

LEMANCO MODULAR BULK STORAGE



INSTALLATION MANUAL P/N 650000



Trusted. Tested. True.

Chief Industries, Inc. – Agri/Industrial Division

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Manual Revisions

- 8-31-2015
 - Updated warranty information
- 10-1-2016
 - General formatting update
- 1-1-2017
 - General formatting update

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For more information about Chief Industries, Inc. and additional products or services please visit our website

www.agri.Chiefind.com

STANDARD LIMITED WARRANTY

Chief Lemanco Bin System Products

1. **Definitions.** The following terms, when they appear in the body of this Standard Limited Warranty for Lemanco Bin System Products in initial capital letters shall have the meaning set forth below:
 - A. Accepted Purchase Order shall mean the Purchase Order identified below.
 - B. Chief shall mean Chief Agri/Industrial, a division of Chief Industries, Inc.
 - C. Original Owner shall mean the original owner identified below.
 - D. Product shall mean the Agri/Industrial Equipment as described in the Accepted Purchase Order.
 - E. Reseller shall mean the authorized Chief Agri/Industrial Equipment dealer identified below.

2. **Limited Product Warranty.** Upon and subject to the terms and conditions set forth below, Chief hereby warrants to the Reseller, and, if different, the Original Owner as follows:
 - A. All new Products delivered to the Reseller or the Original Owner by Chief pursuant to the Accepted Purchase Order will, when delivered, conform to the specifications set forth in the Accepted Purchase Order;
 - B. All new Products delivered pursuant to the Accepted Purchase Order will, in normal use and service, be free from defects in materials or workmanship; and
 - C. Upon delivery, Chief will convey good and marketable title to the Products, free and clear of any liens or encumbrances except for, where applicable, a purchase money security interest in favor of Chief.

3. **Duration of Warranty and Notice Requirements.** Subject to the **Exceptions, Exclusions and Limitations** set forth below, the warranties set forth in Section 2 above shall apply to all covered non-conforming conditions that are discovered within the first twenty-four (24) months following delivery of the Product to the carrier designated by the Reseller and/or the Original Owner at Chief's manufacturing facility in Kearney, Nebraska (the "Warranty Period") and are reported to the Chief as provided in Section 4 below within thirty (30) days following discovery (a "Notice Period").

4. **Notice Procedure.** In order to make a valid warranty claim, the Reseller and/or the Original Owner must provide Chief with a written notice of any nonconforming condition discovered during the Warranty Period within the applicable Notice Period specified in Section 3 above. Said notice must be in writing; be addressed to Chief Industries, Inc., Agri/Industrial Division, Customer Service Department, P.O. Box 848, Kearney, NE 68848; and contain the following information: (a) the Customer's name and address; (b) the Reseller's name and address; (c) the make and model of the Product in question; (d) the current location of the Product; (e) a brief description of the problem with respect to which warranty coverage is claimed; and (f) the date on which the Product was purchased.

5. **Exceptions and Exclusions.** Anything herein to the contrary notwithstanding, the warranties set forth in Section 2 above do **not** cover any of the following, each of which are hereby expressly excluded:
 - A. Defects that are not discovered during the applicable Warranty Period;
 - B. Defects that are not reported to the Chief Agri/Industrial Division Customer Service Department in conformity with the notice procedure set forth in Section 4 above within the applicable Notice Period specified in Section 3;
 - C. Any used or pre-owned Products;
 - D. Any Chief manufactured parts that are not furnished as a part of the Accepted Purchase Order;
 - E. Any fixtures, equipment, materials, supplies, accessories, parts or components that have been furnished by Chief but are manufactured by a third party;
 - F. Any Products which have been removed from the location at which they were originally installed;
 - G. Any defect, loss, damage, cost or expense incurred by the Reseller or the Original Owner to the extent the same arise out of, relate to or result, in whole or in part, from any one or more of the following:
 - (i) Usual and customary deterioration, wear or tear resulting from normal use, service and exposure;
 - (ii) Theft, vandalism, accident, war, insurrection, fire or other casualty;

- (iii) Any damage, shortages or missing parts which result during shipping or are otherwise caused by the Reseller, the Original Owner and/or any third party;
 - (iv) Exposure to marine environments, including frequent or sustained salt or fresh water spray;
 - (v) Exposure to corrosive, chemical, ash, smoke, fumes, or the like generated or released either within or outside of the structure on which the Product is installed, regardless of whether or not such facilities are owned or operated by the Reseller, the Original Owner or an unrelated third party;
 - (vi) Exposure to or contact with animals, animal waste and/or decomposition;
 - (vii) The effect or influence the Product may have on surrounding structures, including, without limitation, any loss, damage or expense caused by drifting snow;
 - (viii) Any Product or portion thereof that has been altered, modified or repaired by the Reseller, the Original Owner or any third party without Chief's prior written consent;
 - (ix) Any Product or portion thereof that has been attached to any adjacent structure without Chief's prior written approval;
 - (x) Any Product to which any fixtures, equipment, accessories, materials, parts or components which were not provided as a part of the original Accepted Purchase Order have been attached without Chief's prior written approval;
 - (xi) The failure on the part of the Reseller, the Original Owner or its or their third party contractors to satisfy the requirements of all applicable statutes, laws, ordinances rules, regulations and codes, (including zoning laws and/or building codes);
 - (xii) The use of the Product for any purpose other than the purpose for which it was designed; and/or
 - (xiii) The failure of the Reseller, the Original Owner and/or any third party to:
 - (a) properly handle, transport and/or store the Product or any component part thereof;
 - (b) properly select and prepare a site that is adequate for the installation and/or operation of the Product or any component part thereof;
 - (c) properly design and construct a foundation that is adequate for the installation and/or operation of the Product or any component part thereof;
 - (d) properly set up, erect, construct or install the Product and/or any component part thereof; and/or
 - (e) properly operate, use, service and/or maintain the Product and each component part thereof.
6. **Resolution of Warranty Claims.** In the event any nonconforming condition is discovered within the Warranty Period and Chief is notified of a warranty claim as required by Section 4 prior to the end of the applicable Notice Period set forth in Section 3 above, Chief shall, with the full cooperation of the Reseller and the Original Owner, immediately undertake an investigation of such claim. To the extent Chief shall determine, in its reasonable discretion, that the warranty claim is covered by the foregoing Limited Product Warranty, the following shall apply:
- A. **Warranty Claims With Respect to Covered Non-Conforming Conditions Discovered Within the First Three Hundred Sixty Five (365) Days and Reported to Chief Within Thirty (30) Days of Discovery.** In the case of a warranty claim which relates to a covered non-conforming condition that is discovered during the first three hundred sixty five (365) days of the Warranty Period and is reported to Chief as required by Section 4 within thirty (30) days of discovery as required by Section 3, Chief will, as Chief's sole and exclusive obligation to the Reseller and the Original Owner, and as their sole and exclusive remedy, work in cooperation with the Reseller and the Original Owner to correct such non-conforming condition, and in connection therewith, Chief will ship any required replacement parts to the "ship to address" set forth in the Accepted Purchase Order FOB Chief's facilities in Kearney, Nebraska, and will either provide the labor or reimburse the Reseller or the Original Owner, as may be appropriate in the circumstances, for any out of pocket expense the Original Owner may reasonably and necessarily incur for the labor that is required to correct such non-conforming condition, provided that if work is to be performed by the Reseller or a third party contractor, Chief may require at least two competitive bids to perform the labor required to repair or correct the defect and reserves the right to reject all bids and obtain additional bids. Upon acceptance of a bid by Chief, Chief will authorize the necessary repairs.
 - B. **All Other Warranty Claims.** Except as is otherwise provided in subsection 6A above, in the case of all other warranty claims which relate to covered non-conforming conditions that are discovered

during the Warranty Period and are reported to Chief as required by Section 4 within thirty (30) days following discovery, Chief will, as Chief's sole and exclusive obligation to the Reseller and the Original Owner, and as the Reseller's and the Original Owner's sole and exclusive remedy, ship any required replacement parts to the Original Owner at the "ship to address" specified in the Accepted Purchase Order FOB Chief's facilities in Kearney, Nebraska; and **in such event, Chief shall have no responsibility or liability to either the Reseller or the Original Owner for the cost of any labor required to repair or correct the defect.**

