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.
New in this Manual

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Updated information on centering the bottom flange on the Z section when mounting the roof stairs on the roof</td>
<td>Mount the Roof Stairs on the Roof on page 29</td>
</tr>
</tbody>
</table>
CONTENTS

1. Introduction ............................................................................................................................................. 5

2. Safety ...................................................................................................................................................... 6
   2.1 Safety Alert Symbol and Signal Words............................................................................................... 6
   2.2 General Safety ................................................................................................................................... 6
   2.3 Personal Protective Equipment........................................................................................................... 7
   2.4 Safety Decals ..................................................................................................................................... 7
   2.5 Decal Installation/Replacement .......................................................................................................... 7
   2.6 Safety Decal Locations and Details ................................................................................................... 8

3. Before You Begin .................................................................................................................................... 11
   3.1 Bin Design and Capacity .................................................................................................................... 11
   3.1.1 Roof Design Capacities for Non-Structural Roofs ...................................................................... 12
   3.1.2 Roof Design Capacities for Structural Roofs .............................................................................. 13
   3.1.3 Roof Snow Load vs. Ground Snow Load ...................................................................................... 13
   3.2 Foundation Design and Loads ........................................................................................................... 14
   3.3 Site and Assembly .............................................................................................................................. 14
   3.4 Methods of Installation ...................................................................................................................... 14
   3.5 Critical Assembly Requirements....................................................................................................... 15
   3.6 Product Storage ................................................................................................................................. 16
   3.7 Grain Bin Use ..................................................................................................................................... 17
   3.8 Important Notes ................................................................................................................................. 17

4. Preparation ............................................................................................................................................. 18
   4.1 Check Shipment ................................................................................................................................. 18
   4.2 List of Tools and Equipment ............................................................................................................. 18
   4.3 Order Optional Equipment .............................................................................................................. 18

5. Assembly ................................................................................................................................................ 19
   5.1 Assembly Safety ............................................................................................................................... 19
   5.2 Planning the Location of Ladder Components ................................................................................... 20
   5.3 Wall Ladder Assembly ..................................................................................................................... 22
   5.4 Typical Roof Stair Installation .......................................................................................................... 25
   5.4.1 Roof Stair Module Layouts ........................................................................................................... 26
   5.4.2 Roof Stair Assembly ...................................................................................................................... 27
   5.4.3 Inspection Hatch Cage Assembly ................................................................................................. 34
   5.4.4 Roof Stair Hardware Usage ......................................................................................................... 37
   5.4.5 Roof Stair Packages ...................................................................................................................... 38
   5.5 Optional Peak Rail Assembly .......................................................................................................... 39
   5.5.1 Peak Rail Hardware Usage ......................................................................................................... 44
   5.6 Optional Peak Platform Assembly .................................................................................................... 44
   5.6.1 Peak Platform Hardware Usage .................................................................................................. 47
   5.7 Optional Roof Stair Block-Off Assembly ............................................................................................ 48
   5.7.1 Roof Stair Block-Off Package Hardware Usage ........................................................................ 51
   5.8 Catwalk Access .................................................................................................................................. 51
   5.9 Optional Eave Platform Assembly ..................................................................................................... 52
   5.9.1 Eave Platform Package ................................................................................................................. 57

6. Appendix ................................................................................................................................................. 58
   6.1 Roof Stair Parts Identification ......................................................................................................... 58
6.2 Peak Rail and Platform Parts Identification ................................................................. 60
6.3 Eave Platform Parts Identification .............................................................................. 62

7. Limited Warranty: Westeel Grain Bin Products ............................................................. 63
1. Introduction

This manual describes how to assemble a Westeel Roof Stair.

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

It is the EZ-Step 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 EZ-Step in any way without written permission from the manufacturer. Unauthorized modification may impair the function and/or safety. Any unauthorized modification 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 EZ-Step and their messages are shown in the figure(s) that follow. Safe operation and use of the EZ-Step 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.

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.

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.
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.

NOTICE

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

Part Number: 8110–00136

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/ft$^3$ (880 kg/m$^3$) average compacted bulk density.
2. Maximum horizontal gusted wind speed of 94 mph (151 km/h).

**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>
<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/m$^2$) to 45 psf (220 kg/m$^2$). *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.

c. For maximum roof snow load capacities for various sizes and types of roofs, refer to the Roof Design Capacities sections that follow.
### 3.1.1 Roof Design Capacities for Non-Structural Roofs

#### Table 2. Maximum Roof Snow Load at STANDARD Peak Load

<table>
<thead>
<tr>
<th>Bin Series</th>
<th>Std Peak Load</th>
<th>Standard Roof</th>
<th>Plus Upgrade 1</th>
<th>Plus Upgrade 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lbs (kN)</td>
<td>psf</td>
<td>kPa</td>
<td>psf</td>
</tr>
<tr>
<td>15</td>
<td>4000 (17.8)</td>
<td>45</td>
<td>2.15</td>
<td>n/a</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>45</td>
<td>2.15</td>
<td>49</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>30</td>
<td>1.44</td>
<td>40</td>
</tr>
<tr>
<td>21</td>
<td></td>
<td>21</td>
<td>1.01</td>
<td>24</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td>24</td>
<td>1.15</td>
<td>39</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>20</td>
<td>0.96</td>
<td>32</td>
</tr>
<tr>
<td>33</td>
<td></td>
<td>23</td>
<td>1.10</td>
<td>33</td>
</tr>
<tr>
<td>36</td>
<td></td>
<td>24</td>
<td>1.15</td>
<td>30</td>
</tr>
<tr>
<td>39</td>
<td></td>
<td>22</td>
<td>1.05</td>
<td>27</td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>19</td>
<td>0.91</td>
<td>24</td>
</tr>
<tr>
<td>45</td>
<td></td>
<td>16</td>
<td>0.77</td>
<td>23</td>
</tr>
<tr>
<td>48</td>
<td></td>
<td>21</td>
<td>1.01</td>
<td>26</td>
</tr>
<tr>
<td>51</td>
<td></td>
<td>20</td>
<td>0.96</td>
<td>28</td>
</tr>
<tr>
<td>54</td>
<td></td>
<td>17</td>
<td>0.81</td>
<td>27</td>
</tr>
</tbody>
</table>

#### Table 3. Maximum Roof Snow Load at UPGRADED Peak Load

<table>
<thead>
<tr>
<th>Bin Series</th>
<th>Upgraded Peak Load</th>
<th>Standard Roof</th>
<th>Plus Upgrade 1</th>
<th>Plus Upgrade 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lbs (kN)</td>
<td>psf</td>
<td>kPa</td>
<td>psf</td>
</tr>
<tr>
<td>15</td>
<td>8000 (35.6)</td>
<td>29</td>
<td>1.39</td>
<td>n/a</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>29</td>
<td>1.39</td>
<td>40</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>24</td>
<td>1.15</td>
<td>27</td>
</tr>
<tr>
<td>21</td>
<td></td>
<td>17</td>
<td>0.81</td>
<td>26</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td>15</td>
<td>0.72</td>
<td>24</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>18</td>
<td>0.86</td>
<td>23</td>
</tr>
<tr>
<td>33</td>
<td></td>
<td>18</td>
<td>0.86</td>
<td>21</td>
</tr>
<tr>
<td>36</td>
<td></td>
<td>16</td>
<td>0.77</td>
<td>19</td>
</tr>
<tr>
<td>39</td>
<td></td>
<td>14</td>
<td>0.67</td>
<td>18</td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>13</td>
<td>0.62</td>
<td>21</td>
</tr>
<tr>
<td>45</td>
<td></td>
<td>16</td>
<td>0.77</td>
<td>21</td>
</tr>
<tr>
<td>48*</td>
<td></td>
<td>14</td>
<td>0.67</td>
<td>20</td>
</tr>
<tr>
<td>51*</td>
<td></td>
<td>13</td>
<td>0.62</td>
<td>n/a</td>
</tr>
</tbody>
</table>

**Note**

1. Standard roofs are adequate for many applications but additional capacity is available when optional upgrade packages are used.
2. Upgrade packages include roof stiffening rings and/or rib supports.
3. For peak load between standard and upgrade limits, a straight line interpolation can be used to determine maximum roof snow load.
4. *Structural roofs for 48’ – 54’ with rafters are available to support peak ring loads greater than loads on Table 3.
5. Higher level upgrade kits include all components from lower level kit; only one upgrade kit needs to be ordered for any given bin.
3.1.2 Roof Design Capacities for Structural Roofs

