

CALDWELL DRYER



INSTALLATION MANUAL

P/N 095504
Rev 1 (July 2020)

CHIEF
AGRI

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Installation Manual

WARNING: If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- **Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.**
- **WHAT TO DO IF YOU SMELL GAS**
 - **Do not try to light any appliance.**
 - **Extinguish any open flames.**
 - **Do not touch any electrical switch.**
 - **Immediately call your gas supplier. Follow the gas supplier's instructions.**
 - **If you cannot reach your gas supplier, call the fire department.**
- **Installation and service must be performed by a qualified installer, service agency or the gas supplier.**

 **WARNING:** Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

FOR YOUR SAFETY

The use and storage of gasoline and other flammable vapors and liquids in open containers in the vicinity of this appliance is hazardous.

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

Thank you for purchasing the Caldwell continuous mix flow grain drying system. Proper installation will ensure you the best overall experience with your dryer and guarantee smooth operation.

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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.

Model Number Description

The dryer model nomenclature distinguishes the application of the dryer. The information includes a designation of the applicable dryer length and height. The model number is stamped on the serial number plate and the definition of the model number nomenclature is as follows:

Example: CMF 24 - 14

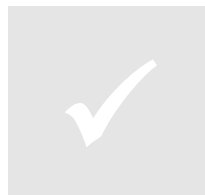
 (a) (b) - (c)

- (a) CMF = Caldwell Continuous Mix Flow
- (b) 24 = Dryer nominal length in feet
- (c) 14 = Dryer tier height

Packing List

The shipment should contain the following items. Verify and inspect all items carefully when unpacking and before installing. In case of any shortage, contact your dealer. In case of damage during shipment, file a claim with the carrier.

Note: Before starting the installation of the dryer, verify that all items called out on the packing list have been received.



Before You Begin


Read this manual thoroughly before operating this dryer. Keep this manual in a location for quick access and reference.

Your Caldwell dryer is designed for safe and reliable operation when properly installed. However, the dryer requires electricity, which when improperly installed or when operated improperly, can be potentially dangerous. Anyone who will operate this unit should read the manual before installing or operating this unit. The following table, provided for your convenience, will aid in verifying that these individuals understand the proper operation of the dryer. After completely reading the manual, this table should be filled in.

Date	Operator Signature	Owner Signature

Special Service Note: If you are unable to remedy any service problem after thoroughly studying this manual, contact the dealer from whom you purchased the unit. Your dealer is your first line of service. The following information is required for service:

1. Dryer model number: _____
2. Dryer serial number: _____
3. Dryer model number: _____
4. Dryer serial number: _____
5. Line Voltage Measured: _____
6. Approximate operating pressure: _____
7. Hours the unit has been in operation: _____
8. Type of grain stored: _____
9. Moisture content of the grain: _____
10. Dealer purchased from: _____
11. Dealer address and phone number: _____
12. Date purchased: _____
13. Service contractor:
 - a. Name: _____
 - b. Address: _____
 - c. Phone: _____

MODEL	_____
SERIAL NO.	_____
PART NO.	_____
	
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**WARNING: Water Sensitive Materials - Read this notice carefully**

Bundles must be inspected and carrier advised immediately if damage is noted. White rust will attack painted as well as galvanized parts. If water has entered a bundle or if condensation has formed between parts, the bundle must be opened, the parts separated and all surfaces dried.

If sheets are to be installed within 10 days:

Store bundled parts of 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. **Note:** 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 parts, resulting from improper storage, will be the responsibility of the receiver.

Safety and Precautions

Your safety and the safety of others is a primary concern to Chief Industries, Inc. This manual was written to assist in the safe installation and operation of the Caldwell Dryer.

It is your responsibility as the owner, builder, operator, or supervisor to know what specific requirements, precautions and hazards exist and to make these known to all personnel working with equipment or on the jobsite so that they can observe any necessary safety precautions.

All personnel, including the installation crew, must read and understand the information contained in this manual before starting construction. Chief Industries, Inc. is not responsible or liable for the misuse of equipment or operation of personnel or equipment in an unsafe manner.

Chief Industries, Inc. assumes no liability with respect to proper construction and inspection, assembly, or use of its products established under applicable laws, all of which is the sole responsibility of the purchaser and those authorized for the installation.

Follow all local and federal safety laws and regulations. Verify that all equipment and personnel conform to any applicable jurisdiction regulations.

Work Area Safety Statement

To ensure the safety of all individuals in the work area, only authorized and trained persons shall install, maintain and use the Caldwell Dryer.

Under no circumstances should unauthorized individuals be allowed to trespass or be present in the work area.

It shall be the duty of all operators to ensure that the work area is clean, organized and kept free of all debris and tools that might cause an accidental tripping or falling hazard.

Special care should be taken when working from unsafe heights. Common sense dictates that when conditions such as rain or wind prohibit the safe use of equipment, the installation be discontinued.

Chief Industries, Inc. strongly recommends that equipment meeting the current specifications be used, whether the individual operator is required by law to do so or not. Proper climbing equipment and a secured safety harness should be used at all times when performing operations work, installation or maintenance.

Field modifications without the authorization of the manufacturer may present unknown dangers to the operator and must be avoided.

Auxiliary Equipment Safety

You may decide to purchase and install “auxiliary equipment” made by other manufacturers. Chief Industries, Inc. has no control over the design and manufacture of this equipment. In view of this, at a minimum, we suggest you do the following:

1. Obtain, read and understand the instructions and safety cautions of the auxiliary equipment manufacturer. Be certain that all equipment is installed in agreement with those instructions.
2. Check with Chief Industries, Inc. to verify that your system is designed to support any additional loads supplied by the auxiliary equipment.
3. Obtain any applicable safety decals from the manufacturer and make certain they are displayed in a visible location.
4. Make certain that all electrical equipment is properly installed and grounded by a qualified electrician.
5. Check availability and operation of electrical lock out and emergency stop systems.
6. Be certain that all guards and shields are securely in place.
7. Store all operation / maintenance manuals in a safe place for future use.