7. **Warranty Not Transferable.** This Warranty applies only to the Reseller and the Original Owner and is **not transferable**. As such, this Warranty does **not** cover any Product that is sold or otherwise transferred to any third party following its delivery to the Original Owner.
8. **Limitation on Warranties, Liabilities and Damages.** The Reseller and the Original Owner expressly agree that the allocation of the risk, liability, loss, damage, cost and expense arising from any Product that does not conform to the limited warranty given in Section 2 above are fair and reasonable and acknowledge that such allocation was expressly negotiated by the parties and was reflected in the Purchase Price of the Product. Accordingly the Reseller and the Original Owner expressly agree as follows:
 - A. **Disclaimer of Implied Warranties.** EXCEPT AS IS OTHERWISE EXPRESSLY SET FORTH HEREIN, CHIEF MAKES NO OTHER REPRESENTATIONS OR WARRANTIES OF ANY KIND WHATSOEVER, WHETHER EXPRESS OR IMPLIED, BY OPERATION OF LAW, COURSE OF DEALING OR OTHERWISE WITH RESPECT TO THE PRODUCT, ANY COMPONENT PART THEREOF OR ANY OTHER GOODS OR SERVICES THAT CHIEF MANUFACTURES, FABRICATES, PRODUCES, SELLS OR PROVIDES TO THE DEALER OR THE ORIGINAL OWNER PURSUANT TO THE TERMS OF ANY ACCEPTED PURCHASE ORDER, INCLUDING WITHOUT LIMITATION ANY REPRESENTATION OR WARRANTY WITH RESPECT TO DESIGN, CONDITION, MERCHANTABILITY OR FITNESS OF THE PRODUCT OR ANY OTHER GOODS OR SERVICES FOR ANY PARTICULAR PURPOSE OR USE.
 - B. **Limitation on Liability.** EXCEPT AS IS OTHERWISE EXPRESSLY SET FORTH IN SECTION 6 ABOVE, CHIEF'S LIABILITY TO THE DEALER AND/OR THE ORIGINAL OWNER WITH RESPECT TO ANY DEFECTS IN ANY PRODUCTS OR FOR ANY OTHER GOODS OR SERVICES WHICH DO NOT CONFORM TO THE WARRANTIES SET FORTH ABOVE SHALL NOT, IN ANY EVENT, EXCEED THE ACTUAL COST OF SUCH NON-CONFORMING PRODUCT, GOODS OR SERVICES AS DETERMINED PURSUANT TO THE ACCEPTED PURCHASE ORDER; AND
 - C. **Limitation on the Nature of Damages.** EXCEPT AS EXPRESSLY PROVIDED IN SECTION 6 ABOVE, CHIEF SHALL NOT, UNDER ANY CIRCUMSTANCES, BE LIABLE TO THE DEALER, THE ORIGINAL OWNER OR ANY THIRD PARTY FOR ATTORNEY FEES COURT COSTS OR ANY OTHER SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL, LIQUIDATED OR PUNITIVE DAMAGES OF ANY NAME, NATURE OR DESCRIPTION AS A RESULT OF THE FAILURE OF ANY PRODUCT OR ANY OTHER GOODS OR SERVICES PURCHASED BY THE DEALER OR THE ORIGINAL OWNER FROM CHIEF PURSUANT TO THE ACCEPTED PURCHASE ORDER TO CONFORM TO THE LIMITED WARRANTIES SET FORTH IN SECTION 2 ABOVE.
8. **Applicable Law.** This Limited Product Warranty has been issued, accepted and entered into by the Reseller, the Original Owner and Chief in the State of Nebraska and shall be governed by, and construed in accordance with, the internal laws of the State of Nebraska. Any legal action or proceeding with respect to any goods or services furnished to the Original Owner by Chief in connection herewith, or any document related hereto shall be brought only in the district courts of Nebraska, or the United States District Court for the District of Nebraska, and, by execution and delivery of this Limited Product Warranty, the undersigned Original Owner hereby accept for themselves and with respect to their property, generally and unconditionally, the jurisdiction of the aforesaid courts. Further, the undersigned Original Owner hereby irrevocably waives any objection, including, without limitation, any forum non conveniens, which it may now or hereafter have to the bringing of such action or proceeding in such respective jurisdictions.

ACKNOWLEDGMENT OF RECEIPT

By its signature hereto, the undersigned Reseller represents and warrants to Chief that the Reseller has provided a true, correct and complete copy of this Standard Limited Warranty to the Original Owner at the time the product was purchased.

Reseller Name and Address: _____

Original Owner Name and Address: _____

Accepted Purchase Order No. _____

Original Jobsite Address: _____

RESELLER:

By: _____
Date

Print name and title

4837-5518-1601, v. 1

Warning

Water Sensitive Materials - Read this notice carefully

Bundles must be inspected and carrier advised immediately if damage is noted. White rust is a corrosion attack of the zinc coating resulting from the presence of water. Anywhere rust is found will result in a reduction of the life of the galvanized steel.

If water has entered a bundle or if condensation has formed between sheets, the bundle must be opened, the sheets separated and all surfaces dried.

If sheets are to be installed within 10 days:

Store bundled sheets off the ground high enough to allow air circulation beneath bundle and to prevent water from entering. Store 1 end at least 8" (20.32cm) higher than the opposite end. Support long bundles in the center. Prevent rain from entering the bundle by covering with a tarpaulin, making provision for air circulation between the draped edges and the ground.

Do not wrap in plastic.

If sheets are not to be installed within 10 days:

Provide inside dry storage. Storage beyond 6 months is not recommended. If white rust is apparent upon receipt of shipment, notify Chief immediately. Damage to sheets, resulting from improper storage, is the responsibility of the receiver.



Before You Begin

Before starting the installation of the bin, take time to thoroughly study the construction methods in this manual, this will save you time and money.

Chief makes no warranty concerning components, accessories or equipment not manufactured by Chief.

When using a cutting torch or welding galvanized material, the possibility of developing toxic fumes will exist. Provide adequate ventilation and respiratory protection when using this type of equipment during installation.

Introduction

Thank you for purchasing a Lemanco Modular Bulk Storage Bin. Proper installation and operation will ensure you the best overall experience and guarantee smooth operation.

This proprietary information is loaned with the expressed agreement that the drawings and information therein contained are the property of Chief Industries, Inc. and will not be reproduced, copied, or otherwise disposed of, directly or indirectly, and will not be used in whole or in part to assist in making or to furnish any information for the making of drawings, prints or other reproduction hereof, or for the making of additional products or equipment except upon written permission of Chief Industries, Inc. first obtained and specific as to each case. The acceptance of this material will be construed as an acceptance of the foregoing agreement.

The technical data contained herein is the most recent available at the time of publication and is subject to modification without notice. Chief Industries, Inc. reserves the right to modify the construction and method of operation of their products at any time without any obligation on their part to modify any equipment previously sold and delivered.

General Design Information

All Chief Lemanco bins are designed individually for project specific bulk densities. Bins can be designed for material density up to:

- 150 PCF (2403 kg/m³)

For the Lemanco system, each individual sidewall tier has been designed to accommodate the vertical and horizontal wall loads imposed by the stored material. Sidewall sheeting gauge and design strength for each tier is individually analyzed for all bin compartments. Sidewall stiffener gauges and design strength is individually determined for the full sidewall height range.

All steel materials are purchased in accordance with the applicable ASTM Standard.

All bolted connections are designed using high strength bolts which meet the specifications of the applicable ASTM or SAE standard.

Galvanized coating type G-115 specifies galvanization of 1.15 oz/ft² (Z350; 350 gm/m²) total for both sides in the following materials:

- 16 Gauge thickness & heavier = Structural Steel Grade 55, Class I; 55ksi min yield (grade 340)

Accessory Equipment

All accessory equipment should be installed and maintained in accordance with each individual supplier's installation and operation instructions. However, if any sidewall penetrations or other modifications to the Chief standard design are required, contact Chief for special recommendations.

Important Note: Do not modify bin design without Chief approval. It is the responsibility of the general contractor to verify that all equipment is properly installed and that the equipment is compatible with the intended use. A qualified electrician should be contracted to complete all electrical wiring and servicing.

General Contractor Responsibilities

It is the responsibility of the general contractor to verify that the complete bin system (bin, foundation, sealing, transport equipment and other accessory equipment is constructed with quality workmanship and that all equipment is installed per the respective manufacturer's instructions.

In addition, the general contractor is responsible for the fitness of use of any system which he constructs. All accessory equipment incorporated into the system should be approved for the intended use by each respective equipment manufacturer.

Field Modifications and Installation Defects

Chief assumes no responsibility for field modifications or installation defects which result in structural damage or storage quality problems. If any field modifications are necessary which are not specifically covered by the contents of the installation manual, contact Chief for approval. Any unauthorized modification or installation defect which affects the structural integrity of the bin will void the warranty.