Table 4. Maximum Roof Snow Load at STANDARD Peak Loads

<table>
<thead>
<tr>
<th>Bin Series</th>
<th>Std Peak Load</th>
<th>Standard Roof</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lbs (kN)</td>
<td>psf</td>
</tr>
<tr>
<td>48</td>
<td>20000 (89.0)</td>
<td>39</td>
</tr>
<tr>
<td>51</td>
<td>39</td>
<td>1.87</td>
</tr>
<tr>
<td>54</td>
<td>39</td>
<td>1.87</td>
</tr>
<tr>
<td>60</td>
<td>39</td>
<td>1.87</td>
</tr>
<tr>
<td>66</td>
<td>38</td>
<td>1.82</td>
</tr>
<tr>
<td>72</td>
<td>38</td>
<td>1.82</td>
</tr>
<tr>
<td>75</td>
<td>37</td>
<td>1.77</td>
</tr>
<tr>
<td>78</td>
<td>37</td>
<td>1.77</td>
</tr>
<tr>
<td>84</td>
<td>37</td>
<td>1.77</td>
</tr>
<tr>
<td>90</td>
<td>37</td>
<td>1.77</td>
</tr>
<tr>
<td>96</td>
<td>37</td>
<td>1.77</td>
</tr>
<tr>
<td>102</td>
<td>32</td>
<td>1.53</td>
</tr>
<tr>
<td>105</td>
<td>32</td>
<td>1.53</td>
</tr>
<tr>
<td>108</td>
<td>32</td>
<td>1.53</td>
</tr>
</tbody>
</table>

Note
Standard capacities are provided. Additional capacity is available with optional upgrades.

Table 5. Maximum Roof Snow Load at UPGRADED Peak Loads

<table>
<thead>
<tr>
<th>Bin Series</th>
<th>Upgraded Peak Load</th>
<th>Standard Roof</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lbs (kN)</td>
<td>psf</td>
</tr>
<tr>
<td>48</td>
<td>60000 (266.9)</td>
<td>38</td>
</tr>
<tr>
<td>51</td>
<td>38</td>
<td>1.82</td>
</tr>
<tr>
<td>54</td>
<td>38</td>
<td>1.82</td>
</tr>
<tr>
<td>60</td>
<td>38</td>
<td>1.82</td>
</tr>
<tr>
<td>66</td>
<td>37</td>
<td>1.77</td>
</tr>
<tr>
<td>72</td>
<td>37</td>
<td>1.77</td>
</tr>
<tr>
<td>75</td>
<td>36</td>
<td>1.72</td>
</tr>
<tr>
<td>78</td>
<td>36</td>
<td>1.72</td>
</tr>
<tr>
<td>84</td>
<td>36</td>
<td>1.72</td>
</tr>
<tr>
<td>90</td>
<td>34</td>
<td>1.63</td>
</tr>
<tr>
<td>96</td>
<td>34</td>
<td>1.63</td>
</tr>
<tr>
<td>102</td>
<td>31</td>
<td>1.48</td>
</tr>
<tr>
<td>105</td>
<td>31</td>
<td>1.48</td>
</tr>
<tr>
<td>108</td>
<td>31</td>
<td>1.48</td>
</tr>
</tbody>
</table>

3.1.3 Roof Snow Load vs. Ground Snow Load

The Roof Design Capacity tables reflect roof snow load (RSL) values. These are design values. Often, comparisons are made to ground snow values (GSL). These are not the same. The conversion from GSL to RSL varies between jurisdictions and is governed by building codes:

- In the United States, for grain bins, GSL = RSL x 2
- In Europe, for grain bins, GSL = RSL x 1.25
• In Canada, for grain bins, the GSL/RSL conversion varies with every location across the country. However, for comparison purposes, the US conversion can be used as an approximation.

Therefore, when comparing against competitive GSL values in the US, double the above values. When comparing against competitive GSL values in Canada, double the above values for a reasonably close approximation.

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/ft³ (880 kg/m³).
If using bin jacks during assembly, always lift on an upright. Choose a hoist with a 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 EZ-Step 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 specific 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 EZ-Step 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 16.)
• Store curved wall sheets ‘hump-up’. (See Detail A in Figure 2 on page 16.)
• 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 16.)
• Roof sheets must be elevated at least 12" at the small end of the sheets. (See Detail B in Figure 2 on page 16.)
• Temporary storage can be provided by erecting a simple framework supporting a waterproof tarp. (See Detail C in Figure 2 on page 16.)
• 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

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 16.)

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 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 15 for mandatory siting and assembly requirements.
- Store only non-corrosive, free-flowing materials up to 55 lbs/ft³ (880 kg/m³) 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
- Scaffold
- 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.
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 EZ-Step.
- 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. Planning the Location of Ladder Components

**Important**
Timing (assembling components in the correct order and relative position) is very important when assembling ladders, eaves rails, roof stairs or roof ladders, platforms and inside ladders, and other bin components. Consideration must be given to this during the planning stages, before assembly of the bin is initiated.

Consider the following:

**Inside Ladders**
The inside ladder sections bolt to existing holes in the horizontal seams of the wall sheets, which are spaced at a consistent 9 3/8". The inside ladders should also be centered on the roof panel that contains the inspection hatch opening. This roof panel should be centered on the horizontal wall sheet hole that will be the center of the inside ladder sections. Spinning the top ring angles and roof sheets relative to this location on the wall sheets may be required to achieve optimum fit-up.

**Roof Stairs or Roof Ladders**
The external ladder sections bolt to existing holes in the horizontal seams of the wall sheets. The roof stairs, or roof ladders, bolt to the ribs of roof panels, and are positioned to the right or left of the inspection hatch. The hatch should be centered on the inside ladders, if present. It may also be desirable to position the roof stairs, or roof ladders, relative to some external elements such as overhead conveyors, or catwalks.

The roof panel that the roof stairs / roof ladders are bolted to must be centered (as much as possible) to the center of the external ladder and eaves rails. To achieve optimum fit-up, it may be necessary to spin the top ring angles and roof sheets relative to the wall sheets, to align this roof panel relative to the intended location of the external ladder.

**Uprights**
Stiffened bins must be given additional consideration since the external ladder/platform combinations must be mounted on either side of a stiffener location. On a stiffened wall sheet the upright locations can be identified by the line of vertical holes set in from either end. (See Figure 4 on page 22.)

**Timing Considerations**
For fully featured bins containing external ladders, eaves rails, platforms, roof stairs or roof ladders, and inside ladders, the following is an example of the timing considerations that should be undertaken prior to the construction of the bin.

1. Select the location of the various ladder components relative to external elements such as conveyors or catwalks.
2. Select the location of the various ladder components relative to other bin elements such as stencil sheets, door openings, remote vent opener, etc.
3. Determine the upright location that the external ladder sections and platforms will be centered on. During the initial assembly phases mark these locations on the top ring of wall sheets. For non-stiffened bins this is not a consideration.
4. Determine if the inspection hatch is located on the right or left side of the external ladder sections.
5. Locate the top ring angles and roof panels relative to this position such that the roof panel containing the inspection hatch is centered, as much as possible, on the hole in the wall sheet that is the center of the inside ladder sections. In general, the center of the inside ladder sections should be 37 ½" (or 4 horizontal wall sheet spaces @ 9 3/8") to the right or left of the center of the external ladder sections.
6. In the absence of an internal ladder, center the roof panel to which the roof stairs or roof ladders are being bolted to, on the center of the external ladder sections.

**Note**
North American layouts are shown throughout this document, unless otherwise noted.

**Figure 3. Ladder Location**

If there is a ladder/platform combination, it is necessary to position the consecutive sidewall ladder runs on either side of an upright. The proper side wall bolt holes are illustrated below for a ladder positioned to the left of the upright. The mirror image of these holes can be used if the ladder is on the right side of the upright. The mirror image of these holes can be used if the ladder is on the right side of the upright.
5.3. Wall Ladder Assembly

When mated with a roof stair, the external ladders, cages and eaves rails should be assembled as per the assembly instructions contained with those products. However, there are a few additional requirements as noted below.

1. Install ladder extensions on 15’ to 54’ diameter bins:
   a. Bolt on the single ladder extension rung (234098) while assembling the pass through rails to the top ladder section as shown in Figure 5 on page 22.
   b. Use the same hardware that is supplied with the ladder package.
   c. Assemble the cage as described in the instructions provided in the ladder installation manual.
2. Install ladder extensions on **60' – 108' diameter bins:**
   a. Bolt on the double rung ladder extension (234103) as illustrated in Figure 6 on page 23. This double rung part is an extension of the ladder.
   b. Raise the pass through rails (234505) accordingly.
   c. For stability, secure both pass through rails to the bottom lip of the first roof stair.
   d. Use the support arms (234504) as described in the following steps.
   e. For these bin diameters, extend the top safety cage section only.
   f. The difference in the top cage section is illustrated in Figure 6 on page 23.

