arising from their use.

Important
Foundation should be uniform and level. Level should not vary by more than ¼” over a span of four feet under the bottom ring angle. Any variance from level must be shimmed under upright base assembly. If being utilized to support a full floor aeration system, this levelness requirement should extend across the complete floor area.
3.3. Site and Assembly

Unless otherwise specifically provided in writing, Westeel does not take responsibility for any defects or damages to any property, or injury to any persons, arising from or related to any site or assembly considerations, including but not limited to:

- Bin location and bin siting
- Soil conditions and corresponding foundation requirements (note that the examples provided in manuals are for specifically stated soil conditions)
- Bin assembly (Westeel recommends the use of qualified bin installers; contact Westeel for information on installers in your area)
- Field modifications or equipment additions that affect the bin structure
- Interconnections with neighboring structures
- Compliance with all applicable safety standards, including but not limited to fall restraint systems (ladders or other systems). Local safety authorities should be contacted as standards vary between jurisdictions.

3.4. Methods of Installation

The recommendations for assembling and installing Westeel grain bins must be closely followed to achieve the full strength of the bin and to achieve adequate weather sealing. The product warranty is void if:

1. Wall sheets and/or uprights not specified for a given tier are used.
2. Foundations are found to be inadequate or out-of-level.
3. Anchor bolts (cast-in-place, drill-in, chemical type or other) are found to be inadequate.
4. Off-center loading or unloading is used. (This does not apply to the use of approved side unloading systems.)
5. Materials stored are not free-flowing or have a compacted bulk density greater than 55 lbs/ft\(^3\) (880 kg/m\(^3\)).

If using bin jacks during assembly, always lift on an upright. Choose a hoist with an adequate capacity for the expected empty bin deadload. Make sure the rated capacity of the hoist is not exceeded.

3.5. Critical Assembly Requirements

To ensure a successful, safe and reliable outcome you must comply with the following assembly techniques and practices:

1. Comply with all local code and jurisdictional requirements applicable to your circular stair installation.
2. Design and build foundations with the necessary strength for the loads they must support, and for local soil conditions. Westeel foundation guidelines are based on specified stated conditions and may not be applicable to local conditions.
3. Your foundation must provide uniform and level support to the structure being supported. Surface imperfections causing gapping must be remedied. This may involve, but not be limited to a) grouting under the bottom ring of a non-stiffened bin or tank, and b) shimming under the uprights of a stiffened bin or tank, or under the legs of a hopper.
4. Make sure that the proper hardware is utilized for all bolted connections. If a shortage occurs, do not substitute. Take the necessary steps to obtain the proper hardware. Make sure nuts are tightened to the required torque values as specified in the appropriate assembly manual.
5. Comply with all assembly instructions provided in the appropriate assembly manual to make sure your whole circular stair is constructed safely. **Important: Do not deviate from the wall sheet and upright layouts provided.**

6. Before anchoring your structure to its foundation, make sure the structure is round. The maximum variation from perfect roundness is 3/4" on the radius. Locate anchor bolts toward the outside of the anchor bolt holes (away from the circle) to permit the incremental expansion that can occur with the initial filling.

7. When installing roof stiffening rings, if it is necessary to shorten the stiffening ring tubes, shorten them as little as possible. Initially the nuts on the expanders should be centered and as close together as possible. When tightening, share the amount of take-up between expanders such that the nuts remain centered, and the amount of engagement between all expanders on the same ring is equalized.

8. If extending an existing bin or tank, ensure that the foundation is adequate for the increased loads it must support.

9. If installing an existing bin on a hopper, make sure the bin is designed for a hopper application, and that the foundation is capable of withstanding the substantial point loads that the hopper legs apply. If uprights are present, make sure that they are supported.

10. Make sure that an integral end-to-end connection exists between all mating uprights. Successive uprights must not overlap.

11. Vertical tolerances between uprights and wall sheets are tight. This can be affected by “jacking” techniques, which can allow the tolerance to grow or shrink depending on the technique used. The gapping between successive uprights must be monitored to ensure that upright holes align with wall sheet holes.

12. If catwalks are being installed on the structure, upright catwalk upgrades are likely required. The upgraded stiffeners must be installed in the correct locations to support the intended catwalk loads. Also, the structure must be properly oriented to ensure the eventual correct alignment between the catwalks and the supporting uprights. Finally, the connectors that tie into the uprights and support the catwalks are best installed during assembly of the structure. See the catwalk assembly manual for additional details.