Dryer Safety




Before operating the unit, perform the following checks:

1. Disconnect and lock out all power and fuel before adjusting, servicing or accessing the dryer and associated equipment. Never rely on the PLC interface for on/off control.
2. Observe recommended drying temperatures.
3. Keep the dryer clean throughout, and ensure grain entering the dryer is sufficiently clean of foreign material. This will prevent risk of fire.
4. Ensure any hot surfaces have had adequate time to cool before working on or in the equipment.
5. If entry to the dryer is required, ensure the dryer has been purged of any combustion by products and harmful gasses or vapors.
6. Never attach lifting equipment to unauthorized locations, such as ladders or platforms.

7. Use extreme caution when working around high speed fans, gas fired heaters, auxiliary conveyors, which may start without warning when the dryer is operating on automatic control.

Heed the following warnings and others:


! CAUTION	
	<ul style="list-style-type: none"> • READ AND UNDERSTAND THE OPERATOR'S MANUAL BEFORE OPERATING DRYER. • DO NOT REMOVE OR MODIFY ANY GUARDS. • MAKE CERTAIN EVERYONE IS CLEAR BEFORE OPERATING DRYER. • CLEAN OUT DRYER PERIODICALLY TO PREVENT FIRES. • CHECK FUEL LINE COMPONENTS FOR LEAKS PERIODICALLY.
STOP DRYER AND LOCK OUT POWER BEFORE ADJUSTING, SERVICING OR CLEANING.	
<small>095006</small>	<small>XX/XX</small>

! WARNING	
	CONFINED SPACE FLAME AND BY-PRODUCTS OF COMBUSTION BEYOND DOOR CAN CAUSE SERIOUS INJURY OR DEATH.
	KEEP DOOR CLOSED, OPEN ONLY TO SERVICE AND MAKE ADJUSTMENTS.
	AUTOMATIC EQUIPMENT CAN START ANYTIME. LOCKOUT POWER AND FUEL BEFORE OPENING ACCESS DOORS.
<small>095007</small>	<small>XX/XX</small>

! WARNING	
	
ROTATING BLADE OR WHEEL CAN CAUSE SEVERE INJURY	
Keep guards in place. Stay clear of fan blade at all times	
LOCK OUT POWER BEFORE REMOVING GUARD.	

01/04

750331

! WARNING	
	
FALL HAZARD: FAILURE TO FOLLOW ALL INSTRUCTIONS MAY RESULT IN SERIOUS INJURY OR DEATH.	
<ul style="list-style-type: none"> • The working load for this ladder is 300 lbs. (136 kg). • Only use ladder if you are in good physical condition. • Do not use this ladder system if it is damaged or improperly assembled. • Face the ladder and maintain 3 points of contact when ascending or descending. • Ladder can be slippery when wet. Always maintain a firm grip and wear slip-resistant shoes when climbing. • Never carry an object or load that could cause you to lose your balance. • Do not over-reach. • Never push or pull anything while on the ladder. • Use a safety harness and safety line when required. 	
<small>095005</small>	<small>XX/XX</small>



General Contractor Responsibilities

It is the responsibility of the general contractor to insure that the complete drying system is constructed with quality workmanship and that all equipment is installed per the respective manufacturer's instructions. This includes the following:

- Dryer
- Foundation
- Grain transport equipment
- Accessory equipment

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, from each respective equipment manufacturer, should be approved for the intended use.

Concrete Design and Construction

The suggested foundation designs shown in the installation manuals 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.

All suggested foundation designs must be approved by a licensed engineer in order to meet local governing building codes and local soil and weather conditions. Wall loads and floor pressure for Chief grain dryers are available from Chief Industries, Inc., upon request.

Note: The finished floor surface must be level at the base plate location. Low spots without adequate shimming can cause structural damage to the dryer. Faulty concrete or missing shims will void the warranty.

The suggested concrete foundation designs must not be used in conjunction with unload and aeration tunnels. Concrete and reinforcing bar requirements must be determined by a certified professional engineer. The design must consider soil bearing capacity, soil consolidation, footing requirements, tunnel requirements and the interaction of all foundation components under loaded condition. Non-uniform settlement of the foundation can cause severe structural damage to the 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 insure that an adequate foundation is provided for the grain dryer.

Accessory Equipment

Accessory equipment can be installed with the grain dryer; however certain limitations and special considerations must be followed in order to maintain the warranty.

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

Note: Do not modify the storage structure design without Chief approval. It is the responsibility of the general contractor to insure 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.

Field Modifications and Installation Defects

Chief Industries, Inc. 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 grain dryer will void the warranty.

Suggested Equipment

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

- Impact wrenches and sockets
- End wrenches
- Crescent wrenches
- Vise grip pliers
- Alignment punches
- Rubber mallets

- Level
- Screw Guns
- Extension cords
- Ladders

Crane Weight Capacity

When determining the crane capacity necessary to install the structure, the boom distance must be considered. If a single crane will not lift the structure two cranes may be used, utilizing a spreader bar. The spreader bar must be adequately designed to carry the entire dead weight.

Note: Overloading the crane capacity can result in substantial property damage and severe personal injury. Always verify crane capacity prior to lifting the structure.

Site Preparation

Electrical:

The side of the dryer with the gas train is identified as the front of the dryer. The electrical junction box is located on this side.

The control panel can be mounted to the dryer or at customer's discretion. The location will need to be determined prior to concrete being poured to allow for the proper conduit installation.

Fuel Supply:

Contact your local gas supplier for proper tank set up and service line installation. The fuel lines may need to be installed prior to the concrete and foundation installation.

Fuel Supply Requirements

Listed below is the heat source requirements needed for the liquid propane or natural gas supply line.