   **Figure 6. Double rung Ladder Extension**

3. Install the support arms (234504) on the side of the roof stair opposite to the inspection hatch location.
   a. Install as per the instructions in the ladder manual.
   b. Use the support arm clips (234517) and support arm brackets (234518).

   **Note**
   Alternatively, one support arm can be attached to the stair stringer, as shown in Figure 7 on page 24. If there is interference of the support arm that extends inward, with the stair stringer, another means of properly supporting the pass through rail, inwards and outwards, will need to be developed. The method proposed in the next step would be adequate.
2. On the side of the roof stair opposite to the inspection hatch location, the support arms (234504) are installed as per the instructions in the ladder manual, using the support arm clips (234517) and support arm brackets (234518), if the roof stair is properly centered to the external ladder. Alternatively one support arm can be attached to the stair stringer, (Figure 3). If there is interference of the support arm that extends inward, with the stair stringer, another means of properly supporting the pass through rail, inwards and outwards, will need to be developed. The method proposed in the next step would be adequate.

3. On the side of the roof stair adjacent to the inspection hatch, the support arms (234504) are used to form part of the protective cage around the inspection hatch (Figure 16). It is very important that the pass through rail is secured to the roof structure in an inwards and outwards direction. Pick the location where the pass through rail crosses the flange of the bottom stair tread. Drill a 3/8" hole completely through the pass rail tube, and through the flange of the stair tread. Secure using a 3/8" x 4 1/2" fully threaded bolt (150475) that is triple nutted as shown (Figure 4). Secure the bolt to the pass through rail with one nut, and sandwich the flange on the stair tread with the remaining 2 nuts. Adjust the relative position of the nuts and tighten to lock into position. If possible, also secure the second pass through in the manner as well.

4. On the side of the roof stair adjacent to the inspection hatch, the support arms (234504) are used to form part of the protective cage around the inspection hatch Figure 20 on page 35.

5. ASSEMBLY ROOF STAIR – WIDE-CORR® GRAIN BIN

**Note**

It is very important that the pass through rail is secured to the roof structure in an inwards and outwards direction.

a. Pick the location where the pass through rail crosses the flange of the bottom stair tread.
b. Drill a 3/8" hole completely through the pass rail tube, and through the flange of the stair tread.
c. Secure using a 3/8" x 4 1/2" fully threaded bolt (150475) that is triple nutted as shown (Figure 4).
d. Secure the bolt to the pass through rail with one nut, and sandwich the flange on the stair tread with the remaining 2 nuts.
e. Adjust the relative position of the nuts and tighten to lock into position. If possible, also secure the second pass through in the manner as well.

5.4. Typical Roof Stair Installation

Figure 9. Bottom Stair Module
(shown with inspection hatch is on the right side of the stairs)

Note
There are varying lengths of handrails used for different configurations roof stair modules. This is accommodated by adjusting the handrail (234149) and handrail splice (234150) for length and then connecting with self-drill screws. If the required length is longer than the maximum length attainable by the handrail and handrail splice, use brace 234176 in place of 234150. The brace can be cut to required length and used as the handrail splice.
1. At every post location, bolt on a bracket for post (234132).
2. Use a 3/8" x 2 ½" bolt from the tread side, passing it through the bracket, stringer and the handrail post.
3. Once the bracket is bolted, install two self-drill screws (234131) per bracket into the stair tread as shown in Figure 9 on page 25 - Detail A.

**Important**
On all the brackets the upper hole is used to make the connection to the stringer and the post, the only exception to this is the bracket bolted to the first handrail post on the right stringer, which is moved up to allow access to the inspection hatch. In this location the lower hole on the bracket is used to make the connection. Also the lowest hole on that post attaches to the stair tread and stringer as shown in Figure 9 on page 25 - Detail B.

4. For larger bin diameters, bolt together additional roof stair modules, as shown in the layout drawings.

### 5.4.1 Roof Stair Module Layouts

**Table 6. Roof Stairs (in assembly order)**

<table>
<thead>
<tr>
<th>BIN MODEL</th>
<th>STAIR TREAD MODULES</th>
</tr>
</thead>
<tbody>
<tr>
<td>15'</td>
<td>5</td>
</tr>
<tr>
<td>18'</td>
<td>7</td>
</tr>
<tr>
<td>21'</td>
<td>8</td>
</tr>
<tr>
<td>24'</td>
<td>6 5</td>
</tr>
<tr>
<td>27'</td>
<td>5 7</td>
</tr>
<tr>
<td>30'</td>
<td>6 7</td>
</tr>
<tr>
<td>33'</td>
<td>8 7</td>
</tr>
<tr>
<td>36'</td>
<td>8 8</td>
</tr>
<tr>
<td>39'</td>
<td>5 7 7</td>
</tr>
<tr>
<td>42'</td>
<td>6 7 7</td>
</tr>
<tr>
<td>45'</td>
<td>6 8 8</td>
</tr>
<tr>
<td>48'</td>
<td>8 8 7</td>
</tr>
<tr>
<td>51'</td>
<td>5 7 7 7</td>
</tr>
<tr>
<td>54'</td>
<td>6 7 7 7</td>
</tr>
<tr>
<td>60'</td>
<td>8 8 7 7</td>
</tr>
<tr>
<td>66'</td>
<td>6 6 6 8</td>
</tr>
<tr>
<td>72'</td>
<td>8 8 8 7</td>
</tr>
<tr>
<td>75'</td>
<td>8 8 8 7</td>
</tr>
<tr>
<td>78'</td>
<td>7 7 7 7</td>
</tr>
<tr>
<td>84'</td>
<td>5 5 7 7</td>
</tr>
<tr>
<td>90'</td>
<td>8 8 8 8</td>
</tr>
<tr>
<td>96'</td>
<td>6 6 8 8</td>
</tr>
<tr>
<td>102'</td>
<td>7 7 7 7</td>
</tr>
<tr>
<td>105'</td>
<td>8 8 7 7</td>
</tr>
<tr>
<td>108'</td>
<td>5 5 8 8</td>
</tr>
</tbody>
</table>

**SHADED MODULE IS THE BOTTOM MODULE** (supplied with short hand and mid rails)

**Table 7. Non-Common Part Numbers**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>5 TREAD MODULE</th>
<th>6 TREAD MODULE</th>
<th>7 TREAD MODULE</th>
<th>8 TREAD MODULE</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRINGER RIGHT</td>
<td>234059</td>
<td>234057</td>
<td>234055</td>
<td>234053</td>
</tr>
<tr>
<td>STRINGER LEFT</td>
<td>234058</td>
<td>234056</td>
<td>234054</td>
<td>234052</td>
</tr>
</tbody>
</table>
5.4.2 Roof Stair Assembly

The following assembly instructions should be used in combination with the layouts provided in Section 5.4.1 – Roof Stair Module Layouts on page 26 for the bin diameter under construction. The layouts provide part numbers, and relative positioning of the principle components.

General
1. Unless otherwise noted, use 3/8” x 1” bolts and nuts for roof stair assembly.
2. Assemble as much as possible on the ground, then lift the completed assembly into place and secure it to the bin roof structure.
3. To determine the part numbers and their locations for the bin diameter being assembled, refer to Section 5.4.1 – Roof Stair Module Layouts on page 26.
4. If multiple stringer sections are being utilized, assemble these sections together.
5. Note that there are left and right stringer sections, and that the stringer flanges point outward.

Assemble Stringers
1. Bolt together the stringer sections as shown in Figure 10 on page 27.

Figure 10. Stringer Assembly

2. Bolt on the stair treads.
3. Complete the stair assembly as shown in Figure 11 on page 28.
Note
For the larger bin diameters with many stair modules, assemble the stair in manageable parts and bolt the mating assemblies together as they are fitted to the roof.

Install Z-Supports
1. Bolt Z-supports to the stringers at the hole locations in the bottom flanges.
   There should be a Z-support at every hole location.
2. Make sure the flange with the multiple slots is positioned downwards and mates to the roof ribs.
   On the top flange of the Z-support there are three possible bolting locations. These allow the roof stairs to be shifted to the right or left in relation to the underlying roof panels.
3. Use the center bolting location, if possible.
   At the bottom end of the roof stairs, it may be necessary to shift the Z-support to the right or left if there is the possibility of it interfering with the operation of the inspection hatch, or if it interferes with the use of the internal ladder sections. (See Figure 12 on page 28.)