Concrete Design and Construction

Choose a site that has good drainage away from the bin so that standing water will be prevented. The soil should be firm and preferably without fill. If fill is required, compact the fill material to avoid uneven settlement.

Foundation designs are based on the allowable soil bearing capacity of the undisturbed soil and should be certified by a licensed engineering firm. Using soil borings to determine the allowable soil bearing capacity, a professional engineer will need to be employed by the contractor to design the foundation and floor slab accordingly. Foundation designs must be approved by a licensed engineer in order to meet local governing building codes and local soil and weather conditions, including seismic and wind loading requirements. Base reactions for structural support steel provided by Chief is available upon request.

Non-uniform settlement of the foundation can cause severe structural damage to the storage structure and foundation. An improperly designed or constructed foundation will void all aspects of the warranty. It is the responsibility of the general contractor to verify that an adequate foundation is provided for the system.

Important Note: Faulty concrete construction will void the warranty.

Bin Installation

Chief does not assume any responsibility from parts damaged due to faulty or improper installation procedures.

Checking Shipment

For your convenience individual items labeled with an appropriate part number and packages labeled. Hardware, including bolts, nuts, screws and other small clips or brackets may be divided into smaller packages for ease of use and identification.

Check your shipment at the time of delivery against the packing list provided with the shipment. If any items are missing or any damaged material is evident, note such shortage or damage on the freight bill before you sign the shipment paperwork.

Claims of shortages will not be honored after 30 days from receipt of shipment. Parts that are missing or damaged are the responsibility of the delivering carrier, not the manufacturer or dealer.

It is advisable to reorder damaged or missing parts immediately so that there will be no delay in the bin installation. After receiving the invoice for the reordered material, file a claim with the delivering carrier immediately.

Suggested Equipment

Chief recommends the following equipment and tools needed for installation of the equipment. Individual installations may vary.

- Impact wrenches and sockets
- End wrenches
- Crescent wrenches
- Vise grip pliers
- Alignment punches
- Rubber mallets
- Level
- Extension cords
- Transit (surveyors level)
- Sealant / Caulk guns
- Welding equipment with long leads
- Working platforms
- Acetylene rig
- Electric Hoist (minimum 2 ton)

Tips and Shortcuts:

The bin parts are packaged to reduce cost. For the most efficient construction of the complete project please consider the following:

1. Chief Industries, Inc. ships 3 sets of assembly drawings with each project. It is very important to read and study these drawings. If you follow these assembly drawings the bin system will go together correctly.
2. Unbundle and sort all components.
3. Stack all vertical starter components together near the bin group, these will be assembled first.
4. Stack all vertical top and roof components together away from the bin group. These will be installed last.
5. Sort the remaining components into stacks of similar parts. These will be the intermediate set of items and will account for the majority.
6. The sorting and stacking can be completed during the construction of the structural steel and hoppers. The ground crew should start loading the compartment on the opposite end from the point where the parts are being staged. Only send the components required to complete one tier at a time. This is important to reduce confusion and not overload the work platforms.
7. Chief Industries, Inc. ships extra fastener hardware. Collect all dropped fasteners to ensure you have enough to complete the project.
8. Make special note of fastener lengths on the construction drawings and verify that all bolt heads are inside the bin compartment.
9. After the structural steel and hoppers are set in place the correct assembly sequence is as follows:
 - a. Install side or partition sheets.
 - b. Apply sealant per instructions.
 - c. Install vertical stiffeners.
 - d. Install horizontal stiffeners.
10. The first tier is very important. If possible you should start the installation in the center compartment and work your way to the outside.
11. Assemble the entire second tier before tightening the bolts in the first tier. Tighten the bolts starting in the center and then work your way to the outside.
12. Verify that you use the correct components in each tier before proceeding to the next.
13. Verify that the bin compartments remain level and square every 3 tiers by using a string level.

Installation Planning

All sidewall sheet bolts are hex head bolts with whiz flange (serrated flange) nuts.

If this description does not correspond with the bolts shipped with the bin, please contact Chief immediately. **Do not substitute any other bolts. Use only the bolts supplied by Chief. The substitution of bolts from other sources is not permitted.**

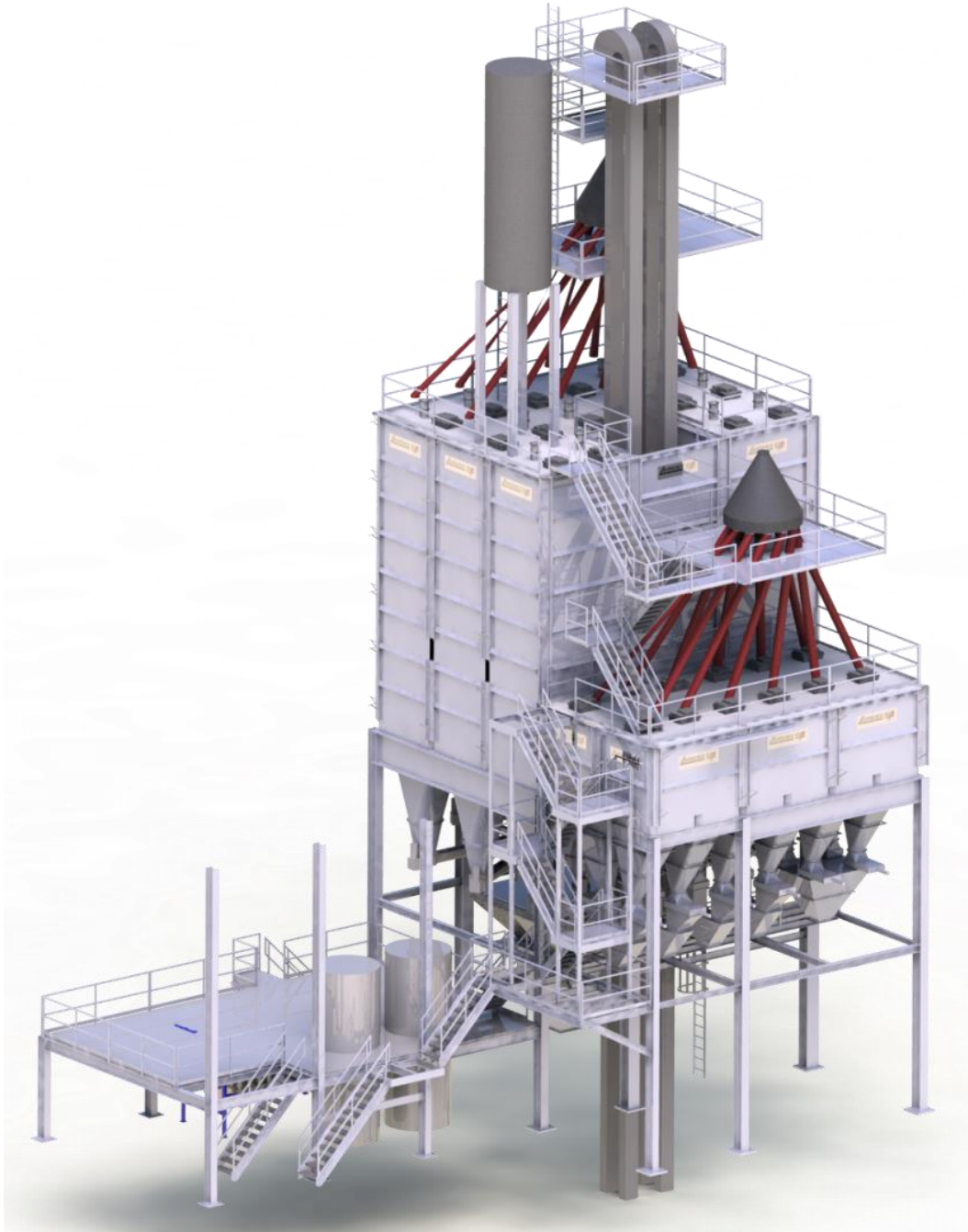
When installing hardware the minimum and maximum torque values shown below must be followed. All hardware must seat tight against the corresponding component. Install all bolts with the head on the interior of the compartments.

Bolt Diameter	Minimum Torque	Maximum Torque
5/16" (.79cm)	22 ft.-lbs.	28 ft.-lbs.
3/8" (.95cm)	25 ft.-lbs.	30 ft.-lbs.
7/16" (1.11cm)	60 ft.-lbs.	75 ft.-lbs.
1/2" (1.27cm)	50 ft.-lbs.	58 ft.-lbs.
5/8" (1.58cm)	105 ft.-lbs.	121 ft.-lbs.
3/4" (1.90cm)	175 ft.-lbs.	201 ft.-lbs.