### 3.6. Product Storage

**Rust on Galvanized Parts**

1. White rust forms when moisture is allowed to collect on galvanized surfaces that have yet to develop the durable zinc oxide layer. This zinc oxide layer naturally occurs as the surface interacts with carbon dioxide, and is characterized over time by the dull grey appearance that weathered galvanized surfaces get.

2. Parts that are not well ventilated or well drained can collect water between surfaces and develop white rust.

3. White rust is not a structural concern if its development is stopped in the early stages. A light film or powdery residue can occur after a period of heavy rainfall or a short time of improper storage. If white rust has started to develop, separate parts and wipe off any moisture. Next, using a clean cloth, apply a thin layer of petroleum jelly or food-grade oil to the entire part.

4. If moisture is left on parts, this white rust can become more aggressive and turn into red rust. Red rust can cause degradation in the material and become a structural concern. Any parts that have red rust should be replaced immediately.

**Storage Guidelines**

- Keep all bundles dry before assembly of the bin.
- Start assembly as soon as possible.
- Do not lay bundles on the bare ground. Raise all bundles 6" to 8" off the ground on wood blocks or timbers. (See Detail A in Figure 2 on page 13.)
• Store curved wall sheets ‘hump-up’. (See Detail A in Figure 2 on page 13.)

• All other bundles material should be placed so that they are well sloped to promote good drainage. (See Detail B in Figure 2 on page 13.)

• Roof sheets must be elevated at least 12" at the small end of the sheets. (See Detail B in Figure 2 on page 13.)

• Temporary storage can be provided by erecting a simple framework supporting a waterproof tarp. (See Detail C in Figure 2 on page 13.)

• All bin boxes, ladder boxes and hardware boxes should be stored inside. These are not waterproof, and will deteriorate in normal weather conditions, allowing moisture to contact the parts inside.

**Figure 2. Product Storage**

![Diagram](image)

**If Parts Become Wet**

1. If parts become submerged or wet, the bundles should be opened as soon as possible, sheets or material separated and dried. Keep separated until assembly.

   Brace parts properly so as to avoid damage or injury from material falling when in storage. (See Detail D in Figure 2 on page 13.)

2. Any boxed parts that become wet should be dried and stored in a new box that is free of moisture.

3. In addition to wiping down wall sheets, a food-grade oil can also be applied with a clean, lint-free cloth. This will assist in preventing any further moisture from contacting the galvanizing on the steel. Due to safety concerns with installation and use, Westeel does not recommend the use of oil on other parts such as roof sheets and safety ladders.

**3.7. Grain Bin Use**

• Do not off-center unload a grain bin. It is imperative to unload from the center of the bin first, until as much grain as possible has been removed, and only then proceed to unload from the next closest unload gate to the center. Continue utilizing the unload gates in succession from the center towards the outside. Gate control mechanisms should be clearly marked and interconnected to prevent an external gate from being opened first.

• The only exception to center unloading is when a properly designed and installed side draw system is utilized. However, as bins tend to go out of round when employing side draws, the bin must be completely emptied before refilling.

• When unloading a bin with a mobile auger through a properly designed auger chute, the entry end of the auger should be pushed into the center of the bin before the auger is engaged. Slower rates of flow are preferable and should not exceed the capacity of an 8" auger.

• Ensure that the inner door panels of grain bin doors are completely closed and latched before filling the grain bin.

• Never enter a loaded grain bin for any reason. Grain can be a killer.
3.8. Important Notes

- Westeel does not provide a foundation design for this product, and is not liable for any damages or injuries related to inadequately designed or constructed foundations. Customers must contract professional services for all foundation design and construction work.

- In order to maintain your wall sheets in good condition separate sheets and allow air circulation between them. Store sheets in a dry place. Do not store sheets with sheet ends pointing upwards.

- To keep an even pressure on walls, the bin must always be unloaded from the centre.

- Contact local power officials for minimum power line clearance.

- See Section 3.5 – Critical Assembly Requirements on page 11 for mandatory siting and assembly requirements.

- Store only non-corrosive, free-flowing materials up to 55 lbs/ft$^3$ (880 kg/m$^3$) average compacted density in Westeel bins.

- Tighten all bolts to the recommended torque settings.

- Do not locate grain bins close to high buildings, which might cause snow to fall onto or build up on the roof of the grain bin. Consider future expansion and allow space for loading and unloading of the bin. Your dealer and local government agricultural consultants can help you plan your storage system for maximum efficiency.
4. Preparation

4.1. Check Shipment

Unload the parts at the assembly site and compare the packing slip to the shipment. Ensure that all items have arrived and that none are damaged.