- 16' Dryer length = 14M BTU/HR
- 24' Dryer Length = 22M BTU/HR
- 32' Dryer Length = 30M BTU/HR
- 40' Dryer Length = 38M BTU/HR
- 48' Dryer Length = 46M BTU/HR

Liquid Propane Fuel Supply

The liquid line is equipped with a $\frac{3}{4}$ " NPT connection.

Natural Gas Fuel Supply

Chief recommends the pressure supplied to the natural gas train inlet be 5-10 psig.

Connection Sizes:

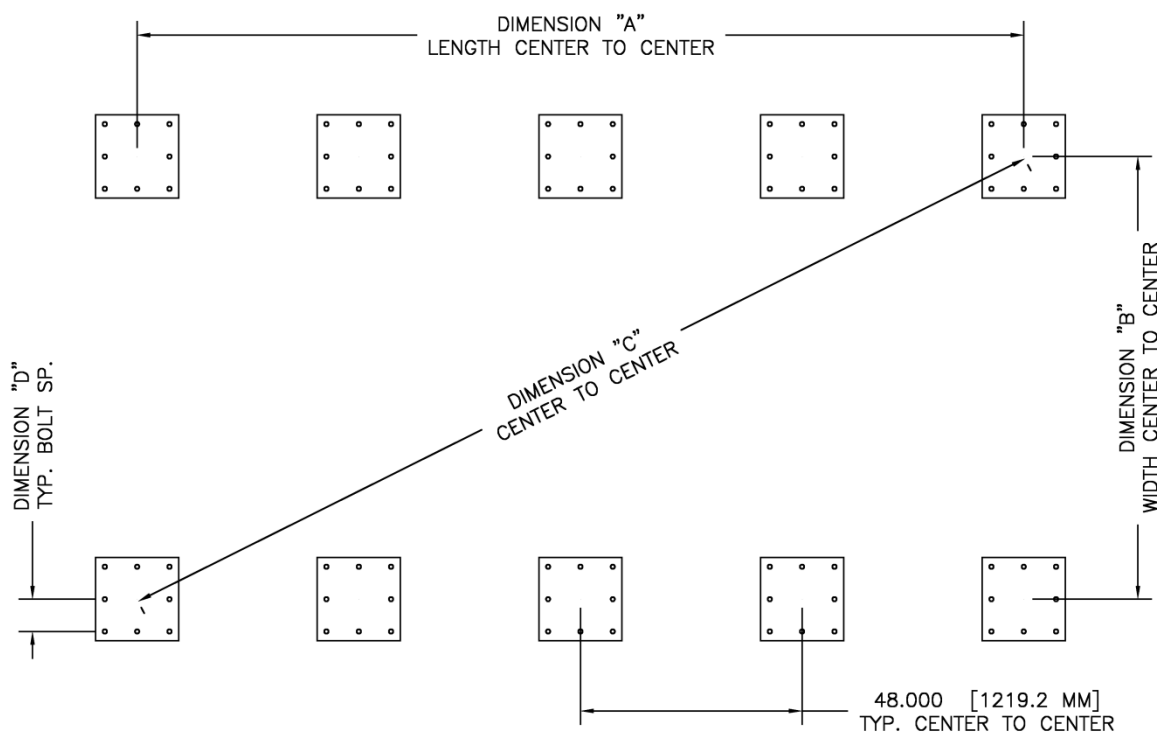
- 16' = 2" NPT
- 24' = 2.5" NPT
- 32' = 3" NPT
- 40' = 3" NPT
- 48' = 4" NPT

Foundation

Dimensions “A” and “B” are found by measuring parallel to the dryer, from the centerline of base plate to centerline of base plate. Dimension “D” is found by measuring parallel to the tower, from the centerline of anchor bolt to centerline of anchor bolt. Dimension “C” is a check dimension to verify the bolt pattern. This is found by measuring the centerline of the base plate to centerline of the base plate.

Use the correct bolts and bolt torque values as specified by a qualified consulting engineer. Verify anchor bolt grade, protrusion from concrete and minimum embedment for your foundation before proceeding with the installation. The foundation is critical to the structural integrity of the dryer system

Note the following reference layout drawing:



Model	Dim "A"	Dim "B"	Dim "C"	Dim "D"	Total Base Plates
CD16	192"	95.75"	214.551"	7"	10
CD24	288"	95.75"	303.500"	7"	14
CD32	384"	95.75"	395.758"	7"	18
CD40	480"	95.75"	489.567"	7"	22
CD48	576"	95.75"	583.904"	7"	26

Installation Procedures

All components are assembled using SAE grade 5 washer head bolts. Whiz flange (serrated flange) nuts are used to secure the bolts in position.

If these descriptions do not correspond with the bolts shipped with the dryer, please contact the customer service department immediately. Substitution of any other type or bolt grade or hardware from other sources is not allowed and will void the warranty.

When installing hardware, the minimum and maximum torque values shown below must be followed. All hardware must seat tight against the corresponding dryer component.

Bolt Diameter	Minimum Torque	Maximum Torque
5/16" (.79cm) (.79cm)	22 ft.-lbs.	28 ft.-lbs.
7/16" (1.11cm)	60 ft.-lbs.	75 ft.-lbs.

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

Bolt Size	Color Code	Head Size	Nut Size
5/16" (.79cm) (.79cm)	Blue	1/2" wrench	1/2" wrench
7/16" (1.11cm)	Red	5/8" wrench	11/16" wrench
1/2" (1.27cm)	Green	3/4" wrench	3/4" wrench
5/8" (1.58cm)	Yellow	15/16" (.79cm) wrench	15/16" (.79cm) wrench

For efficient installation consider the following:

- If renting a crane, plan for the crane to arrive just before trucks arrive with dryer parts. After dryer parts have been off loaded, setting the legs and stacking of the dryer can begin.
- After stacking begins, have personnel installing bolts while other personnel rig the next section. Note: Not all bolts need to be installed before stacking the next section. After the entire dryer is stacked, install remaining hardware inside and out. This procedure will utilize the time of the crane more efficiently.
- Fans can be lifted by forklift when installing fans to base of the dryer.
- Plan the equipment assembly in advance. If possible the following guidelines should be followed:
 - Divide the overall project into smaller individual tasks assigned to teams.
 - Use trained workers and have the proper tools and equipment readily available.
 - Lay out the components according to plan. The layout and inventory should be mapped.