Please note the following wrench / socket size to be used on the corresponding hardware:

Bolt Size	Head Size	Nut Size
5/16"	1/2" wrench	1/2" wrench
3/8"	9/16" wrench	9/16" wrench
7/16"	5/8" wrench	11/16" wrench
1/2"	3/4" wrench	3/4" wrench
5/8"	15/16" wrench	15/16" wrench
3/4"	1-1/8" wrench	1-1/8" wrench

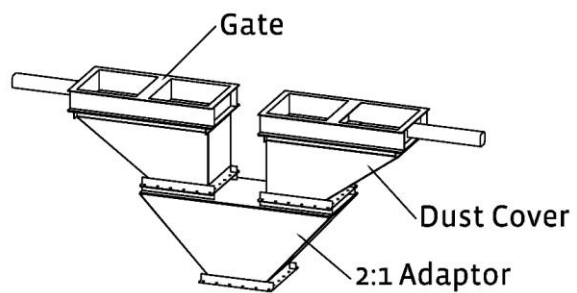
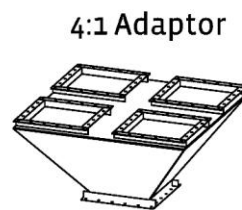
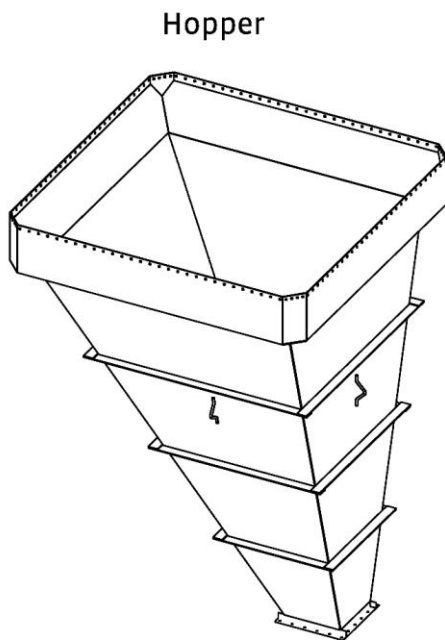
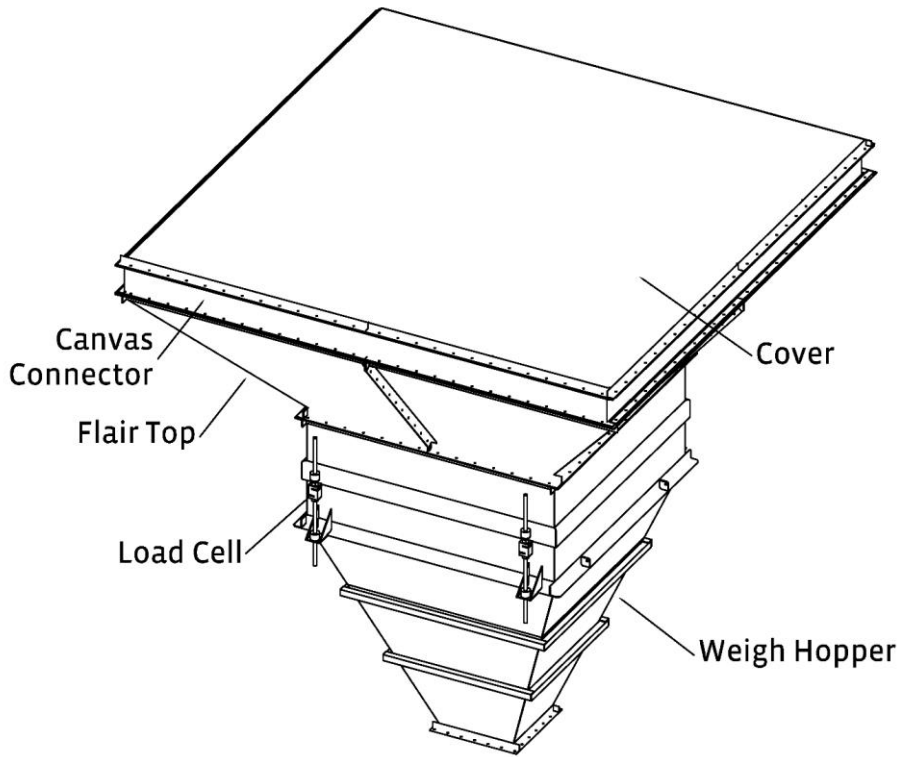
Important Note: To save time and assist as a quick reference guide, the main component parts and the main assemblies created from these specific components will be shown on the following pages. Take note of the orientation of these parts in the top level assemblies to help reduce time and errors during the installation process.