Report damaged parts or shortages immediately to the delivering carrier, followed by a confirming letter requesting inspection by the carrier, if required. Order any replacement parts immediately to ensure that assembly will not be held up by missing parts. All parts will be charged for and credit will be issued by party at fault. No credit will be issued if freight bills are signed as received in good condition.

4.2. List of Tools and Equipment

Use quality tools and equipment. Use them safely, and correctly, for their intended use. Tools for this application should include:

Tools
- Electric or pneumatic (air) impact tools
- Power drill and drill bits
- Sockets (multiple 9/16" and 1/2" sockets recommended)
- Large-pocket carpenter pouch
- 8" (20 cm) metal punches (for aligning bolt holes)
- Step and extension ladders, construction grade
- 6-point wrenches (Imperial, box end)
- Metal-cutting saw suitable for cutting roof rings and wind rings
- Scaffolding
- Centre-post bin stand
- Crane and/or bin jacks

Minimum Recommended Safety Equipment
- A properly-stocked first-aid kit
- Eye, foot, head, and hand protection (safety glasses, steel-toed boots, hard hat, work gloves)
- Cable, chain, or rope to tie-off bin or jacks in case of wind
- Body harness and lifeline (for use where falling hazard exists)
- Ground fault interrupt protected electrical hook-ups

4.3. Order Optional Equipment

Optional equipment such as unloading augers, aeration equipment, anchor bolts, foundation sealant, external ladders, safety cage and platforms, etc., should all be on site and checked before assembly starts. Plan your installation in advance. For details, see assembly instruction supplied with optional equipment.
4.4. Stair Location Planning

Planning the location of the circular stairs relative to the other grain bin features is important. Since the stair is built from the top down, alignment with the roof features is the first consideration. Usually the top stair platform will align with the roof ladder or stairs, or possibly the inspection hatch (subject to the owner’s preference).

As the stairs progress down through the wall sheet tiers, it is desirable to avoid interference with sidewall features such as the stencil sheet and grain gauge locations. Also, the stairs must not interfere with the proper function of the door, aeration and unload systems, or other equipment that may be around the base of the bin.

The stairs are designed to be installed using existing wall sheet holes as installation pickup points. The few exceptions to this are noted in the installation instructions. The circular stairs are also designed to be installed in either direction. Therefore, once the starting position at the top of the bin is designated, the stairs can progress down to the right, or down to the left, which ever is preferable.

The stairs are assembled in half-tier increments. Each half tier progresses a total of three standard 9 ¾" wall sheet hole spacings around the bin. The top platform, and rest platforms, also span three standard 9 ¾" wall sheet hole spacings. Since there are a total of twelve standard 9 ¾" hole spacings per wall sheet, it takes a combination of two full vertical tiers of circular stairs, or three half-tier sections and a platform section, to progress the equivalent of one full wall sheet around the bin.

**Note**

Toward the bottom of larger bins, the horizontal wall sheet hole spacing may decrease to 4 11/16". In this case the number of hole spacings per half stair section, or platform, would double to six.

Uprights (on stiffened bins) and vertical wall sheet seams, create the need for special consideration as it is wise to avoid these locations. This is relatively easy to do since uprights are spaced at six standard wall sheet hole locations, as are vertical seams (both which are multiples of three). Therefore when starting the circular stair at the top of a stiffened bin, it is suggested to use any of the horizontal wall sheet seam holes that are not a stiffener location, or a vertical wall seam location. On non-stiffened bins, the vertical wall seams are the only consideration. Once started properly, the balance of the circular stair should proceed without any interference with either stiffener, or wall sheet seams.

The top platforms can be located at a full tier height location (which is aligned with the horizontal wall sheet seams) or at a half tier height location (which is located midway between the horizontal wall sheet seams). The first location may be preferable if accessing a roof stair, or roof ladder. The second location may be preferable if accessing the inspection hatch. In the latter case a shortened ladder section, or step, can be used to access the roof ladder.

Mid-span rest platforms are located at the full tier height locations only (i.e. aligned with the horizontal wall sheet seams).
Figure 3. Attachment points for circular stair installation

Start installation of circular stairs using holes that are not on vertical wall sheet seam or upright locations.

Once starting location determined, maintain 3 standard 9 3/8” hole spacings for all circular stair attachments.

Attachment points for tubular supports for mid-tier platform
Attachment point for wall bracket
Attachment points for tubular support
5. Assembly

Before continuing, ensure you have completely read and understood this manual’s Safety section, in addition to the safety information in the section(s) below.