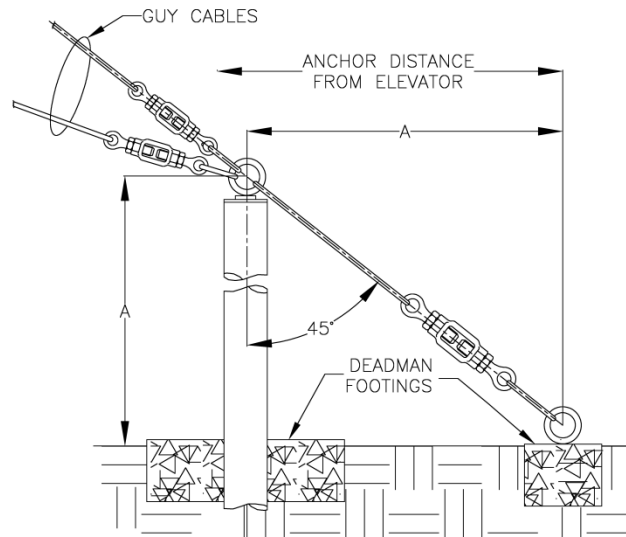
Guy Cable Support

Anchors for Guy Cable Installation

The dryer must be laterally supported at specified locations. Guy cables must be used to support the dryer, with cables attached in equal directions and attached to anchors.

Note: Verify that guy cables are protected from accidental damage. Truck or machinery can cause serious damage and result in collapse of the dryer.

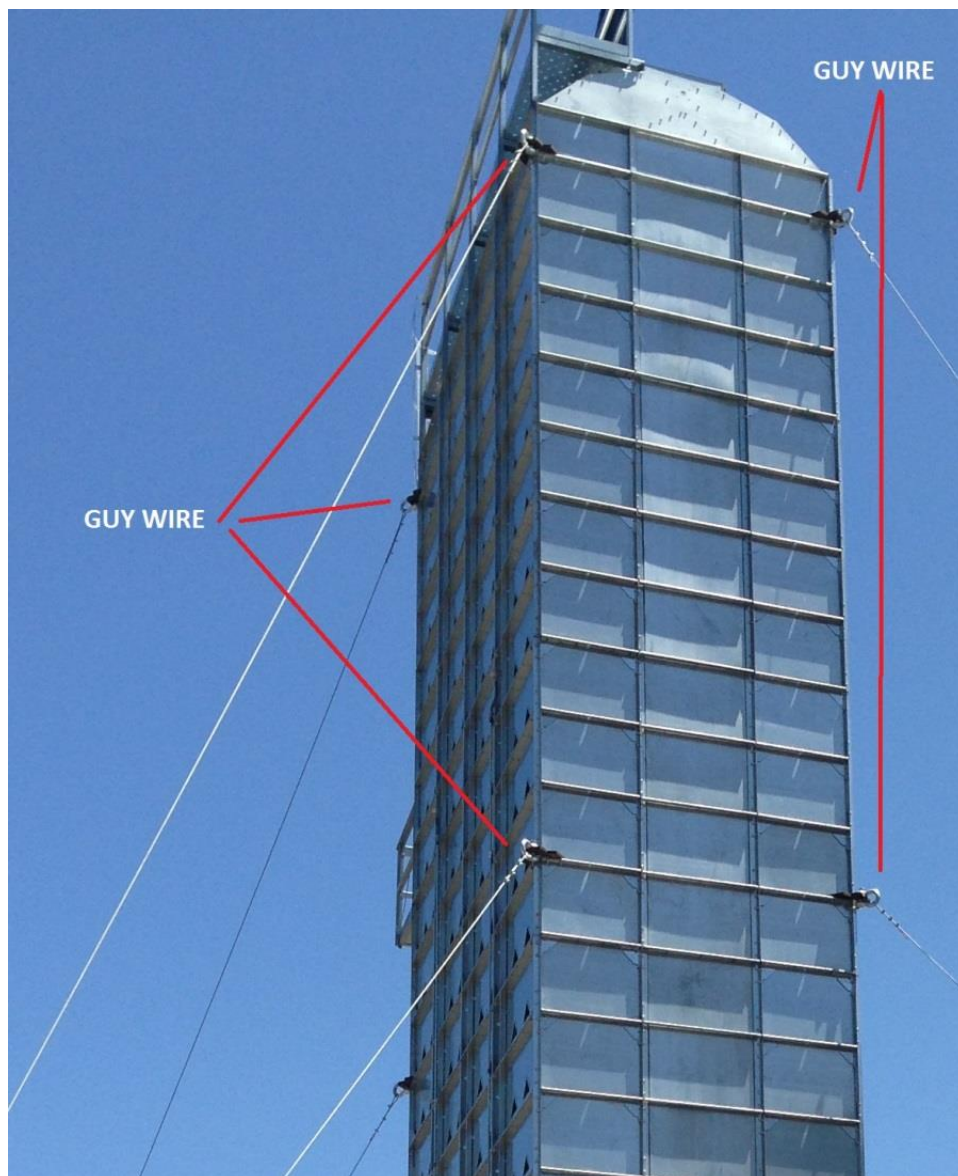
Guy cable protection can be protected by incorporating guard fences and elevated anchors. This will keep equipment a safe distance from the cables. Elevated anchors allow vehicles to pass safely underneath cables near the anchors.



Anchors are to be located 90 degrees apart around the dryer and must be properly designed to withstand the cable loads. **Note:** All anchors must be designed by a structural engineer to match the soil and ground conditions. All cables or braces attached to buildings or other structures must be approved by the manufacturer of the structure and a structural engineer.