Figure 12. Installing Z-supports
**Note**

**For 60’ – 108’ Diameter Bins**: For bins where there is a step in the roof ribs, there are two sizes of Z-supports to accommodate the additional height at the bottom of the roof.

- The standard Z-section (234070) is 4” high. These are used at the top of the roof.
- The extended Z-sections (234104) are 7 ⅞” high and are used at the bottom of the roof.

(See Figure 13 on page 29.)

**Figure 13. Installing Z-supports on larger commercial roofs**

---

**Mount the Roof Stairs on the Roof**

1. Position the bottom Z-section relative to the bottom holes in the roof panels. There is flexibility with the fit-up, but the bottom stair tread should be positioned close enough to the pass-through rails to permit the bolting of the two pieces together as provided in Step 4 on page 24.

2. Make sure the center of the bottom flange on the Z section is located:
   - 5” above the bottom hole in the roof rib for 15’ to 54’ diameter roofs
   - 15” above the bottom edge of the roof rib for 60’ and larger roofs

3. Make sure bottom stair tread is within 1” to 2” of the ladder pass through rail. There is some allowance in the slotted holes for side to side movement.
Figure 14. Mounting the roof stairs

4. For best results center the roof stair on the roof panel, and on the ladder pass through rails. (See Timing Considerations on page 20.)

5. Drill hole locations into the roof ribs as required and secure with hardware.

6. Put the sealing washer on the inside to ensure a water tight seal.

   **Note**
   
   If the layouts are followed correctly, and if the roof stairs are located properly, there should be no interference between the Z-supports and existing bolt locations along the roof rib.

7. If interference does occur, move the complete stair assembly up or down slightly to avoid these bolt locations.

8. Alternately, rotate the Z sections at these locations such that the bottom flange is pointing upwards.

**Connect the Top of the Roof Stairs**

1. For extra stability at the top of the stairs, locate the point where the Z-section protrudes across neighboring roof ribs.

2. Using the closest slot in the bottom flange of the Z-support as a guide, drill a 3/8” hole through the underlying rib.

3. Insert a 3/8” x 4 1/2” fully threaded bolt (150475), washers and triple nut as shown in Figure 15 on page 31.
Figure 15. Bolting the Z-section to roof ribs

4. Secure the bolt to the roof rib with one nut, and sandwich the flange on the Z-section with the remaining two nuts.
5. Adjust to take up the slack and tighten to lock in position.
6. Repeat on the other side and at other locations where convenient.
7. Put a sealing washer (taken from a 3/8” bin bolt) on the inside to ensure a water tight seal.

Attach Handrail Posts and Handrails

1. Attach the vertical hand rail posts (234129) as shown in Figure 16 on page 32.
2. Use the handrail (234149) and handrail splice (234150) to form a single handrail.
3. In locations where the 234149/234150 combination is not long enough, use a 234176 brace with one end cut off in place of 234150.

   The handrail and mid-rail lengths vary based on the stair modules, on the either side.

4. Position the lower vertical hand rail post, on the side of the stair next to the inspection hatch, higher up on the stringer to accommodate access to the inspection hatch.

**Bolt On Handrails and Midrails**

1. Bolt on hand rails and mid rails as shown in Section 5.4 – Typical Roof Stair Installation on page 25.

2. If multiple stair modules are being used, overlap mating handrails over each other at the handrail post locations as shown in Figure 17 on page 33.

   Mating mid rails also overlap. All rails are positioned on the inside of the vertical hand rail supports.
Figure 17. Overlapping handrails at posts

3. Fit one end of one handrail into the other end of the second handrail between posts as shown in Figure 18 on page 33.

Figure 18. Joining handrails between posts

Attach a Warning Chain

1. Attach a warning chain (234101) to a spare hole on the upper end of a hand rail, by securing a bolt through the end link on the chain.
2. Drape the chain across the stairwell opening and secure it on the bolt of the handrail at the opposite vertical post.

Figure 19. Attaching a warning chain

5.4.3 Inspection Hatch Cage Assembly

1. Attach three 1" diameter support arms (234504) to the pass through rail adjacent to the inspection hatch as illustrated, using support arm clips (234517).
   a. Position the lowest 1" diameter support arm just above the bend in the pass through rail.
   b. Position the top support arm as high as possible.
   c. Position the center support arm midway between the other two.
2. Using the support arms as guides, position the vertical support tube (234069) such that it attaches to the other ends of the support arms using the support arm clips, bridges the eave of the roof panel, and aligns alongside the wall sheet.
   a. Using the holes in the vertical support tube as a guide, drill 3/8" holes through the crest of the mating wall sheet corrugations
   b. Attach using 3/8" x 2 ½" bolts.
   c. Put the sealing washer on the inside to ensure a water tight seal.
   d. Attach the plastic cap (234559) to the vertical support tube.

3. Bolt on the 1 ¾" diameter longer, lower support rail (234100) between the pass through rail and the vertical support tube.
   a. Use support arm clips.
   b. Position the lower rail lower down on the pass through rail, below the bend in the pass through rail. (See Figure 20 on page 35.)

4. When attaching the top support rail to the pass through rail:
   a. Use the bolt and nut to secure the end link on the second warning chain (234101).
5. Prevent the support arm clips from sliding down the pass through rail tube and the vertical support tube by securing with the self drilling screws provided (900461).

**Figure 22. Support arm clips**

6. Using the support arm clip and support arm bracket, attach the final support arm (234504) to the vertical support tube, and to the nearest roof rib, as shown in Figure 20 on page 35.

7. Drill into the roof rib and secure the assembly, as required.
5.4.4 Roof Stair Hardware Usage

All roof stair and related connections are made using 3/8" x 1" bolts and 3/8" nuts, except for the following:

- Clamps built into top cage hoops secure using 3/8" x 1 ½" bolts
- Pass through rails secure to sidewall ladder using 3/8" x 2 ½" bolts (these are supplied with the ladder)
- Vertical support tube secures to the wall sheet using 3/8" x 2 ½" bolts
- Pass through rails secure to front lip of stair tread using 3/8" x 4 ½" fully threaded bolts and 3 - 3/8" nuts at each location
- For stability, "Z" supports secure to roof ribs using 3/8" x 4 ½" fully threaded bolts and 3 - 3/8" nuts at each location
- To keep the horizontally placed support arms from slipping down the vertical supports, secure them using the #10 x ¾" self-drilling screws.
- Handrail to vertical posts use 3/8” x 2-1/2” hex bolts.

Figure 23. Hardware Usage

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>234943</td>
<td>Bolts - 3/8&quot; x 1&quot; (bag of 50)</td>
<td>4</td>
</tr>
<tr>
<td>193797</td>
<td>Bolts - 3/8&quot; x 1 1/2&quot;</td>
<td>5</td>
</tr>
<tr>
<td>150517</td>
<td>Bolts - 3/8&quot; x 2 1/2&quot;</td>
<td>7</td>
</tr>
<tr>
<td>150475</td>
<td>Bolts - 3/8&quot; x 4 1/2&quot;</td>
<td>18</td>
</tr>
<tr>
<td>235951</td>
<td>Nuts - 3/8&quot; (bag of 100)</td>
<td>2</td>
</tr>
<tr>
<td>900461</td>
<td>Self Drill Screws - #10 x 3/4&quot;</td>
<td>14</td>
</tr>
<tr>
<td>234517</td>
<td>Support Arm Clip</td>
<td>7</td>
</tr>
<tr>
<td>234559</td>
<td>Pipe Cap</td>
<td>3</td>
</tr>
</tbody>
</table>
### Table 8  234085 - Roof Stairs Hardware Package (continued)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>234101</td>
<td>Chain</td>
<td>2</td>
</tr>
<tr>
<td>198934</td>
<td>Manual - WC Roof Stairs</td>
<td></td>
</tr>
</tbody>
</table>