5.1. Assembly Safety

- Do not take chances with safety. The components can be large, heavy, and hard to handle. Always use the proper tools, rated lifting equipment, and lifting points for the job.
- Carry out assembly in a large open area with a level surface.
- Always have two or more people assembling the circular stair.
- Make sure you have sufficient lighting for the work area.
- Tighten all fasteners according to their specifications. Do not replace or substitute bolts, nuts, or other hardware that is of lesser quality than the hardware supplied by the manufacturer.
- Stay away from overhead power lines and other obstructions during assembly. Contact with power lines can cause electrocution.
- Do not work in high winds.

5.2. Circular Stairway Installation Procedure

Note

All circular stair installation details contained within this manual are provided as if the stair is spiraling down from the top platform in a clockwise rotation. The stairs are also designed to spiral in a counterclockwise direction. This is not illustrated.

Top Platform and Half Tier of Steps at Half Tier Location:

The standard circular stair packages are provided with the platform located midway between the top and bottom horizontal wall seams on the top tier of the grain bin.

1. Select the position of the platform as per the guidelines in Section 4.4 – Stair Location Planning on page 16.
2. Bolt two tubular supports (234147) to the wall sheet horizontal seams.
   a. Space them at 28 ¼" apart (i.e. three standard 9 3/8" wall sheet hole spacings).
   b. When bolting into the lower holes, also bolt in one support arm bracket (234518) at each location as shown in Figure 4 on page 19.
3. Bolt the platforms (234172 for 15' to 24' diameter bins / 234173 for 27' and larger bins) to the two holes in the center of the tubular support.

The platforms can be oriented for stairs traveling in either direction. Two flanges on the platforms are formed upwards and two flanges are formed downwards.

a. Orient the platform such that the flange against the grain bin wall sheet is pointing down, and the flange in the direction of travel (i.e. closest to the stair treads), is also pointing down.

b. Bolt the platforms to the tubular supports as shown, using 2" bolts.

c. Make sure the distance from the leading edge of the platform closest to the stair treads to the bolt hole location on the closest tubular support is:
   - 4 ¼" for 15' to 24' bins
   - 2 ¾" for 27' to 108' bins

   **Note**
   - There are indents marking these locations.
   - The upper holes on the inner stringer (234140), also bolts to the same tubular support at this time.
Figure 5. Bolt the platform to the tubular support

4. Support the outer portion of the platform with two support tubes (234178) that run from the platform to the support arm brackets attached in Step 2 on page 18.

a. Bolt the upper end of the support arms to support arm brackets

b. Bolt the support arm brackets into the slots in the floor of the platform.

If properly connected the platform should be level.
Figure 6. Support the platform with support tubes

5. There are two combinations of three holes located in the upper portion of the outer stringer (234141).
   - The square holes are for bins 15' to 24' in diameter.
   - The round holes are for bins from 27' to 108'.
     a. Bolt the stringer to the platform, as shown in Figure 7 on page 21, at the same location from the leading edge as provided in the previous step.
     b. Note that a handrail post bolts on to the same hole locations (see Figure 8 on page 22).
     c. Use 2" bolts for any handrail connection.

Figure 7. Stringer to platform assembly

6. Bolt on one handrail post (234174) at the leading edge of the platform next to the stairs as shown. The six holes spaced relatively close together, are at the bottom of the post. See diagram for the appropriate hole combination. Use 2" bolts.
5. ASSEMBLY

a. Note that the six holes, spaced relatively close together, are at the bottom of the post.
b. See Figure 8 on page 22 for the appropriate hole combination.
c. Use 2" bolts.

**Figure 8. Installing the first handrail post**

7. Bolt on two handrail posts (234174) at the end of the platform away from the stairs as shown, using 2" bolts through the holes indicated.
   a. Verify proper assembly by making sure the handrails are all the same height.
   b. Bolt on the two triangular post gussets (234155).
      They go on the inside of the respective platform flanges (the one closest to the bin pointing down and the one furthest from the bin pointing up).
   c. Do not place the gussets between the handrail post and the platform flanges.
      Two of the holes align with post holes, and at least one additional hole picks up on the slots in the platform to form a triangle.
   d. Orient the post vertically and tighten the bolts securely.
8. The two handrail posts furthest away from the grain bin are secured by ½" diameter brace tubes (234175).
   a. Bolt one end of the tubes directly to the bottom holes in the handrail posts using 2" bolts.
   b. Bolt the other ends to support arm brackets (234518).
   c. The support arm brackets are bolted to the floor of the platform.
Figure 10. Secure the handrail posts

9. Bolt two handrail segments (234149 and 234150) between the two handrail posts furthest away from the grain bin, at the top and mid-rail locations.