To install guy cables, note the following instructions.

1. Guy cables are to be mounted on the corner gussets located on the outside corners of the dryer. See table for location on your dryer.



2. The guy cable corner gussets can be installed prior to stacking. This will make the assembly process easier.

Note: The four corner holes will need to be drilled for re-sizing to allow for a 5/8" bolt.



Guy cable Assembly

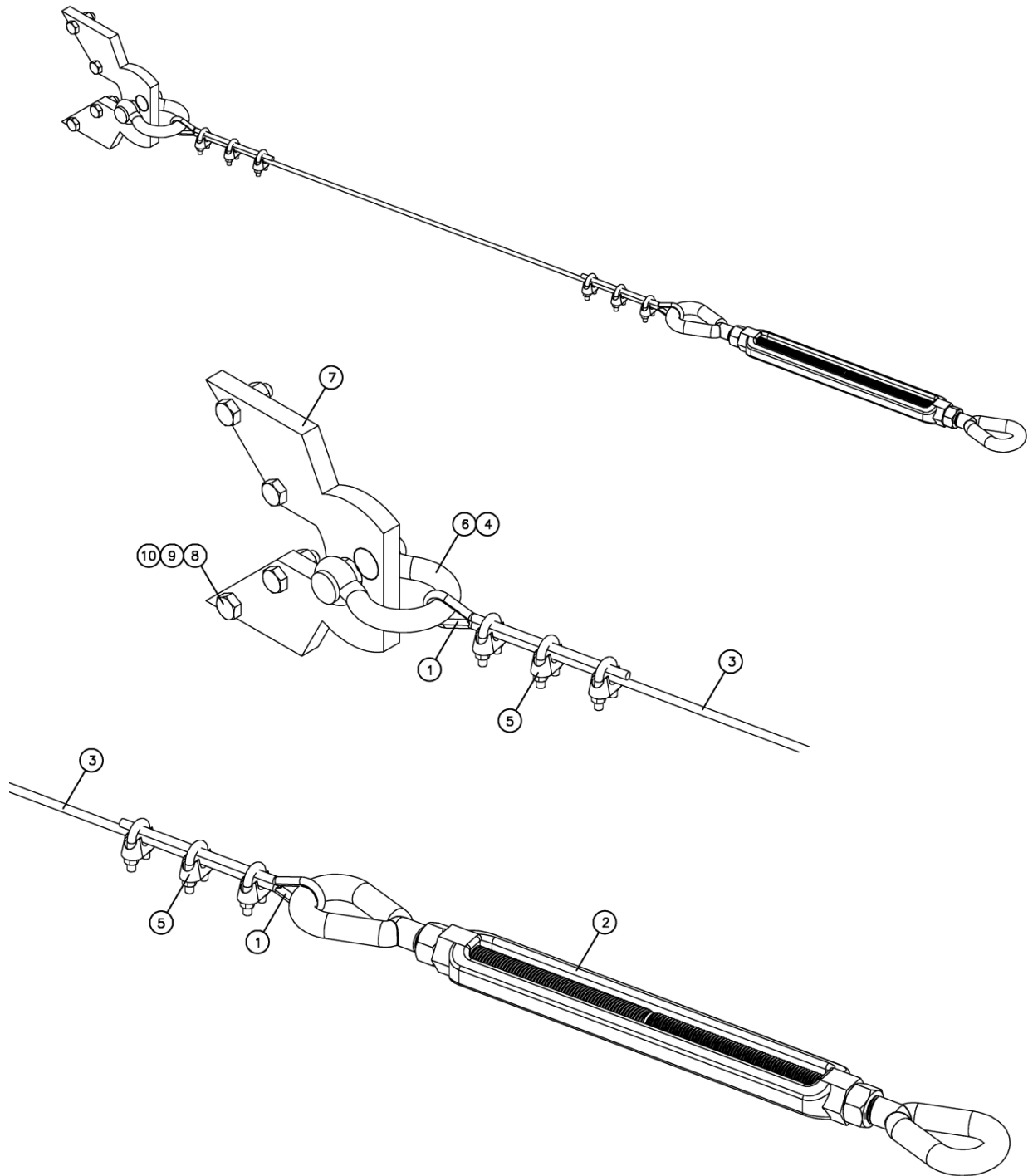
To organize the attachment of cables while the dryer is being installed, pre-mark each guy cable bracket with its future position on the dryer (height and direction), then determine the length of the cable for each guy cable bracket being sure to allow for all cable connections. Cut and attach the cables to predetermined guy cable brackets. As the dryer is assembled the guy cable brackets can be installed with the proper cables attached.

Connect each guy cable to its anchor, starting with the lowest set of cables and progressing towards the top elevation. Locate a turnbuckle on each cable at a convenient distance from the anchor. Extend the turnbuckles as far as possible to allow for later adjustment.

The recommended method of connecting a cable is to bend the cable around a cable thimble for the specified cable turn back length. Place the first cable clip 8 inches from the dead end. Place the third clip as close to the loop as possible.

Assemble the guy cable cables as shown in the following illustrations. **Important:** The saddle of the cable clamp must be on the load bearing side of the cable. The overlap of the cable ends must be 8" minimum with a minimum of 3 cable clamps on each end.

Guy cable Assembly			
Item	P/N	Description	Qty.
1	460808	Thimble .375	2
2	095010	Turnbuckle	1
3	460907	Guy cable 3/8"	1
4	127693	Nut 1.125	2
5	460857	Cable Clamp .375	6
6	095011	Clevis	1
7	9000216	Corner Gusset	1
8	489088	Bolt .625 x 2.5	4
9	464800	Lock Washer .625	4
10	102473	Nut .625	4



Use two transits to keep the dryer straight and plumb while tightening the cables at the turnbuckles. Locate one transit in line with one row of anchors past the farthest anchor. This transit will be used for adjusting cables extending to the right and left of it. Set a second transit 90 degrees from the first transit in line with the row of anchors, to adjust the cables extending in the other two directions.