### 5.4.5 Roof Stair Packages

#### Table 9.  Roof Stair Packages (15’ to 48’ bins)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>15’</th>
<th>18’</th>
<th>21’</th>
<th>24’</th>
<th>27’</th>
<th>30’</th>
<th>33’</th>
<th>36’</th>
<th>39’</th>
<th>42’</th>
<th>45’</th>
<th>48’</th>
</tr>
</thead>
<tbody>
<tr>
<td>234129</td>
<td>HANDRAIL POST</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>13</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>234132</td>
<td>BRACKET FOR HANDRAIL POST</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>13</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>234052</td>
<td>STRINGER - 8 TREAD LEFT</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>234053</td>
<td>STRINGER - 8 TREAD RIGHT</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>234054</td>
<td>STRINGER - 7 TREAD LEFT</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>234055</td>
<td>STRINGER - 7 TREAD RIGHT</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>234056</td>
<td>STRINGER - 6 TREAD LEFT</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>234057</td>
<td>STRINGER - 6 TREAD RIGHT</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>234058</td>
<td>STRINGER - 5 TREAD LEFT</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>234059</td>
<td>STRINGER - 5 TREAD RIGHT</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>234064</td>
<td>STAIR TREAD</td>
<td>5</td>
<td>7</td>
<td>8</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>14</td>
<td>15</td>
<td>17</td>
<td>18</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>234149</td>
<td>HANDRAIL - GRAIN BIN SPIRAL STAIR</td>
<td>4</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>16</td>
<td>16</td>
<td>20</td>
<td>22</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>234176</td>
<td>BRACE (LONG) - GRAIN BIN SPIRAL STAIR</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>8</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>234069</td>
<td>SUPPORT POST</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>234070</td>
<td>Z-SUPPORT 4”</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>234085</td>
<td>ROOF STAIR HARDWARE PACKAGE</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>234131</td>
<td>SDLRILL SCREW 12-14 x 0.75 ZN (Bag of 12)</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>234559</td>
<td>TUBE CAP φ1.66</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>12</td>
<td>13</td>
<td>13</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>234098</td>
<td>LADDER - SINGLE RUNG</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>234100</td>
<td>SUPPORT ARM - BOTTOM</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>234103</td>
<td>LADDER - DOUBLE RUNG</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>234104</td>
<td>Z-SUPPORT 7.8”</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>234504</td>
<td>SUPPORT ARM</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>234163</td>
<td>LADDER CAGE - TOP HOOP</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>234542BDL</td>
<td>LADDER CAGE - VERTICAL BAR BUNDLE 30”</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>234543BDL</td>
<td>LADDER CAGE - VERTICAL BAR BUNDLE 25”</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>235943</td>
<td>BOLT .375 x 1.0 GR8.2 ZJS500 (Bag of 50)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>150517</td>
<td>BLT HC .375-16 X 2.5 ZN G5</td>
<td>22</td>
<td>32</td>
<td>32</td>
<td>38</td>
<td>43</td>
<td>49</td>
<td>54</td>
<td>54</td>
<td>65</td>
<td>70</td>
<td>70</td>
<td>76</td>
</tr>
<tr>
<td>235951</td>
<td>NUT HEX .375-16 GR5 ZJS500 (Bag of 100)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 10. Roof Stair Packages (51’ to 108’ bins)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>51’</th>
<th>54’</th>
<th>60’</th>
<th>66’</th>
<th>72’</th>
<th>75’</th>
<th>78’</th>
<th>84’</th>
<th>90’</th>
<th>96’</th>
<th>102’</th>
<th>105’</th>
<th>108’</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>212618</td>
<td>234105</td>
<td>234106</td>
<td>234107</td>
<td>234108</td>
<td>234109</td>
<td>234110</td>
<td>234111</td>
<td>212620</td>
<td>212621</td>
<td>212622</td>
<td>212623</td>
<td></td>
</tr>
<tr>
<td>234129</td>
<td>HANDRAIL POST</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>21</td>
<td>22</td>
<td>22</td>
<td>26</td>
<td>26</td>
<td>26</td>
<td>26</td>
<td>29</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>234132</td>
<td>BRACKET FOR HANDRAIL POST</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>21</td>
<td>22</td>
<td>22</td>
<td>26</td>
<td>26</td>
<td>26</td>
<td>26</td>
<td>29</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>234052</td>
<td>STRINGER - 8 TREAD LEFT</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>5</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>234053</td>
<td>STRINGER - 8 TREAD RIGHT</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>5</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>234054</td>
<td>STRINGER - 7 TREAD LEFT</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>234055</td>
<td>STRINGER - 7 TREAD RIGHT</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>234056</td>
<td>STRINGER - 6 TREAD LEFT</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>234057</td>
<td>STRINGER - 6 TREAD RIGHT</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>234058</td>
<td>STRINGER - 5 TREAD LEFT</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>234059</td>
<td>STRINGER - 5 TREAD RIGHT</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>234064</td>
<td>STAIR TREAD</td>
<td>23</td>
<td>24</td>
<td>27</td>
<td>30</td>
<td>34</td>
<td>35</td>
<td>37</td>
<td>39</td>
<td>43</td>
<td>46</td>
<td>49</td>
<td>51</td>
<td>51</td>
</tr>
<tr>
<td>234149</td>
<td>HANDRAIL - GRAIN BIN SPIRAL STAIR</td>
<td>28</td>
<td>30</td>
<td>32</td>
<td>38</td>
<td>40</td>
<td>40</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>54</td>
<td>64</td>
<td>64</td>
<td>56</td>
</tr>
<tr>
<td>234150</td>
<td>HANDRAIL SPLICE - GRAIN BIN SPIRAL STAIR</td>
<td>26</td>
<td>30</td>
<td>26</td>
<td>30</td>
<td>26</td>
<td>30</td>
<td>26</td>
<td>42</td>
<td>26</td>
<td>34</td>
<td>64</td>
<td>58</td>
<td>26</td>
</tr>
<tr>
<td>234176</td>
<td>BRACE (LONG) - GRAIN BIN SPIRAL STAIR</td>
<td>2</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>14</td>
<td>6</td>
<td>22</td>
<td>20</td>
<td>6</td>
<td>30</td>
<td>66</td>
<td>58</td>
<td>26</td>
</tr>
<tr>
<td>234069</td>
<td>SUPPORT POST</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>234070</td>
<td>Z-SUPPORT 4”</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>234085</td>
<td>ROOF STAIR HARDWARE PACKAGE</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>234131</td>
<td>SFORDRILL SCREW 12-14 x 0.75 ZN</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>18</td>
<td>19</td>
<td>19</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>26</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>234559</td>
<td>TUBE CAP g1.66</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>21</td>
<td>22</td>
<td>22</td>
<td>26</td>
<td>26</td>
<td>26</td>
<td>26</td>
<td>29</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>234098</td>
<td>LADDER - SINGLE RUNG</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>234100</td>
<td>SUPPORT ARM - BOTTOM</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>234103</td>
<td>LADDER - DOUBLE RUNG</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>234104</td>
<td>Z-SUPPORT 7.8”</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>7</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>234504</td>
<td>SUPPORT ARM</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>234163</td>
<td>LADDER CAGE - TOP HOOP</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>23452BDL</td>
<td>LADDER CAGE - VERTICAL BAR BUNDLE 30”</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>23453BDL</td>
<td>LADDER CAGE - VERTICAL BAR BUNDLE 26”</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>235943</td>
<td>BOLT .375 x 1.0 GR8.2 ZJS500 (Bag of 50)</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>150517</td>
<td>BLT HC .375-16 X 2.5 ZN G5</td>
<td>86</td>
<td>92</td>
<td>97</td>
<td>113</td>
<td>119</td>
<td>119</td>
<td>140</td>
<td>140</td>
<td>140</td>
<td>157</td>
<td>184</td>
<td>184</td>
<td>162</td>
</tr>
<tr>
<td>235951</td>
<td>NUT HEX .375-16 GR5 ZJS500 (Bag of 100)</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

5.5. Optional Peak Rail Assembly

The peak rail is an option to the roof stairs and is intended to be assembled to the roof stairs.

1. The peak rail assembly tubes are supported at each end by the stair support posts (which are tubes) via a connector clip. The remainder of the peak rail is supported on vertical posts (which are angled steel) via U-bolts.
Optional Peak Rail Assembly

The peak rail is an option to the roof stairs and is intended to be assembled to the roof stairs.

1. The Peak Rail Assembly tubes are supported at each end by the stair support posts (which are tubes) via a Connector Clip. The remainder of the Peak Rail is supported on vertical posts (which are angled steel) via U-Bolts.

2. Preassemble the peak rail support posts (234092) to the support clips (234093) such that when the clips match the slope of the roof, the support posts are vertical. The flange on the support posts should be oriented such that the peak rails are attached on the inside of the support posts.

3. Using connector clips, loosely secure one peak rail tube to the roof stair handrail support posts and the second tube to a mid-point on the handrail support posts.
   a. At each location, make sure the tubes butt up against the ladder posts and do not protrude inside of the plane of the handrail support.
   b. Level the tubes (as described in the following steps).
   c. Secure the ends of the tubes using self-drilling screws at the locations shown in the following diagram.
Figure 26. Securing peak rail tubes to support posts

4. The support posts should be roughly distributed among the available roof ribs.
   a. Start with the support post that is across from the roof stairs.
   b. Using the peak rail tubes as guides, position this support post such that it mates with both tubes at the two desired locations.
   c. Drill the roof rib to mate with the holes in the support clip.
   d. Secure the support post assembly to the ribs and to the safety tubes.
   e. Make sure the support posts are vertical.