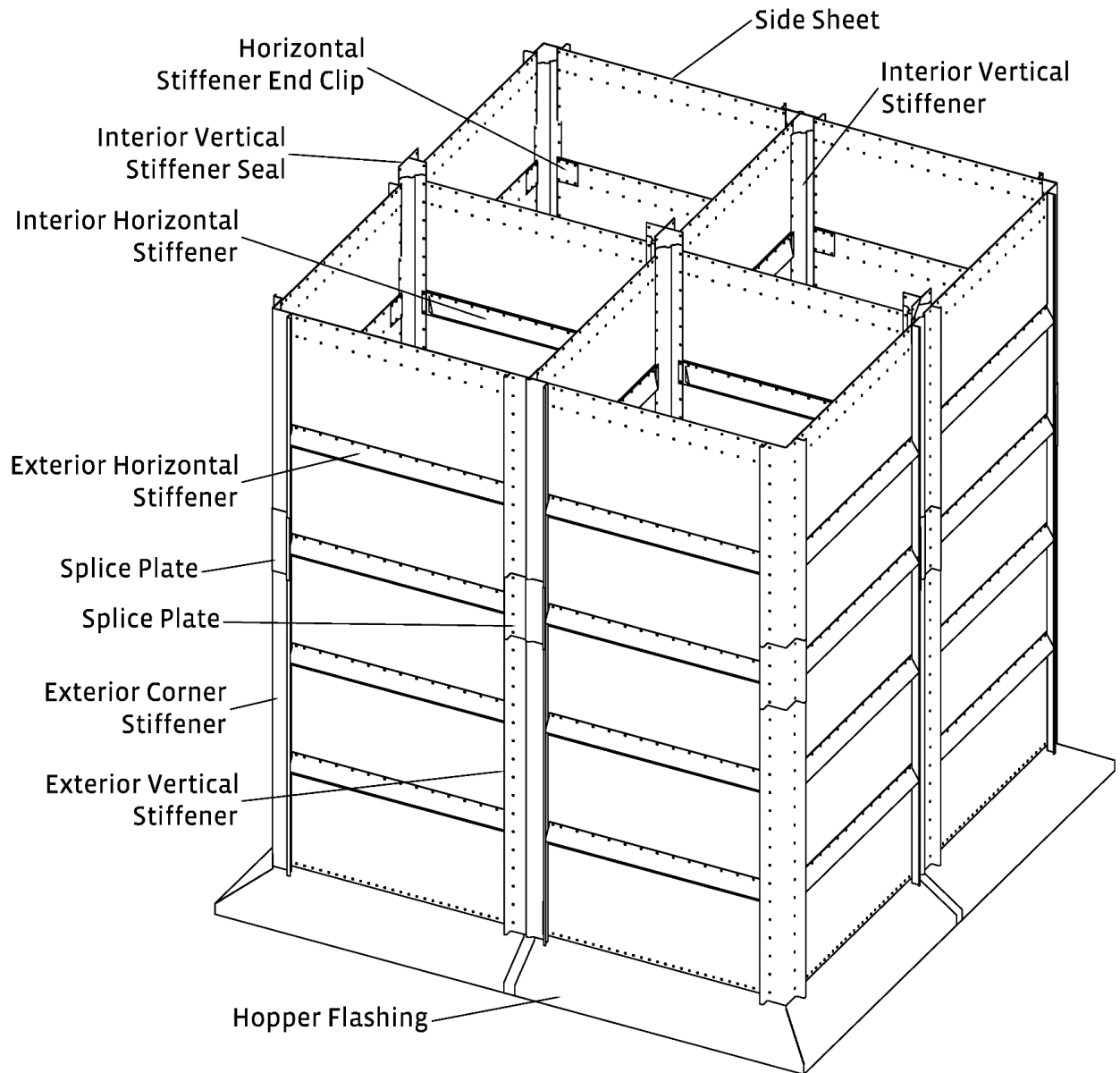
Part Identification

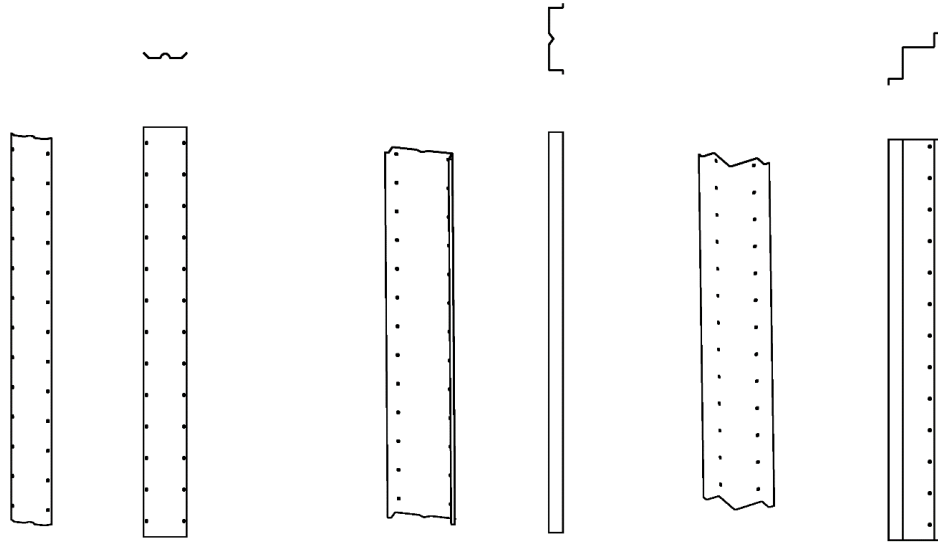
Use the following information to identify parts used during installation.

Hopper Components



Bin Components

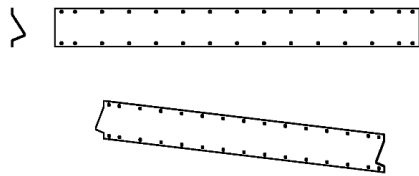




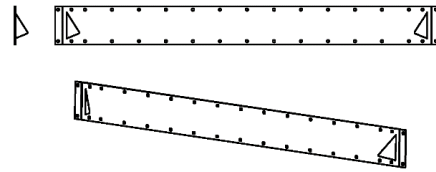
Interior Vertical Stiffener

Exterior Vertical Stiffener

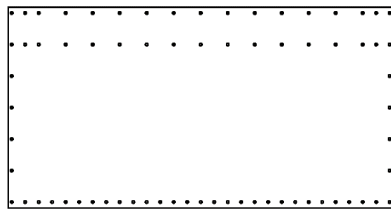
Exterior Corner Stiffener



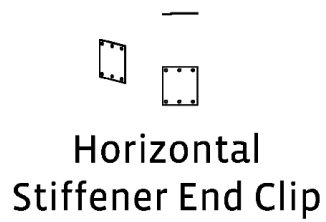
Exterior Horizontal Stiffener



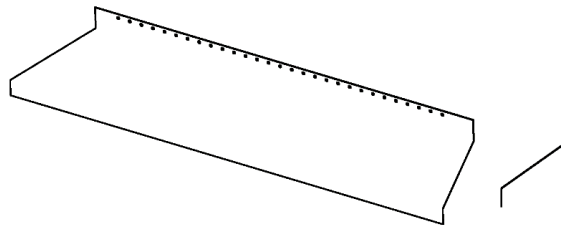
Interior Horizontal Stiffener



Side Sheet

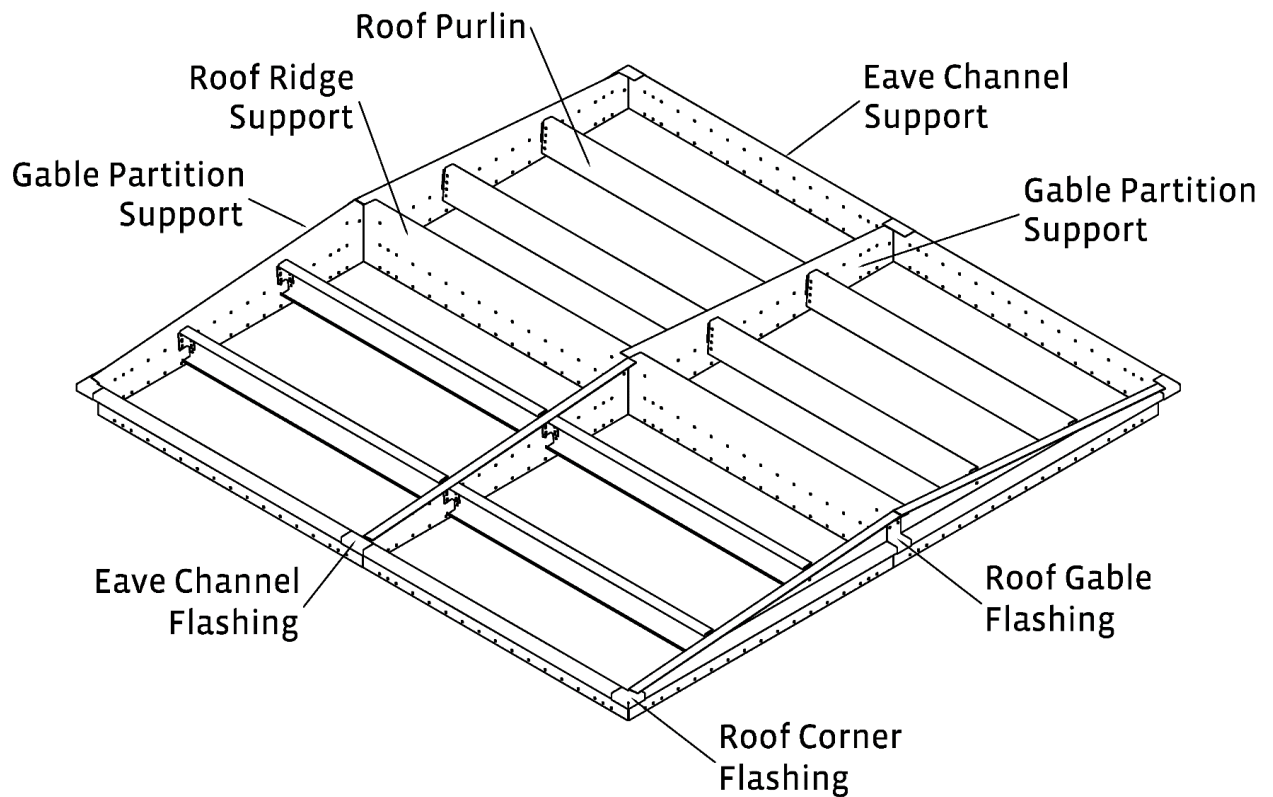
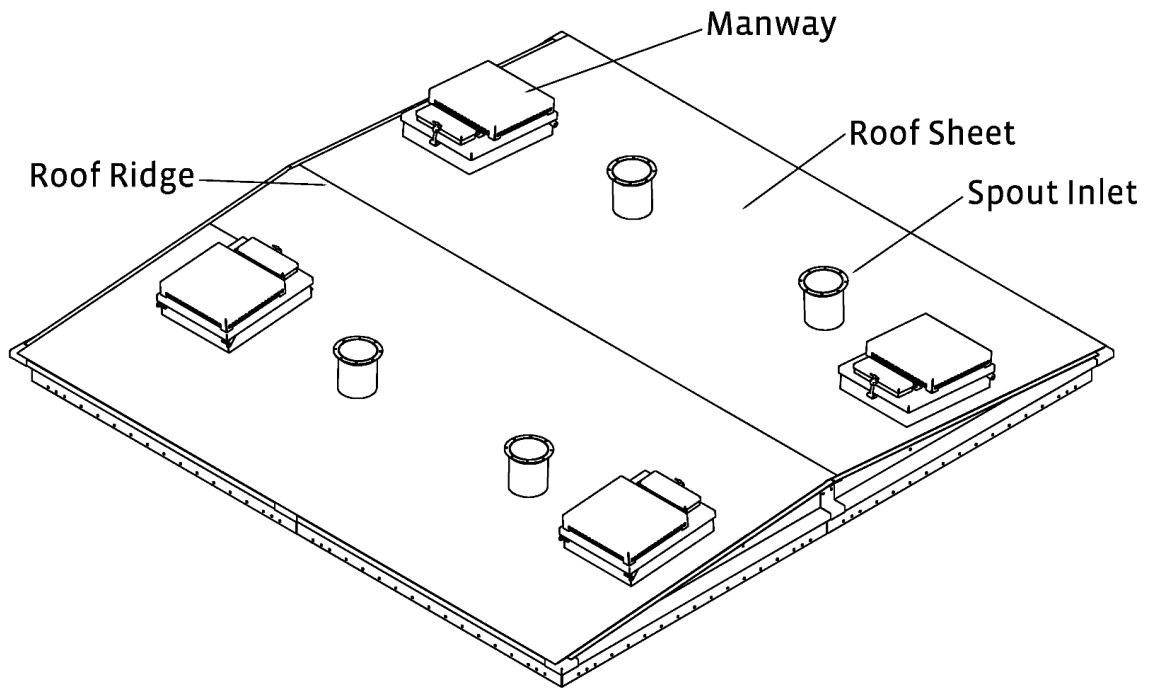