While adjusting all sections to plumb, tension all cables in alternate succession to 600-700 pounds. Starting at the lowest elevation guy wire bracket location, tighten two cables in opposite corners of the elevator. Check dryer for plumb, and then tighten the two remaining cables. Repeat this procedure for each successive guy wire bracket.

A final recheck for plumb is made with a plumb bob. Tie the plumb line to a cross board over the top of the tower section. Locate the line so it clears all sides and lower the plumb bob to the bottom of the tower section. Note the position of the plumb line with respect to the tower section at the top and bottom ends of the dryer. If it is not the same readjust the guy cables.

Note: After all cables have been tensioned and the leg rechecked for plumb and straightness, permanently secure the turnbuckles from loosening. Either end or the center of a turnbuckle may turn and loosen the cable. One method of securing the cable is to lace a short length of cable through the ends and center of the turnbuckle and secure the cable with cable clamps.

WARNING: All 3/8" diameter guy cables are to use a 6,950 lb. minimum strength cable (Siemens martin or equivalent). All 1/2" diameter guy cables are to use 12,100 lb. minimum strength cable (Siemens martin or equivalent). Do not mix types of cables even though they meet the minimum strength requirements.

WARNING: Guy Cables must not be attached by other means than those provided. Welding to or cutting into the dryer sections is prohibited.

WARNING: All cables or braces attached to buildings or other structures must be approved by the manufacturer of the structure or by a structural engineer.

Guy Cable Locations and Loads**CMF 16 Dryers**

Tiers	Height (ft)	Full Weight (lbs)	Wind (lbs)	Tie Down	Tie #1 (ft)	Cable Length #1 (ft)	Dead Head Location #1 (ft)	Tensile Per Cable (lbs)
10	39	111973	7000	1	30	43	29-31	4950
11	40	117722	7000	1	32	46	32-34	4950
12	42	124560	7500	1	34	49	34-36	5304
13	44	131378	7500	1	36	51	35-37	5304
14	45	139263	8000	1	38	54	37-39	5657
15	47	146073	8000	1	40	57	39-41	5657
16	49	152931	8500	1	42	60	41-43	6011
17	51	159443	9000	1	44	63	43-45	6364
18	53	166336	9000	1	46	66	45-47	6364
19	55	173155	9500	1	48	68	47-49	6718
20	57	180012	10000	1	50	71	49-51	7072
22	61	186831	10500	1	54	77	54-56	7425
24	65	207299	11000	1	58	82	57-59	7779

CMF 24 Dryers

Tiers	Height (ft)	Full Weight (lbs)	Wind (lbs)	Tie Down	Tie #1 (ft)	Cable Length #1 (ft)	Dead Head Location #1 (ft)	Tensile Per Cable (lbs)
10	40	166990	10500	1	30	43	29-31	7425
11	42	177231	11000	1	32	46	32-34	7779
12	44	187097	11500	1	34	49	34-36	8132
13	46	197246	12000	1	36	51	35-37	8486
14	48	208838	12500	1	38	54	37-39	8839
15	50	218949	13000	1	40	57	39-41	9193
16	52	229073	13500	1	42	60	41-43	9546
17	54	239184	14000	1	44	63	43-45	9900
18	56	248966	14500	1	46	66	45-47	10254
19	58	259077	15000	1	48	68	47-49	10607
20	60	269201	15500	1	50	71	49-51	10961
22	64	289336	16500	1	54	77	54-56	11668
24	68	309653	17500	1	58	82	57-59	12375

CMF 32 Dryer

Tiers	Height (ft)	Full Weight (lbs)	Wind (lbs)	Tie Down	Tie #1 (ft)	Tie #2 (ft)	Cable Length #1 (ft)	Cable Length #2 (ft)	Dead Head Location #1 (ft)	Dead Head Location #2 (ft)	Tensile Per Cable (lbs)
12	46	259053	15500	1	34		49		34-36		10961
14	50	289687	17000	1	38		54		37-39		12021
16	54	308383	18500	1	42		60		41-43		13082
17	56	321784	19000	1	44		63		43-45		13436
18	58	335428	19500	2	46	31	66	44	45-47	30-32	13789
20	62	362249	21000	2	50	34	71	49	49-51	34-36	14850
21	64	375652	22000	2	52	35	74	50	51-53	35-37	15557
22	65	389053	22000	2	54	37	77	53	54-56	37-39	15557
24	69	415872	23500	2	58	39	82	56	57-59	39-41	16618