Figure 27. Position the support posts

5. Locate the remaining support posts such that the spaces between them are roughly equal.
   a. Secure to the peak rail tubes using the U-bolts.
   b. Drill into the roof ribs.
   c. Secure with the hardware provided.
Figure 28. Securing support posts

Distribute remaining peak ring support posts equally around the roof and secure on roof ribs.

6. Drill in self drilling screws from the back of the handrail support post to secure the end of the peak rail tubes at all four locations. (See Figure 26 on page 41.)

Figure 29. Secure the end of the peak rail tubes

Use self drilling screws to secure peak ring tubes at roof stair hand rail support post locations.

7. Install pipe plugs (234102) into the end of the peak rail tubes.

8. Tighten all connections.

9. Install two support arms (234504) on two support posts at roughly 90° to the roof stairs (one of either side) to brace the structure laterally.
   a. Bolt the support arms to the flange of the support posts.
   b. Attach the other end to the roof rib using the support arm brackets (234518).
Figure 30. Installing support arms

FASTEN SUPPORT ARMS
STIFFEN THE STRUCTURE

Variation: It is possible to install the peak rails independent of the roof stairs. However additional parts will be required. Two additional peak rail support posts (234092) and two additional support clips (234093) will be required to secure the ends of the tubes. Also, some means of stiffening these two posts against lateral failure will also be required. This could be accomplished with two braces (234504) attached to each post flange at roughly 90° to each other and secured to the roof ribs with support arm brackets (234518).

Figure 31. Installing the peak rails independently of the roof stairs

EXTRA PARTS REQUIRED
234092: SUPPORT POSTS - 2
234093: SUPPORT CLIPS - 2
234504: SUPPORT ARMS - 4
234518: SUPPORT ARM BRACKETS - 4

PROVIDE LATERAL SUPPORT TO POSTS AT ENTRY POINT
5.5.1 Peak Rail Hardware Usage

All peak rail connections are made using 3/8" x 1" bolts and 3/8" nuts except for the following:

- Safety tubes are secured to support posts by 5/16" U-bolts and 5/16" lock nuts and to the vertical handrail supports on the roof stairs by corner clips and self-tapping screws.

**Table 11. 2234095 - Roof Peak Rail Package (15' to 27' Roofs)**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>234091</td>
<td>Ring for 15' - 27' Bins</td>
<td>2</td>
</tr>
<tr>
<td>234092</td>
<td>Support Post</td>
<td>5</td>
</tr>
<tr>
<td>234097</td>
<td>Hardware Package</td>
<td>1</td>
</tr>
<tr>
<td>234504</td>
<td>Support Arm</td>
<td>2</td>
</tr>
</tbody>
</table>

**Table 12. 234096 - Roof Peak Rail Packages (30' to 108' Roofs)**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>234094</td>
<td>Ring for 30' - 108' Bins</td>
<td>2</td>
</tr>
<tr>
<td>234092</td>
<td>Support Post</td>
<td>7</td>
</tr>
<tr>
<td>234097</td>
<td>Hardware Package</td>
<td>1</td>
</tr>
<tr>
<td>234504</td>
<td>Support Arm</td>
<td>2</td>
</tr>
</tbody>
</table>

**Table 13. 234097 - Roof Peak Rail Hardware Package**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>235943</td>
<td>Bolt 3/8&quot; x 1&quot; (Bag of 50)</td>
<td>1</td>
</tr>
<tr>
<td>234099</td>
<td>Bolt &quot;U&quot;-Round 5/16&quot;</td>
<td>18</td>
</tr>
<tr>
<td>235955</td>
<td>Nut - 3/8&quot;</td>
<td>1</td>
</tr>
<tr>
<td>900225</td>
<td>Nut - 5/16&quot; Hex Nylon Lock</td>
<td>40</td>
</tr>
<tr>
<td>234693</td>
<td>Roof Clip</td>
<td>7</td>
</tr>
<tr>
<td>234102</td>
<td>Pipe Plug</td>
<td>4</td>
</tr>
<tr>
<td>157042</td>
<td>1&quot; Self-Drilling Screw</td>
<td>10</td>
</tr>
<tr>
<td>234518</td>
<td>Support Arm Bracket</td>
<td>2</td>
</tr>
<tr>
<td>198934</td>
<td>Roof Stair Manual</td>
<td>1</td>
</tr>
<tr>
<td>213029</td>
<td>Hand Rail Corner Clip</td>
<td>6</td>
</tr>
<tr>
<td>234131</td>
<td>0.75&quot; Self-drilling screw (12)</td>
<td>2</td>
</tr>
</tbody>
</table>

5.6. Optional Peak Platform Assembly

The peak platform is an option to the roof stairs and peak rails, and must be assembled in conjunction with them.

1. The peak platform support ring is located similarly to the peak rail tubes that are provided with the peak rail assembly, towards the bottom of the peak rail support posts and roof stair handrail posts.
   a. The support ring is secured to the support ring posts using the half-round clips (234114) and ¼" diameter self drilling screws.
   b. Secure to the roof stair posts using connector clips (213029) and self drilling screws.
   c. Bolt the half-round clips onto all of the posts with the supporting ends facing inward towards the peak ring.
   d. Securely seat the supporting 1.66" diameter tube into the half-round cradles.
   e. Secure with a self drilling screw that is drilled in from the backside.
Figure 32. Installing the peak platform support ring (optional)

2. The peak platform deck pieces (234118) are evenly distributed around the peak ring such that the amount of overlap between adjacent pieces is roughly even.
   a. Support the wider end on the support ring.
   b. Rest the narrow end on the ribs of the roof sheets.
3. To initiate the alignment, center one deck piece on the top roof stair tread.
   a. There will be interference between the deck piece and the skid resistance indentations on the stair tread. The best way to overcome this interference is to shorten the peak platform deck piece enough to avoid the skid resistance indentations that are on the top surface of the stair tread.
   b. Secure the deck piece to the stair tread with at least two self drilling screws.

Figure 33. Aligning the peak platform deck pieces

4. Distribute the remaining deck pieces around the roof such that the amount of overlap between adjacent pieces is roughly equal. Align the deck pieces such that at least two of the ¼" pilot holes on the wide end are squarely aligned over the center of the support ring and secure with the self drilling screws.
5. Position the toe board pieces (234119) such that they loop around the outside circumference of the deck pieces and bridge between the support posts.
   a. Overlap mating toe board pieces at the support post locations.
   b. Secure to the support posts using self drilling screws.
   c. If necessary, shorten toe board pieces to prevent unsightly overhang.

5. Position the toe board pieces (234119) such that they loop around the outside circumference of the deck pieces and bridge between the support posts.
   a. Overlap mating toe board pieces at the support post locations.
   b. Secure to the support posts using self drilling screws.
   c. If necessary, shorten toe board pieces to prevent unsightly overhang.
Variation: It is possible to install the peak rail and platform independent from the roof stairs. The two additional support posts and related parts as identified in the previous section will be required. There will be no need to shorten the one deck piece to avoid interference with the top roof stair tread. However, it will be necessary to provide a means of supporting the wide end of the one deck piece that would normally be supported by the stair tread. This can be done by bridging between the two support posts on either side of the entry point. Secure the deck piece to this support using the self drilling screws.