One piece fits inside of the other and they can be adjusted for length.

a. Note that the same holes are used for the continuation of the handrail, so the mating handrail pieces for the next circular stair module, need to be mounted at this time.

b. Note that the handrail post and handrails that are required for the half tier are supplied with the mating stair packages.

c. Use 2" bolts for any handrail to post connection.

d. Drill in round head self tapping screw, from outside after attachment to posts, thru both rail parts, 1" from open end.
Figure 11. Assemble handrail segments to posts

10. Two end rails (234177) are bolted using 2" bolts to the two handrail posts that are furthest from the stair treads to close off the open end of the platform.

Figure 12. Bolt on end rails

11. The stair treads (234171) bolt between the inner and outer stringer at the hole locations provided. Like the platform, there are two flanges formed upwards and two flanges formed downwards, and they can be oriented for clockwise and counter-clockwise assembly.
a. Orient the treads so the inner flange and the flange facing the next lowest stair tread are pointing downwards and the outer flange and the flange facing the platform are pointing upwards.

There is room within the slots located within the stringers to adjust the stair treads back and forth.

b. Position them such that the treads are consistently spaced with respect to each other, along the length of the stair.

c. When securing the bottom stair tread, use the same holes to secure the bottom of the inner stringer to a ladder wall bracket (234501).

d. Secure the ladder wall bracket to the wall at the horizontal seam location.

e. Bolt on the mating inner stringer from the next stair module using the same holes and hardware.

Figure 13. Assemble stair treads to stringers

5.3. Top Platform Located at the Eave of the Bin

If desirable, in order to directly access a roof stair, or for some other purpose, the top circular stair platform can be located at the eave of the grain bin. This involves different parts and must be ordered separately. For the most part the location and the assembly of the platform is consistent with the instructions provided for the platform mounted at the half tier location. The following illustrates the differences.

1. Two eaves brackets (234154) are used in place of the two tubular supports to secure the platform to the wall, at the full tier locations. These are designed to avoid interference with the eaves of the roof panels.
Figure 14. Use eaves brackets to secure the platform

1. Two eaves brackets (234154) are used in place of the two tubular supports to secure the platform to the wall, at the full tier locations. These are designed to avoid interference with the eaves of the roof panels. Bolt the brackets into the top ring angle/wall sheet hole locations as shown. Orient the brackets vertically and drill additional holes using the brackets as a template and secure 8" lower.

2. Bolt the platform to the eave brackets. One bolt is positioned vertically through the bracket and the slotted hole on the top of the platform. The starting position of the bracket relative to the platform is the same as for the half tier location provided earlier.

Figure 15. Bolt the platform to the eave brackets

3. Use the long support arms (234176) to brace from the platform down to the next horizontal wall sheet seam.
5. ASSEMBLY

5.4. Rest Platform

The circular stair platform (234172 for 15' to 24' diameter bins and 234173 for 27' and larger bins) can also serve as an intermediate rest platform. The location of a rest platform is only intended for connection at a horizontal seam.

1. The platform attaches to the bin wall with one ladder wall bracket (234501) and one eaves bracket (234154), bolted directly into the horizontal wall seam.

Figure 16. Install the long support arms

Figure 17. Attach the ladder wall bracket
a. Position the wall bracket on the side of the platform next to the stairs going up, and the eaves bracket on the side with the stairs going down. The attachment locations maintain the constant three standard 9 3/8" horizontal wall sheet hole spacings that are consistent with the rest of the circular stair installations (see planning section).

Bolt the platform to the eave bracket such that the leading edge of the platform (next to the downward stair treads) is spaced from the wall bracket as per the dimensions provided for the half tier mounting location (for 15' to 24' bins, this dimension is 4 ¼", and for 27' and larger bins this dimension is 2 ¾"). This location permits alignment of the slots in the platform with the lower portions of the mating inner and outer stringers located above the platform.

**Note**

It may be possible to bolt on the platform utilizing a four-hole spacing. To do so will possibly cause interference with uprights and vertical seams.

b. Align and bolt these in place.

c. When bolting on the outer stringer, bolt the handrail post on at the same time using 2" bolts.

2. Bolt on the long support arms (234176) in the same manner as for the top platforms.

**Figure 18. Bolt on the long support arms**

3. The lower stringers bolt into platform in the same manner as the stringers bolted into the top platform.

4. Bolt on the second handrail post at the same time using 2" bolts.
Figure 19. Install the lower stringers and second handrail post

5. The rest of the assembly is similar to the instructions provided for the top platforms at the half tier and full tier levels. Note that some parts—handrail post (234174), long and short handrails (234149 and 223150) and ½" brace tube (234175)—are supplied with the mating stair modules.