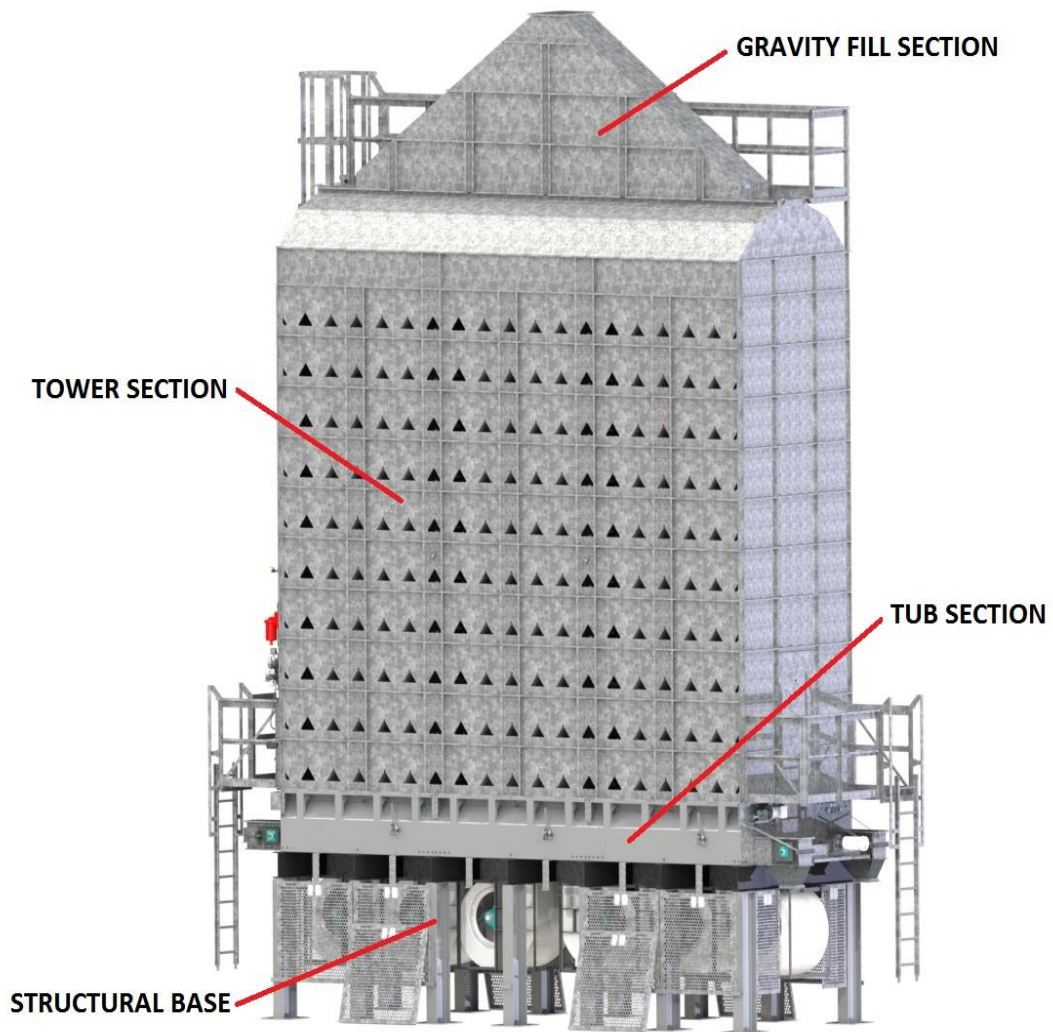
CMF 40 Dryer

Tiers	Height (ft)	Full Weight (lbs)	Wind (lbs)	Tie Down	Tie #1 (ft)	Tie #2 (ft)	Cable Length #1 (ft)	Cable Length #2 (ft)	Dead Head Location #1 (ft)	Dead Head Location #2 (ft)	Tensile Per Cable (lbs)
16	58	394112	24500	2	42	29	60	41	41-43	28-30	17325
18	62	430747	26500	2	46	31	66	44	45-47	30-32	18739
20	66	464150	28000	2	50	34	71	49	49-51	34-36	19799
22	70	497459	29500	2	54	37	77	53	54-56	37-39	20860
24	74	530933	31500	2	58	39	82	56	57-59	39-41	22274

CMF 48 Dryer

Tiers	Height (ft)	Full Weight (lbs)	Wind (lbs)	Tie Down	Tie #1 (ft)	Tie #2 (ft)	Cable Length #1 (ft)	Cable Length #2 (ft)	Dead Head Location #1 (ft)	Dead Head Location #2 (ft)	Tensile Per Cable (lbs)
16	60	491081	30500	2	42	29	60	41	41-43	28-30	21567
18	64	536277	32500	2	46	31	66	44	45-47	30-32	22981
20	68	580843	34500	2	50	34	71	49	49-51	34-36	24396
22	72	625802	36500	2	54	37	77	53	54-56	37-39	25810
24	76	670368	38500	2	58	39	82	56	57-59	39-41	27224

Assembly Overview



Structural Base and Tub Section

1. Inspect the concrete and verify that the concrete is flush and level.
2. Verify location of anchor bolts. If the anchor bolts are in place, start by placing the structural support legs over the anchor bolts and tighten hardware finger tight only at this time.
3. If the anchor bolts are not installed yet, measure the base of the dryer and transfer those dimensions to the concrete where the dryer will be installed. Measure diagonally from a singular point on each corner to ensure the layout is square. [Refer to the reference foundation drawings previously](#). Mark the location of the gas train.
4. Place the legs in position according to the layout transferred to the concrete.
5. Once the legs are positioned (fan guard brackets facing out), start installing the cross members using the hardware provided. The hardware should only be finger tight at this time.



6. Once all the legs and Cross members are set in place, pick the tub section up with a crane at the specified points using the lifting brackets provided.



7. With the tub suspended, install the 2 discharge hoppers on the discharge end. **Note:** This must be completed before setting the tub onto the legs.
8. Once the discharge hoppers are installed set the tub section onto the legs and cross members. Verify that the gas train is facing the correct direction. All hardware can be fully tightened at this time.



9. Once all the hardware is tightened, the anchor bolts can be tightened. If anchor bolts are not cast in the concrete, drill in wedge type anchors will need to be installed.
Note: Anchor bolts are not provided by Chief Industries, Inc.
10. Anchor bolts must be installed and tightened before further assembly.

Tower Sections

The tower sections need to be stacked in a specific order. Refer to the drawings provided with your dryer shipment for the specific stacking order.

The tower sections are lifted by crane with the same lifting brackets used previously to lift the tub section.

Note: Verify the ladder and platforms are on the same side as the gas train.

Using the 5/16" (.79cm) hardware provided, securely tighten the tower sections as they are stacked. Tie off holes are located in the flanges throughout the dryer. This allows workers to use a harness and be supported while both hands are free to fasten hardware.



Gravity Fill Section



The gravity fill section is the final section located at the top of the dryer. This section is lifted by crane with the same lifting brackets used previously to lift the tub and tower sections. **Note:** Verify the opening for the access platform is on the same side as the ladders.