Figure 36. Installing the peak rail and platform independent from the roof stairs

5.6.1 Peak Platform Hardware Usage

All peak Platform connections are made using 3/8" x 1" bolts and nuts except for the following:

- Make sure support ring tubes are sitting fully in the half round clips (234114) and secure to the support posts using ¼" self drilling screws through the pilot hole in each support post
- Secure platform deck pieces using ¼" self drilling screws
- Secure toe boards using ¼" self drilling screws

Table 14. 234115 - Peak Platform 15' - 27' Bins

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>234112</td>
<td>Support Ring - Small</td>
<td>1</td>
</tr>
<tr>
<td>234118</td>
<td>Platform Piece</td>
<td>12</td>
</tr>
<tr>
<td>234119</td>
<td>Toe Board</td>
<td>3</td>
</tr>
<tr>
<td>234117</td>
<td>Hardware</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 15. 234116 - Peak Platform 30' - 108' Bins

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>234113</td>
<td>Support Ring - Large</td>
<td>1</td>
</tr>
<tr>
<td>234118</td>
<td>Platform Piece</td>
<td>16</td>
</tr>
<tr>
<td>234119</td>
<td>Toe Board</td>
<td>4</td>
</tr>
<tr>
<td>234117</td>
<td>Hardware</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 16.  234117 Peak Platform Hardware Package

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>234114</td>
<td>Support Ring Clip</td>
<td>9</td>
</tr>
<tr>
<td>235943</td>
<td>Bolt - 3/8&quot; x 1&quot; (Bag of 50)</td>
<td>1</td>
</tr>
<tr>
<td>235955</td>
<td>Hex Nut - 3/8&quot; (Bag of 50)</td>
<td>1</td>
</tr>
<tr>
<td>157042</td>
<td>1&quot; Self Drilling Screw</td>
<td>100</td>
</tr>
</tbody>
</table>

5.7. Optional Roof Stair Block-Off Assembly

The Roof Stair Block-off Package is an option that mates with a roof stair package when the roof stairs is not used in combination with a Westeel ladder package. Such would be the case if the roof stair was being accessed from an overhead conveyor, and there was no wall ladder. The Stair Block-off Package is intended to provide a barrier at the lower end of the roof stair to prevent somebody from stepping off into space.

Some of the necessary parts are supplied with the roof stair package that forms the inspection hatch cage assembly. (See Section 5.4.3 – Inspection Hatch Cage Assembly on page 34.) The balance of the parts are supplied as part of the Roof Stair Block-off Package.

1. As shown in the following diagram, position one of the vertical support tubes (234069) to align with the inspection hatch roof sheet rib that is furthest away from the roof stair.
   a. The bend in the support tube bridges the eave of the roof sheets and aligns alongside the top wall sheet.
   b. Keep the support pushed up as high as possible.
   c. Using the holes in the support tube as guides, and keeping the support tube in a vertical orientation, drill 3/8" holes through the crest of the mating wall sheet corrugations.
   d. Attach using 3/8" x 2 ½" bolts.
   e. Put the sealing washers on the inside to ensure a water tight seal.
Figure 37. Installing vertical support tubes

2. Attach four 1" diameter support arms (234504) to the vertical support tube, as illustrated using support arm clips (234517).
   a. Position the lowest just above the bend in the vertical support tube, the highest toward the top, and the other two roughly equidistant apart.
   b. Attach a fifth support arm onto the upper portion of the vertical support tube in the same manner and brace down to the nearest roof rib, as shown.
   c. Secure the lower portion of the support arm with a support arm bracket (234518) that is secured to the roof rib.

3. Using the four support arms as guides, place them horizontally and position a second vertical support tube such that it attaches to the other end of the support arms using the support arm clips, bridges the eave of the roof panel and aligns alongside the top wall sheet. Secure in a similar manner to the first.

4. When attaching the top support arm to the second vertical support tube, use the bolt and nut to secure the warning chain (234101). Hook the other end of the chain to a mating hole in the vertical hand rail support across the opening.
5. Position the second vertical support tube in close proximity to the bottom stair tread on the roof stair.
   a. Pick the location where the vertical support tube crosses the flange of the stair tread and drill a 3/8” hole through both.
   b. Secure using a 3/8” x 4 ½” fully threaded bolt (150475) that is triple nutted as shown.
   c. Secure the bolt to the vertical support tube with one nut, and sandwich the flange on the stair tread with the remaining two nuts.
   d. Adjust the relative position of the nuts and tighten to lock into position.

6. Assemble the rest of the support arms:
   a. Attach four more 1” diameter support arms to the second vertical support tube in a similar manner to 3 Step # 2 on page 49.
   b. Using these as guides, position and secure the third and last vertical support tube as per 3 Step #3 on page 49.
   c. Use the last support arm to brace the third vertical support tube to the roof rib as per 3 Step # 2 on page 49.
7. Prevent the support arm clips from sliding down the vertical support tubes by securing with the self drilling screws provided (900461).

**Figure 40. Completing support arms assembly**

8. Secure the plastic caps (234559) to the vertical support arm tubes.

### 5.7.1 Roof Stair Block-Off Package Hardware Usage

**Note**

Required hardware also supplied with Roof Stair Packages

All Roof Stair Block-Off Package connections are made using 3/8" x 1" bolts and 3/8" nuts except for the following connections.

- Vertical support tubes are secured to the grain bin wall sheets using 3/8" x 2 ½" bolts and nuts
- Secure middle vertical support tube to the bottom stair tread using a 3/8" x 4 ½" fully threaded bolt and triple nutting as shown in the instructions.
- Prevent the support arms from sliding down by securing the support arm clips with self drilling screws.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>234069</td>
<td>Vertical Support Tube</td>
<td>2</td>
</tr>
<tr>
<td>234504</td>
<td>Support Arms</td>
<td>8</td>
</tr>
<tr>
<td>234517</td>
<td>Support Arm Clips</td>
<td>13</td>
</tr>
<tr>
<td>234518</td>
<td>Support Arm Bracket</td>
<td>2</td>
</tr>
</tbody>
</table>

### 5.8. Catwalk Access

Catwalks can be accessed from a roof stair with the aid of a plate fabricated as shown in Figure 41 on page 52. Bolt the plate to the back of any stair tread on the roof stair. The plate supports the bottom of a standard ladder section (234500) which can then tie in with an access point on the catwalk. Ladder sections must be supported structurally every 44". 
Figure 41. Catwalk Access

Catwalks can be accessed from a roof stair with the aid of a plate fabricated as shown. The plate can be bolted to the back of any stair tread on the roof stair and then used to support the bottom of a standard ladder section (234500) which could then tie in with an access point on the catwalk.

Ladder sections must be supported structurally every 44".

---

5.9. Optional Eave Platform Assembly

If desirable, in order to directly access a roof inspection hatch, or for some other purpose, an optional eave platform can be installed on the grain bin. This involves different parts and must be ordered separately.

1. Usually the eave platform will align with the roof ladder or stairs, or possibly the inspection hatch (subject to the owner’s preference). So the location must be planned accordingly. The eave platform brackets span three standard 9 ¾" wall sheet hole spacings. Two eaves brackets (234154) are used 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.
a. Bolt the brackets into the top ring angle/wall sheet hole locations as shown in the following diagram. These bolt locations will be spaced 28 ⅛" apart.

b. Orient the brackets vertically.

c. Drill additional holes using the brackets as a template.

d. Secure 8" lower than top holes.

Figure 42. Bolt the eaves brackets to the bin

2. Bolt the platform (234172) to the eave brackets.

a. Position one bolt vertically through the bracket and the slotted hole on the top of the platform.

b. Align the platform’s position relative to the bracket such that the middle slots on either side of the inner flange are bolted at four locations using 1" bolts.

Figure 43. 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.

a. Use the support arm brackets (234518) in the same relative slot positions.

b. Use 1" bolts for all connections.

c. Two long braces and support brackets are provided with the eave platform package; the other brackets are provided with the hardware package included.
d. If properly connected the platform should be level.

**Figure 44.** Install long support arms to brace from the platform to the wall

4. Bolt on two handrail posts (234174) at the end of the platform away from the bin eave and two handrail posts to the flange close to the bin eave to the slots near corners.
   a. Use the respective holes as shown, using 2" bolts through the holes indicated.
   b. When properly assembled the handrails should all be at the same height.
   c. Orient the post vertically.
   d. Tighten the bolts securely.
5. The two handrail posts furthest away from the grain bin are secured by \( \frac{3}{8} \)" 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. Bolt the support arm brackets (234518) to slots on inner flange of the platform.
Figure 46. Installing handrail post brace tubes

5. The two handrail posts furthest away from the grain bin are secured by ½" diameter brace tubes (234175). One end of the tubes is bolted directly to the bottom holes in the handrail posts using 2" bolts. The other ends are bolted to support arm brackets (234518) which in turn are bolted to slots on inner flange of the platform.

6. Two handrail segments (234149 and 234150) each are bolted between the two handrail posts furthest away from the grain bin, at the top and mid-rail locations.
   a. Fit one piece inside of the other and adjust for length.
   b. Use 2" bolts for all handrail to post connections.
   c. Drill in round head self tapping screw from the outside after attachment to posts, through both rail parts, 1" from open end.

Figure 47. Installing handrail segments
7. Bolt four end rails (234177) at the mid rail and top rail positions.
   a. Use 2” bolts to the handrail posts, as shown in the following diagram.
   b. Bolt a toe-board (234508) to the side flange of the platform, formed downwards to close off the open end of the platform.