6. Shorten the long handrail (234149) to fit between the handrail posts at the rest platform location.

7. Cut the round end to fit between the handrail posts and mate with the short handrail.
5.5. Circular Stair Module

The circular stair components are supplied in 1, 2 or 3 tier packages. There are two inner and outer stingers, and six stair treads, per tier. The attachment of the first stair section to a platform is provided in the section dealing with platform installations. The assembly of mating single tier curved stair modules is as follows.

1. Secure inner stringers to the wall sheets:
   a. Use ladder wall brackets (234501) when the connection is made at a horizontal seam.
   b. Use tubular supports (234147) and 2" bolts when the connection is made at a half tier location.
   c. In all cases the spacing of wall brackets and tubular supports maintains a constant three standard 9 3/8" wall sheet hole spacings along the horizontal seams.
   d. Note that a mating stringer and a stair tread also bolts on when this connection is being made.
Figure 21. Secure inner stringers to the wall sheets

2. Bolt the stair treads (234171) between the inner and outer stringer at the hole locations provided.
   a. Like the platform, there are two flanges formed upwards and two flanges formed downwards, and they can be oriented for clockwise and counter-clockwise assembly.
   b. Orient the stair treads such the inner flange and the flange facing the next lowest stair tread are pointing downwards.
   c. The outer flange and the flange facing the higher step are pointing upwards.
   d. There is room within the slots located within the stringers to adjust the stair treads back and forth.
   e. Position the treads so the treads are consistently spaced with respect to each other, along the length of the stair.
Figure 22. Bolt the stair treads between inner and outer stringers

3. Bolt the outer stringer bolts to the mating outer stringer at the bolt holes provided.
   a. There are two combinations of three holes located in the upper portion of the outer stringer (234141):
      • The square holes are for bins 15' to 24' in diameter.
      • The round holes are for bins from 27' to 105'.
   b. Note that a handrail post (234174), using 2" bolts, also gets bolted into position when this connection is
      being made.
   c. See Figure 25 on page 36 for proper orientation.
4. Secure the outer edges of the circular stair using the two braces provided.
   a. Use a long brace (234176) in conjunction with a ladder wall mounting bracket when securing to a horizontal seam.
   b. Use the shorter support arms (234178) when working at the half tier location.
   c. In both cases the braces attach to a hole in the mating stair tread flange that is formed downwards and that is adjacent to the outer stringer.
   d. There are five possible hole locations. Use the hole that results in the step being in the most level position.
   e. Attach the other end of the braces to the next lower horizontal wall seam utilizing support arm brackets (234518).
Figure 24. Connect circular stair braces

5. Bolt the handrail posts on at every mating location of the outer stringers using the bolt holes illustrated.
   a. Secure the handrail posts to the rest of the structure by utilizing the ½" brace rods (234175).
   b. Bolt one end to the lowest hole in the handrail post.
   c. Attach the other end to a hole in the stair tread flange that is formed downwards and that is adjacent to the inner stringer.
   d. There are five possible hole locations. Use the hole that results in the handrail post being in the most vertical orientation.
   e. Use 2" bolts at any handrail post connection.
Figure 25. Connect handrail posts to outer stringers

6. Handrail sections (234149 and 234150) span between, and bolt to, the handrail posts at mid-rail and top rail locations.
   a. Fit one piece inside of the other and adjust for length.
   b. Put the larger section on the upper end to permit drainage.
   c. Use 2" bolts.
   d. Drill in round head self tapping screw, from outside after attachment to posts, thru both rail parts, 1" from open end.

Figure 26. Install handrail sections
5.5.1 Bottom Tier Installation

There are two differences between the bottom tier and the rest of the circular stair modules:

1. There is no handrail post or handrails for the first half tier. Instead, there is a long handrail section comprising of a long handrail (234149) and a long brace (234176). The flattened end of the long brace needs to be cut off (as shown) and inserted into the handrail. This spans from the top handrail position to the base bracket location as illustrated.

2. A base bracket (234146) bolts to the lower portion of the outer stringer. This needs to be secured to the foundation in some appropriate manner. If the stair is extending beyond the limits of the foundation, some means of supporting the outer stringer to the foundation will need to be facilitated. If the foundation is raised significantly relative to ground level, a safe means to access the stairs will also need to be provided. There is a stair tread provided for the lowest position. This can be added or deleted as appropriate for the specific site requirements. Drill in round head self tapping screw, from outside after attachment to posts, thru both rail parts, 1" from open end.

Figure 27. Bottom Tier Installation

5.5.2 Circular Stair Gate

An optional stair gate is available to restrict access to the circular stairs and the roof. The stair gate must be installed on the second tier or higher.