Horizontal Stiffener End Clip



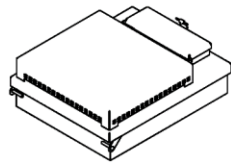
Hopper Flashing

Roof Components





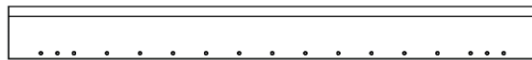
Roof Sheet



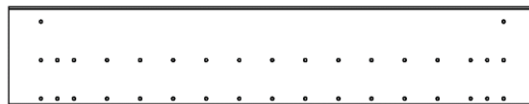
Manway



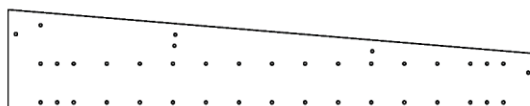
Spout Inlet



Eave Channel Support



Roof Ridge Support



Gable Partition Support



Roof Purlin

Structural Steel Support Frame Assembly

Before starting verify you have structural assembly drawings and a copy of the packing list for this order. In addition, the AISC Code of Structural Practice for Steel Buildings and Bridges may be consulted for additional information.

All local state and federal safety regulations and requirements must be strictly observed and enforced.



Important Note: Foundations and footing are not the responsibility of Chief Industries, Inc. A licensed engineering firm should be employed to take soil borings, determine the max allowable soil pressure and design the bin system foundations accordingly.

Foundation drawings should be consulted to verify the allowance for grouting under columns. Before installing the structural steel support frame all anchor bolts should be verified for correct location and square as shown in the engineering drawings.

Installation of structural steel components is largely a matter of individual choice and experience. The following general outline is provided for reference only.

1. Add leveling nuts and plate washers to the installed anchor bolts. Set columns over the plate washers and add additional plate washers and nuts over the top of the base plates, these nuts should only be finger tightened at this point. Brace columns temporarily to prevent overturning.
2. Bolt in struts and lower level beams. Install knee braces between struts and columns, leaving connections loose. At this point, check elevation on column plates, shim to level, and square structure. Temporary diagonal bracing may be required to hold structure square. Some diagonal wind bracing may be installed at this point. Be sure to level top of steel. Verify diagonal bracing is turned in the correct position when installing.
3. Install weigh hopper support beams (if applicable). Check engineering drawings closely to properly locate holes for scale system.
4. Install diagonal wind bracing between columns. At this point, all joints should be loose to aid installation of wind braces. Do not re-drill or ream out holes as this may violate structural integrity. Connections should be worked into place with a spud bar.

5. Bolt in main beams and balance of diagonal braces. Begin to tighten lower connections. All main beams (hopper grid) must be installed level.
6. Verify all wind bracing is in place before all joints are tightened. Do not begin to set hoppers on steel until all members are in place and joints are completed.
7. Check columns bases: to ensure they are level. Shim as Required. Check plane at top of main beams to ensure they are level and square. Individual spaces where hoppers fit must be square and level.
8. After all connections have been tightened, grout under columns for full bearing.
9. After grout has hardened, placement of hoppers may start. See drawing for hopper mark number and location. Verify hopper orientation and discharge location.

If field modifications are required it is required to contact Chief Industries, Inc. before proceeding. If there are fabrication errors, or shortages occur, do not substitute similar components. Chief will not be responsible for unauthorized modifications.

Structural steel components are shipped to the jobsite with a prime coat of protective paint. Care should be taken by the installation crew to protect this coating. If damage occurs during shipment or field modifications are required these should be touched up immediately after installation.

Chief Industries, Inc. is not responsible for damages incurred during shipment, staging or installation.

Weigh Hopper / Lorry Assembly

The weigh hopper or weigh lorry should be assembled directly after the structural components they rest on are assembled and verified as correct. Always refer to the installation drawings for the proper location and part number.

The weigh hopper and weigh lorry are assembled in a similar manner to the standard hoppers described below. Additional information and assembly instructions will be provided with shipment as required for your project.

Hopper Assembly

Important Note: Before starting the bin installation you must verify the structural steel support for the hoppers. The bin cluster support must be in a single plane, level, square, and plumb. Set hoppers, one at a time, starting near center of cluster, check the drawing for orientation of hopper outlets. Verify that all hoppers and hopper flanges clear all structural steel members.



Additional information and assembly instructions will be provided with shipment as required for your project. Install the hoppers according to the following instructions:

1. The support frame steel must be square and level and on the same plane. The hopper must clear the edge of the beam flanges.
2. If hoppers are fabricated in one piece, they are marked according to part number. If hoppers are fabricated in sections, the sections will have individual part numbers, and should be assembled prior to beginning the installation process. Following the instructions provided with shipment for bolt together hopper assembly.
3. Installation platforms should be placed inside the hoppers at ground level and lifted with the hoppers. 1 platform is required for each compartment. Small bin parts may also be lifted with the hopper.
4. Hoppers must be lifted over the structure, and lowered into place through the space between the beams. Use the lifting lugs provided for lifting. The upper portion of the hopper has a base angle which rests on the center line of the structural beams.
5. The center hoppers of the bin group should be placed first, then proceed toward the outside.
6. Hoppers should be set on center line of beam web, with a space of approximately 1/8" (.31cm) between all hoppers.

Important Note: A chalk line should be used to line up the hoppers on the beam grid to verify proper location. Square and level all hoppers, and verify the holes align with the hopper base angle. Do not weld hoppers to hopper grid beams at this time.

7. Installation of screw feeders, discharge gates and adaptors should not be done until 4 tiers have been installed and hoppers welded to structure. Adaptors will require the connecting flanges to be field located and installed for proper alignment. Clean-up and touch-up painting is required.

Bin Assembly

Important Note: Before starting the bin installation you must check the hopper installation. The hoppers must be in a single plane, level, square, and plumb. After the hopper installation the bin section tiers are assembled.



The sequence of assembly of the bin wall components must be such as to allow assembly of all parts without re-drilling or reaming of the bolt-holes. Reference the standard engineering drawings for the orientation of all components.

The bin assembly supervisor should study the bin cluster compartment layout and plan the installation of the wall sheets in a manner starting near the center and working outward. This will reduce the possible misalignment of bolt-holes, due to addition of tolerances. The bin walls should be installed one tier at a time, not tightening bolts until all bolts in the tier above have been set in place. Care should be taken in the assembly of the first tier as it serves as the base for all tiers above. The first step in the assembly of the first tier is the installation of the wall sheets. The first row of bolts serves a second purpose as a clamp for the hopper flashing. To complete the first tier and start the bin corner columns, mount the interior vertical stiffener starter into the corner of each hopper starter plate.

Install the interior vertical stiffener and vertical corner stiffener or exterior vertical stiffeners as specified. See the installation drawings for the length of all required components.

Insert the second tier wall sheets between the interior vertical stiffeners. Align the sheets by using holes at the end and mid-point where there are only 3 thicknesses of material. Install the horizontal stiffeners and leave all bolts in the upper tier loose. You can tighten the bolts in the lower tier at this time. Check installation drawings for any additions or accessories to the bin cluster. Attachments for cage ladders and platforms should be attached to the bins as they are assembled.

Chief Industries, Inc. has provided an ample quantity of silicone sealant, and recommends its use in certain joints and connections to prevent the possibility of leakage or cross-contamination of material.

Important Note: Add sealant only as shown on the installation drawings. It is recommended to use a 3/16" (.47cm) bead of sealant unless otherwise specified.