Figure 48. Installing end rails

---

5.9.1 Eave Platform Package

All eave platform connections are made using 3/8" x 1" bolts except for the following:
- Handrail posts bolt to the platform, braces and the end rails use 3/8" x 2" bolts.
- Long and short handrail connection uses self-drill screws provided.

Table 18. Eave Platform Package

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>UNIT WT. (lbs)</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>234174</td>
<td>HANDRAIL POST</td>
<td>4.6</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>234175</td>
<td>BRACE - 1/2&quot;</td>
<td>0.5</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>234176</td>
<td>LONG BRACE</td>
<td>2.9</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>234172</td>
<td>PLATFORM (15-24)</td>
<td>43.2</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>234177</td>
<td>PLATFORM END RAIL</td>
<td>1.8</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>234149</td>
<td>HANDRAIL - LONG</td>
<td>2.4</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>234150</td>
<td>HANDRAIL - SHORT</td>
<td>0.9</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>234518</td>
<td>SUPPORT ARM BRACKET</td>
<td>0.20</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>234154</td>
<td>PLATFORM ATTACHMENT BRACKET</td>
<td>5.2</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>234508</td>
<td>TOE BOARD</td>
<td>5.3</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>234510</td>
<td>HDWE BAG EAVE PLATFORM</td>
<td>0.5</td>
<td>1</td>
</tr>
</tbody>
</table>
6. Appendix

6.1. Roof Stair Parts Identification

Figure 49. Roof Stair Parts — 1

<table>
<thead>
<tr>
<th>P/N</th>
<th>Description</th>
<th>&quot;L&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>234052</td>
<td>Stringer - 8 Tread Left</td>
<td>104.4</td>
</tr>
<tr>
<td>234053</td>
<td>Stringer - 8 Tread Right</td>
<td>104.4</td>
</tr>
<tr>
<td>234054</td>
<td>Stringer - 7 Tread Left</td>
<td>91.1</td>
</tr>
<tr>
<td>234055</td>
<td>Stringer - 7 Tread Right</td>
<td>91.1</td>
</tr>
<tr>
<td>234056</td>
<td>Stringer - 6 Tread Left</td>
<td>77.8</td>
</tr>
<tr>
<td>234057</td>
<td>Stringer - 6 Tread Right</td>
<td>77.8</td>
</tr>
<tr>
<td>234058</td>
<td>Stringer - 5 Tread Left</td>
<td>66.7</td>
</tr>
<tr>
<td>234059</td>
<td>Stringer - 5 Tread Right</td>
<td>66.7</td>
</tr>
</tbody>
</table>

- Handrail Post
- Stringer - 8 Tread Left 104.4
- Stringer - 8 Tread Right 104.4
- Stringer - 7 Tread Left 91.1
- Stringer - 7 Tread Right 91.1
- Stringer - 6 Tread Left 77.8
- Stringer - 6 Tread Right 77.8
- Stringer - 5 Tread Left 66.7
- Stringer - 5 Tread Right 66.7

- Handrail (1" OD)
- Stringer - 8 Tread Left 104.4
- Stringer - 8 Tread Right 104.4
- Stringer - 7 Tread Left 91.1
- Stringer - 7 Tread Right 91.1
- Stringer - 6 Tread Left 77.8
- Stringer - 6 Tread Right 77.8
- Stringer - 5 Tread Left 66.7
- Stringer - 5 Tread Right 66.7

- Handrail Post
- Stringer - 8 Tread Left 104.4
- Stringer - 8 Tread Right 104.4
- Stringer - 7 Tread Left 91.1
- Stringer - 7 Tread Right 91.1
- Stringer - 6 Tread Left 77.8
- Stringer - 6 Tread Right 77.8
- Stringer - 5 Tread Left 66.7
- Stringer - 5 Tread Right 66.7

- Handrail (1 ¼" OD)
- Stringer - 8 Tread Left 104.4
- Stringer - 8 Tread Right 104.4
- Stringer - 7 Tread Left 91.1
- Stringer - 7 Tread Right 91.1
- Stringer - 6 Tread Left 77.8
- Stringer - 6 Tread Right 77.8
- Stringer - 5 Tread Left 66.7
- Stringer - 5 Tread Right 66.7

- Handrail (1" OD)
- Stringer - 8 Tread Left 104.4
- Stringer - 8 Tread Right 104.4
- Stringer - 7 Tread Left 91.1
- Stringer - 7 Tread Right 91.1
- Stringer - 6 Tread Left 77.8
- Stringer - 6 Tread Right 77.8
- Stringer - 5 Tread Left 66.7
- Stringer - 5 Tread Right 66.7

- Handrail (1 ¼" OD)
- Stringer - 8 Tread Left 104.4
- Stringer - 8 Tread Right 104.4
- Stringer - 7 Tread Left 91.1
- Stringer - 7 Tread Right 91.1
- Stringer - 6 Tread Left 77.8
- Stringer - 6 Tread Right 77.8
- Stringer - 5 Tread Left 66.7
- Stringer - 5 Tread Right 66.7

- Brace (Long)(1" OD)
- Cut and use with handrail
- Can be cut to fit if req'd length is greater than 51.75

- Brace (Long)(1 ¼" OD)
- Cut and use with handrail
- Can be cut to fit if req'd length is less than 33.75

- Stair Tread
- Vertical Support Tube
Figure 50. Roof Stair Parts — 2

234070 – “Z” Support 4"

234098 – Single Rung Ladder Extension

234100 – Support Arm 1 ⅛” Dia

234103 – Double Rung Ladder Extension

234104 – “Z” Support 7 ⅞”

234504 – Support Arm 1” Dia

234132 – Bracket for Post

234517 – Support Arm Clip
6.2. Peak Rail and Platform Parts Identification

Figure 51. Peak Rail and Platform Parts — 1

- 234092 – Support Post
- 234093 – Roof Clip
- 213029 – Handrail Corner clip
- 234559 – Tube Cap ϕ 1.66
- 234114 – Support Ring Clip
- 234118 – Platform Piece

APPENDIX II – PEAK RAIL AND PLATFORM PARTS IDENTIFICATION

ROOF STAIR – WIDE-CORR® GRAIN BIN
Figure 52. Peak Rail and Platform Parts — 2

234119 – Platform Toe Board

234091 – Peak Rail Tube
85" diameter (1.25" OD Tube)

234094 – Peak Rail Tube
109" diameter (1.25" OD Tube)

234518 – Support Arm Bracket

234113 – Peak Platform Support Ring
Large - 109" diameter (1.66" OD Tube)

234112 – Peak Platform Support Ring
Small - 85" diameter (1.66" OD Tube)
6.3. Eave Platform Parts Identification

Figure 53. Eave Platform Parts

- 234172 – Platform
- 234177 – Platform End Rail
- 234174 – Handrail Post
- 234154 – Eaves Bracket
- 234175 – Post Brace (1/2”)
- 234174 – Handrail Post
- 234508 – Toe Board
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:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Galvanized Bins</td>
<td>5 years</td>
</tr>
<tr>
<td>EasyFlow2</td>
<td>24 months</td>
</tr>
<tr>
<td>Westeel Fans</td>
<td>36 months</td>
</tr>
<tr>
<td>Floors</td>
<td>12 months</td>
</tr>
<tr>
<td>Catwalk</td>
<td>12 months</td>
</tr>
<tr>
<td>Bulk Feed Tanks</td>
<td>24 months</td>
</tr>
<tr>
<td><strong>SeedStor-K Cones</strong></td>
<td></td>
</tr>
<tr>
<td>Paint</td>
<td>12 months</td>
</tr>
<tr>
<td>Structural</td>
<td>30 months</td>
</tr>
<tr>
<td><strong>Elite Cones</strong></td>
<td></td>
</tr>
<tr>
<td>Paint</td>
<td>30 months</td>
</tr>
<tr>
<td>Structural</td>
<td>10 years</td>
</tr>
<tr>
<td><strong>WESTEEL cones</strong></td>
<td></td>
</tr>
<tr>
<td>Paint</td>
<td>No Warranty</td>
</tr>
<tr>
<td>Structural</td>
<td>12 months</td>
</tr>
<tr>
<td><strong>Smooth Wall Bins</strong></td>
<td></td>
</tr>
<tr>
<td>Paint</td>
<td>60 months</td>
</tr>
<tr>
<td>Structural</td>
<td>10 years</td>
</tr>
<tr>
<td><strong>Commercial Smooth Wall Bins</strong></td>
<td></td>
</tr>
<tr>
<td>Paint</td>
<td>12 months</td>
</tr>
<tr>
<td>Structural</td>
<td>10 years</td>
</tr>
</tbody>
</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.