1. Bolt the two brackets for stair gate (234216) vertically to the (top) bolt holes on the corresponding wall sheet seams.
   a. Choose the bolt-hole 9 3/8" away from the vertical tube support as shown in Figure 29 on page 39.
   b. For the bottom holes the wall sheets must be site drilled using the bracket as a template.
   c. Attach brackets to bin wall with 3/8" x 1" bolts, then complete the assembly as shown in Figure 28 on page 38.
Figure 28. Install stair gate brackets

2. Use a push nut (236847) and a spacer washer (236841) on the top and bottom side of the door pan, respectively, along with the hinge rod (236825) to attach and position the door pan to the brackets.

3. Bolt the latch sub-assembly (234219) on the door pan (234215) using a ¼” x ¾” flange head bolt and ¼” lock nut. There are three slots for the sub-assembly for the latch to bolt on, and can be placed accordingly to enable latching onto the handrail. The figure shows the stair gate for the circular stairs going up counter-clockwise. The circular stair gate can be used for the circular stairs going clockwise but the subassembly for the latch will use the three slots on the left side and will be inverted.
4. In order to close the gate, the latch catches onto the hand rail.
   a. The gate can be locked shut by using a padlock though the matching holes on the latch bracket and the latch.
   b. To keep the gate in the open position a support arm bracket (234518) can be bolted onto the wall sheet seam.
   c. Then use a tie-down cord passed through the bracket and the hole at the bottom of the door pan to hold it in place. The tie-down cord is not provided as a part of the package.
### 5.6. Optional Vertical Support Ladder Details

#### Table 2. 234569 Vertical Ladder Support Chart For 21' Diameters or Less

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<th>Rows of Supports</th>
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<th>Needed For Span Between 2 Legs</th>
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Table 3. 234568 Vertical Ladder Support Chart For 24’ Diameters or Greater

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- Hoppers with diameters of 21’ or smaller use the 234569 ladder support
- Hoppers with diameters of 24’ or larger use the 234568 ladder support
- Use the vertical ladder charts to identify the quantity of ladder supports needed to span between hopper legs
- Two ladder supports need to be overlapped and connected together with at least two self-drilling screws for spans greater than 60”
- Bottom set of vertical ladder support spans between 3 legs; all sets of vertical ladder supports above span between 4 legs.
- Please see Curved Stair Installation Manual for further installation details of curved stairs
- Please see Wide-Corr® Ladder Installation Manual for further installation details of vertical ladders

Figure 30. Ladder Configuration (Featuring ISO View of the Assembly)
Figure 31. Circular Stair Configuration (Featuring ISO View of the Assembly)

Both drawings feature an ISO view of each assembly - Hoppers with diameters of 21’ or smaller will use the 234569 Ladder Support (LS) - Hoppers with diameters of 24’ or larger will use the 234568 LS - Use the Vertical Ladder charts to identify the quantity of LS needed to span between Hopper Legs - Two LS need to be overlapped and connected together with at least 2 selfdrilling screws for spans greater than 60” - Please see Curved Stair Installation Manual for further installation details of curved stairs - Please see Wide Corr Ladder Installation Manual for further installation details of vertical ladders
5.7. Circular Stair to Hopper Legs

Figure 32. Circular Stair to Hopper Legs
# 6. Appendix

## 6.1. Circular Stair Packages

### Table 4. Circular Stair Packages

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*STANDARD LADDER PACKAGES

### Table 5. Circular Stair Gate Package-234218 (Optional)

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>QUANTITY</th>
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<tbody>
<tr>
<td>1</td>
<td>234215</td>
<td>DOOR PAN</td>
<td>1</td>
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<tr>
<td>2</td>
<td>234216</td>
<td>BRACKET FOR STAIR GATE</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>234219</td>
<td>SUB ASSEMBLY FOR LATCH</td>
<td>1</td>
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<tr>
<td>4</td>
<td>236825</td>
<td>HINGE ROO</td>
<td>1</td>
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<td>5</td>
<td>236841</td>
<td>SPACER WASHER 1/2</td>
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<td>BLT HFW .25 x .75 GR8.2</td>
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<td>7</td>
<td>150014</td>
<td>NUT HX LK NI .25-20 ZN G2</td>
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<td>8</td>
<td>236947</td>
<td>DOOR PUSH NUT 1/2</td>
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</tbody>
</table>
6.2. Parts Identification

234140 – Inner Stringer

234141 – Outer Stringer

234171 – Stair Tread

234172 – Platform 15'- 24'