General sequence of assembly:

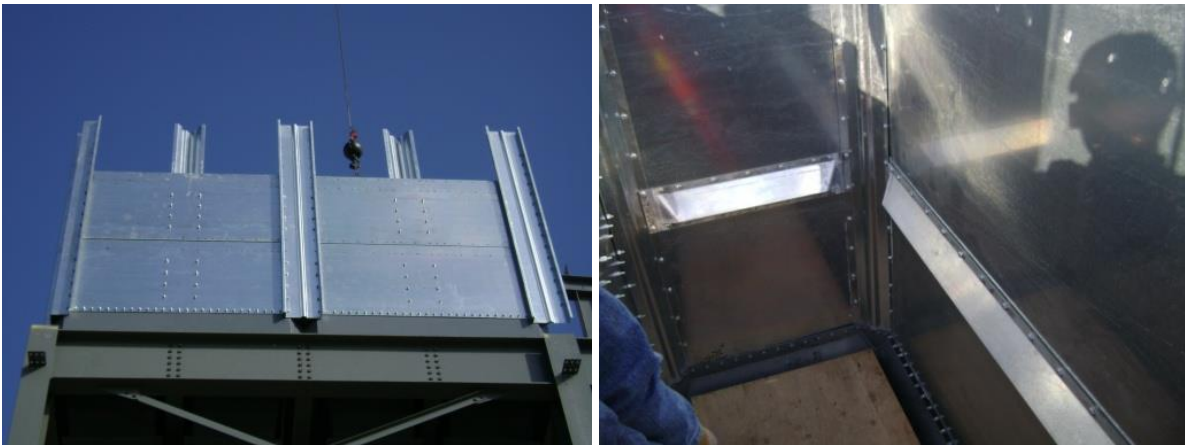
1. Level hopper structural steel support
2. Set hoppers
3. Verify hoppers for level, square, and plumb
4. Install side sheets
5. Leave all first tier bolts loose
6. Mount interior vertical stiffener starter
7. Install vertical column components
8. Set interior vertical stiffeners
9. Install exterior horizontal stiffeners
10. Check again that cluster is square and level
11. Check for exterior bin attachments, ladders, or platforms
12. Start second tier side sheets
13. When all second tier bolts are in place tighten all bolts in lower tier
14. Adaptors

Important Note: Check engineering drawings and manual for any special instructions, details, or layouts. Installation drawings for a specific project take precedence over any drawings shown in the manual.

Project specific engineering drawings will be designated as follows:

- 100 Series- Presentation / Approval Drawings
- 200 Series- Structural Steel / Anchor Bolt Layout
- 300 Series- Installation - Bin Set
- 400 Series- Installation – Roof
- 500 Series- Hopper / Adaptor Layout
- 600 Series- Screw Feeder Layout
- 700 Series- Enclosure
- 800 Series- Safety Equipment
- 900 Series- Mezzanine / Flooring Layout

Sidewall Installation



1. Refer to the side sheet arrangement drawing, first tier of the bin assembly drawing to locate mark numbers on the side and partition sheets.
2. All remaining bin parts, such as vertical and horizontal stiffeners, should be lifted to the assembly area using a hoist.
3. One or two workers at ground level, with a set of bin assembly drawings, can send the parts up to the assembly area, where they can be distributed throughout the bin group for installation.
4. At this point, installation platforms are supported by the hopper walls, and work as a large floor, enabling workers to move with ease from one compartment of the bin group to the other. Platform load limits must be observed. Platforms should be designed to hold 2100 lbs. uniformly distributed load.

Important Note: Installation platforms can be constructed with Hooks that utilize optional platform clips that are bolted in each bin corner. Safety chains should also be used to attach to these optional platform clips in each bin corner. Platform clips, hooks and chains are not supplied with shipment unless specifically ordered.

5. The first tier partition sheets should be placed at the center of the group, leaving bolt joints loose. Work to the outside until the first tier is finished.

Important Note: Refer to the standard detail drawings for bolt size and location of sealant. Place sealant at all corners at the top of the hoppers.

6. While installing the outside side sheets on the first tier, install hopper flashing; tighten joints between first tier side sheets and hoppers. Refer to the standard detail drawings for additional information.
7. Next, install interior vertical stiffener starter at all interior bin corners. Optional platform clips are installed as interior vertical stiffeners are bolted together.
8. If optional platform clips are used, install one clip, one platform hook and one safety chain in each corner of every compartment at each tier level. Clips should be installed in all corners

- of the bin compartment on both sides of the interior vertical stiffener. Verify all the bolts holding the platform clips are tight before raising the platform.
9. Before installing the second tier of side sheets, raise all platforms from the hopper level so that the platform hooks, (at each corner of the platform) fit into the clips installed at the top of the first tier. Safety chains should also be attached to the platform clips in each corner.
 10. Installation platforms should be raised by use of the manual rods with one worker at each corner lifting the platform so that the hooks fit into the appropriate clips.
 11. When all installation platforms are raised, this will provide a safe floor for workers to move freely on the first tier.
 12. Parts for the second tier can now be distributed on the platforms (observe load limit of platform). Begin the installation of the second tier at the center of the group and away from where the bin parts are being received, with work proceeding toward the receiving point.
 13. Side and partition sheets should then be placed between the vertical corner stiffeners and exterior corner stiffeners. Install horizontal stiffeners and next run of interior vertical stiffeners for each succeeding tier.
 14. Optional clips to support the installation platforms at the next level are installed at this time. This procedure is repeated upward, with the installation platforms moving up with each tier up to the top of the bin group.
 15. Care should be taken to equalize tolerances at the horizontal joints so that vertical holes remain on correct centers. This is necessary to keep all tiers level and walls plumb, and prevents loss of dimension due to accumulated tolerances in one direction. Before tightening the lower horizontal sequence of bolts, verify you have placed a drift pin in the top corner holes to maintain the correct tolerance. Take up any hole tolerances that develop with each tier to prevent curves from developing in side sheet

Vertical Column Installation



1. Vertical columns are constructed from vertical corner stiffeners and exterior vertical stiffeners. These members should always be installed before the side and partition wall sheets. (After the first tier of side sheets are installed, proceed to install the first run of vertical corner stiffeners and exterior vertical stiffeners are attached to this first tier.)
2. A bead of sealant must be applied vertically to the vertical corner stiffeners and exterior vertical stiffeners to form a seal against the side sheets. Be sure that all joints are sealed continuously.
3. Succeeding runs of vertical corner stiffeners and exterior vertical stiffeners are butted end to end as the columns extend upward. These butt joints are covered with corner stiffener splice plates or stiffener splice plates, using vertical bolt joints in the vertical corner stiffeners and exterior vertical stiffeners. Seal well before applying splice plates.

Split Compartment Installation



1. When a full size compartment is split into half or quarter size bins, the resulting compartments are fabricated and installed in the same manner as full size compartments.
2. Half and quarter size hoppers are used to begin the compartments, just as in full size compartments.
3. When half or quarter size compartments attach to full sized partition or side sheets, vertical rows of holes are required up the center of the full size sheets. These are specially marked sheets. Full length horizontal reinforcing beams (exterior horizontal stiffeners and interior horizontal stiffeners), are used on the outside of these split compartments.

Important Note: No horizontal reinforcing is required on the opposite side of the split compartments (refer to the bin assembly drawings).

4. Interior vertical stiffeners are to be used in all corners of all compartments regardless of compartment size. (Refer to the bin assembly drawings for proper location and part numbers.)

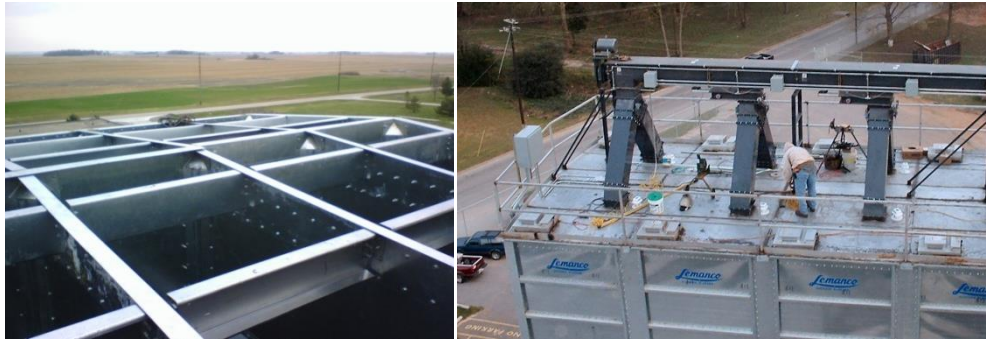
Ladder Bracket and Platform Installation

Important Note: Reference the standard engineering drawings for the orientation of all components.

1. Bolt the ladder brackets over the horizontal stiffeners as you assemble the bins.
2. Ladders, safety cages and safety platforms can be pre-assembled at ground level prior to installation on the bin system.
3. After the bins are assembled use a crane or hoist to lift the ladders in to place. Bolt the ladder to the brackets by using the ladder clips. Verify safety precautions are taken when you mount the ladder.
4. If girts are used on the structural steel, weld the ladder bracket to the girts:

Important Note Refer to the installation drawings for the proper placement of the ladder brackets and orientation of safety platforms. Additional information and assembly instructions will be provided with shipment as required for your project.

Roof Installation



1. With installation platforms located one tier below the top of the last tier of the bin cluster, the roof support members are installed.
2. Eave supports, gable supports and roof ridge supports should be bolted to the top of the upper (highest) tier.
3. In some cases, the interior vertical stiffeners extend up beyond the top tier to join the roof support members. The exterior vertical columns do not extend past the top of the upper tier.
4. Install the roof purlin bracing.

Important Note: Reference engineering drawings for correct locations.

5. If a head house is required, the head house stub columns should be installed at the locations specified in the engineering drawings. This should be completed after the installation platforms have been removed.
6. All roof eave support, roof gable support and roof ridge support members form flat surfaces at the proper slopes to which the roof deck is welded and/or fastened. Remove installation platforms before roof purlin bracing and roof sheets are installed.

Important Note: It is possible to remove installation platforms with these supports in place, leaving a space to withdraw the platform.)

7. Weld roof sheeting as shown in the engineering drawings. Weld the sheeting at the bottom of the eave first, and then work up towards the roof ridge. Roof sheets are to be lapped in such a manner so as to shed water from the roof ridge and prevent moisture from leaking into the bin compartments.
8. Reference the standard engineering drawings for the orientation of all components.

Concrete Roof Installation

1. Connect the flat roof supports to the top tier of the bin side sheets.
2. Bolt the curb form between the side sheets and the vertical stiffeners.
3. Mount the stub columns.
4. Lay the decking on the roof framing and weld the decking together.
5. Mount the columns for the head house to the stub columns. Level and square columns using temporary bracing to hold the columns in place until all framing for the head house is installed.
6. If handrails are being used, verify that handrails are square and plumb before welding the handrail to the decking.
7. Locate spout inlets, manways and other roof accessories.
8. Pour and finish the concrete slab.
9. After concrete has cured as specified in the engineering drawings, install all other components such as siding, doors and windows to the head house as specified.

Roof Handrail Installation



1. Refer to the installation drawing for the proper layout of the handrails. Use a chalk line to layout the handrails. Tack weld the gable handrails first, and then fully weld the side handrails to the gable handrails.
2. Fully weld the base of the handrail stanchions to the roof sheeting.
3. Locate the entry of the safety gate. Trim handrail where required and mount the safety gate into place. Weld ladder brackets as required to the top rail.
4. Additional information and assembly instructions will be provided with shipment as required for your project.

Gates and Adaptors Assembly



1. Refer to the installation drawing for the proper layout of all adaptors and gates.
2. Verify that all gates, adaptors and screw feeders are aligned correctly before field welding mounting flanges.
3. Additional information and assembly instructions will be provided with shipment as required for your project.

Mezzanine Floor and Catwalk Assembly



1. Refer to the installation drawing for the proper layout of all mezzanine floors and catwalks.
2. Installation will be similar to the installation of the structural steel support frame.
3. Verify the proper layout of all flooring materials before welding / fastening to structural steel framing.
4. Additional information and assembly instructions will be provided with shipment as required for your project.

Head House Assembly



1. Mount the stub columns.
2. Mount the columns for the head house to the stub columns. Level and square up the columns. You may need to use temporary bracing to hold the columns in place until the rest of the framing for the head house is installed.
3. Additional information and assembly instructions will be provided with shipment as required for your project.

Safety Equipment Assembly

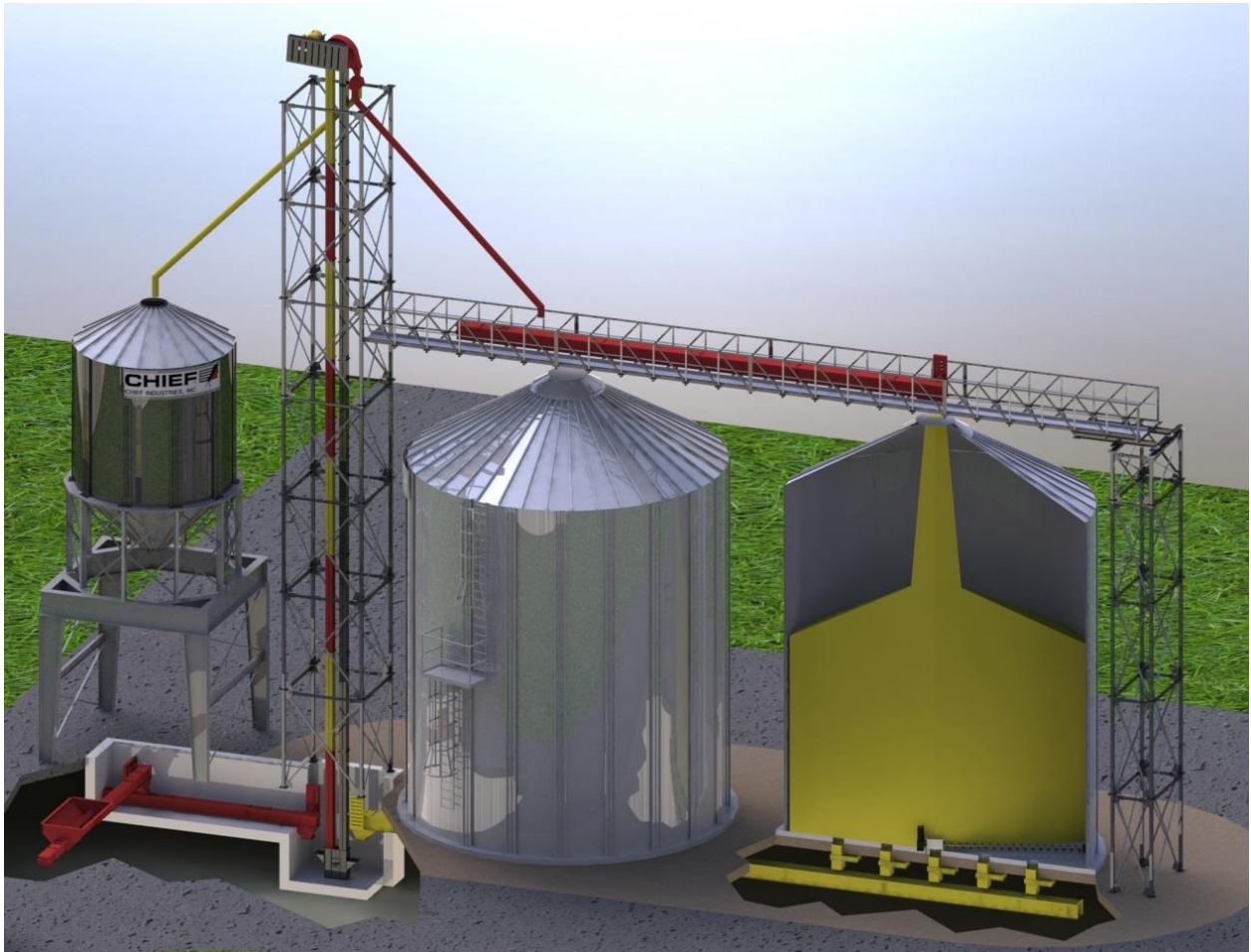
1. Refer to the installation drawing for the proper layout of all safety equipment.
2. Additional information and assembly instructions will be provided with shipment as required for your project.

Enclosure Assembly

Installation of structural steel components and building enclosures is largely a matter of individual choice and experience. The following general outline is provided for reference only.



1. Bolt on all required clips and flange braces. Verify elevations of all framing members.
2. Bolt on all girts to sidewall and endwall locations.
3. Install all framing for doors and windows.
4. Install sheeting and trim. Verify the location of all lap joints before fastening sheeting.
5. Refer to the installation drawing for the proper layout of all enclosures. Separate assembly instructions and information is provided due to custom requirements for bin system enclosures



Should you have any questions concerning assembly instructions, parts or drawings, please feel free to contact us at any of the following.

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