234173 – Platform 27'- 108'

234146 – Base Bracket

234149 – Handrail (1.25" Dia x 34" Long)

234150 – Handrail (1" Dia x 17" Long)

234174 – Handrail Post

234175 – Post Brace (1/2" Dia x 24-3/4" Long)

234176 – Brace (1" Dia x 53-1/8" Long)

234147 – One Tier Tube Support
6.3. Optional Stair Gate Parts Identification

234154 – Platform Bracket
234155 – Post Gusset
234501 – Ladder Wall Clip
234177 – Platform End Rail
234178 – Support Arm (1" Dia x 38" Long)

234216 – Bracket for Stair Gate
234215 – Block-Off Door Pan
234219 – Latch Assembly

236825 – Hinge Rod (46" Long)
7. Limited Warranty: Westeel Grain Bin Products

Westeel – Ag Growth International ("Westeel") warrants products that it has manufactured and/or that are branded with its name (the "goods") subject to the following terms and limitations, (the "warranty"):  

**Duration of Warranty**

This warranty will run from the date of purchase from the dealer or distributor, authorized by Westeel. The duration of the warranty is limited as follows:

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Coverage Period</th>
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<tbody>
<tr>
<td>Galvanized Bins</td>
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<tr>
<td>EasyFlow2</td>
<td>24 months</td>
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<tr>
<td>Westeel Fans</td>
<td>36 months</td>
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<tr>
<td>Floors</td>
<td>12 months</td>
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<td>Catwalk</td>
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<td>Bulk Feed Tanks</td>
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<td>Paint</td>
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<td>Smooth Wall Bins</td>
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<td>Paint</td>
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<tr>
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</table>

**Limitation of Remedies Replacement**

Within the warranty period, Westeel will replace the goods and/or original manufactured components thereof which are found, to Westeel's satisfaction, to be defective. Westeel is not responsible for direct, indirect, special, consequential, or any other damages of any kind, including personal injury to any individual, howsoever caused, including caused by transportation of the goods for repair or replacement.
Procedure for Obtaining Service

In the event of a warranty claim, the purchaser must complete any and all information required by Westeel in order to properly assess or investigate the claim. Westeel will not be responsible for the removal of any of the goods found to be defective, or transportation charges to and from Westeel's authorized dealer or distributor, or for installation of any replacement goods and/or parts furnished under the warranty.

Limitations as to Scope of Warranty

The warranty does not extend to defects or damage caused, in whole or in part, by:

1. use of a kind and/or to a degree not reasonably expected to be made of the goods;
2. improper storage of the goods both prior to and after purchase;
3. damage caused by, or in the course of, installation or assembly;
4. any use of the goods which is not an intended use as specified in Westeel's published product literature, or otherwise specified by Westeel in writing;
5. any equipment attached to or used in conjunction with the goods;
6. any field modifications or substitutions to original bin components;
7. inadequate ventilation or any other circumstance not in keeping with proper maintenance and/or use of the goods;
8. Acts of God, accident, neglect or abuse of the goods by the purchaser and/or any other individual or entity; or
9. Any use or installation inconsistent with Westeel’s Standard Disclaimers.

Limitations as to Manufacturer

The warranty does not cover products sold by Westeel that are not manufactured by Westeel. In those circumstances, the purchaser is referred to the manufacturer of those products.

Limitation of Implied Warranties and Other Remedies

To the extent allowed by law, neither Westeel nor its dealers, nor any company affiliated with Westeel makes any warranties, representations, or promises as to the quality, performance, or freedom from defect of any Product covered by this Warranty.

WESTEEL HEREBY DISCLAIMS, TO THE EXTENT APPLICABLE, ANY AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. A PURCHASER'S ONLY REMEDIES IN CONNECTION WITH THIS WARRANTY ARE THOSE SET FORTH IN THIS WARRANTY. IN NO EVENT WILL WESTEEL, ITS DEALERS, OR ANY COMPANY AFFILIATED WITH WESTEEL BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES.

Some jurisdictions do not allow waivers of certain warranties, so the above waivers may not apply to you. In that event, any implied warranties are limited in duration to ninety (90) days from delivery of the products. You may also have other rights which vary from jurisdiction to jurisdiction.

Exclusive Warranty

This warranty is the only warranty provided by Westeel and all other warranties and/or commitments, whether express or implied and no matter by whom made, statutory or otherwise, are subsumed and replaced by it and are of no legal effect. If any provision of the warranty is held by a court of
competent jurisdiction to be void or unenforceable, in whole or in part, such provision shall be deemed severable and will not affect or impair the legal validity of any other provision of the warranty.