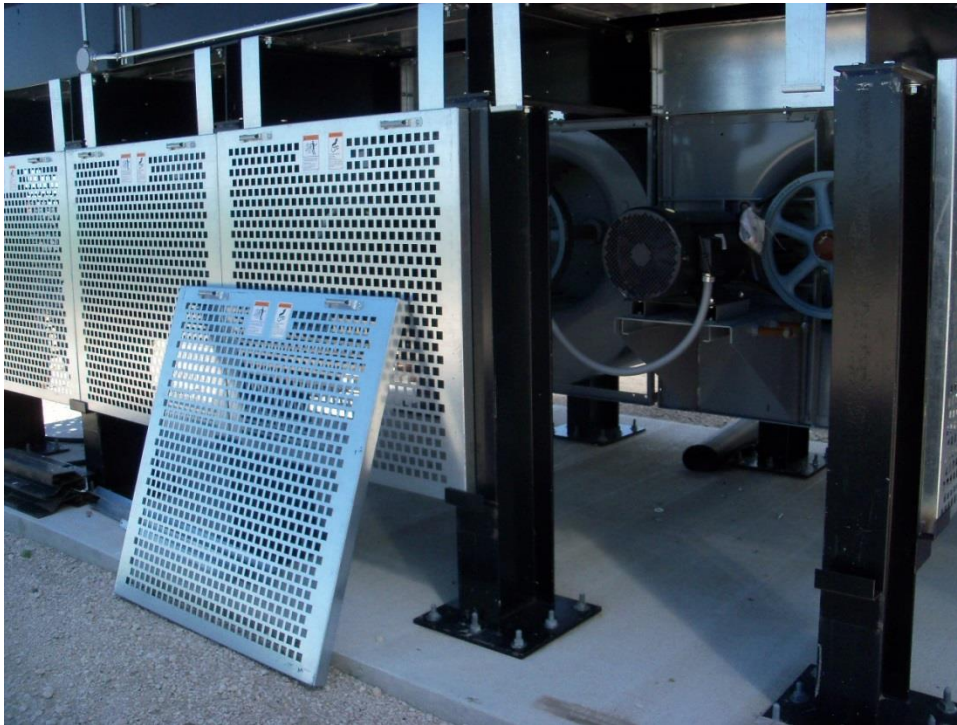
Once the gravity fill section has been set in place, fasten the hardware and start securing the dryer for lateral loads with the guy cable package provided.

Fan Installation

Caldwell dryers require an equal number of right and left fans. All motors will face the same side when completed. Install the fans starting from the center of the dryer working to the ends.



- 1) Pre-assemble the fan transition ends and sides.
- 2) Raise the fans into place using a lifting device. Fasten to the tub section using 4 nuts and bolts per side. **Note:** Additional holes are punched for modular installation; thus different holes are used for varying fan models.
- 3) Install the fan sheeting splice plates. These may need to be notched and cut for proper for coverage.
- 4) Install the top fan guard supports onto the structural support legs.
- 5) Set the fan guards aside for later assembly once the electrical installation is complete.



Ladder and Platform Installation

1. Starting from the bottom, install the ladders using the ladder clip bolt assembly.
2. Using the ladder clip bolt assembly, fasten all ladder connections between tower sections, working towards the top of the dryer.

Air Switch Installation

1. An air switch is necessary to shut the dryer down if there is no air flow from the fans. The air switch is mounted inside the junction box located on the dryer. A copper line is attached to the air switch but needs to be routed to the inlet on the first fan. The end of the copper line should be flush with fan housing near fan blade.

Control Panel Mounting

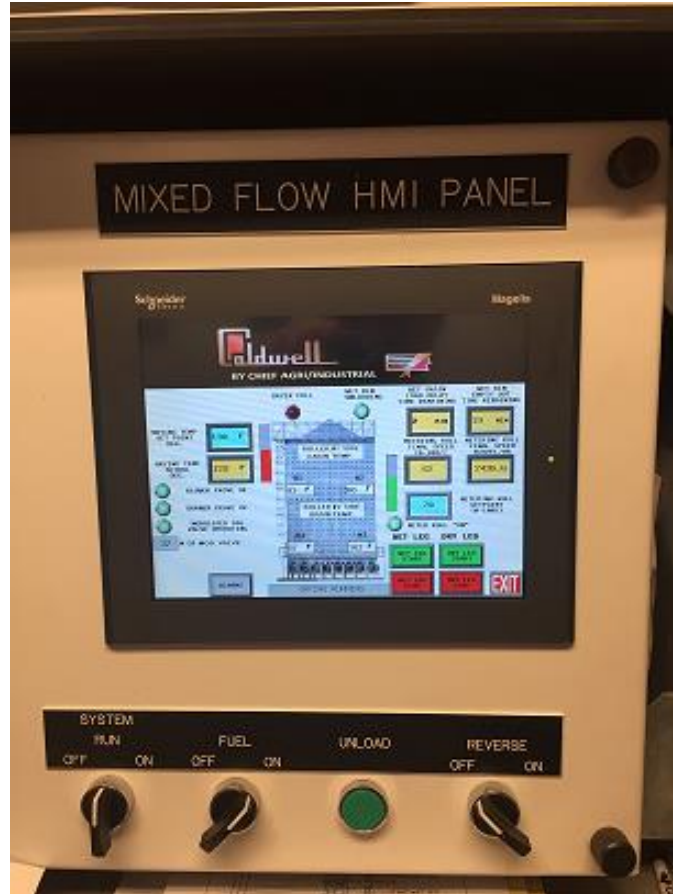
1. Based upon the dryer ordered, one of two control panels has been provided – A non-touchscreen panel or a PLC (Programmable Logic Controller) with touchscreen HMI. (Human Machine Interface)

Note: A harness from the junction box on the dryer to the control panel will be provided if control panel is mounted to the dryer. If the control panel is mounted remotely, an optional harness is available.

- a. Both control panels can be mounted to the corner of the dryer with a separate main disconnect. The control panel can be mounted between the first and second set of legs replacing the fan guard.



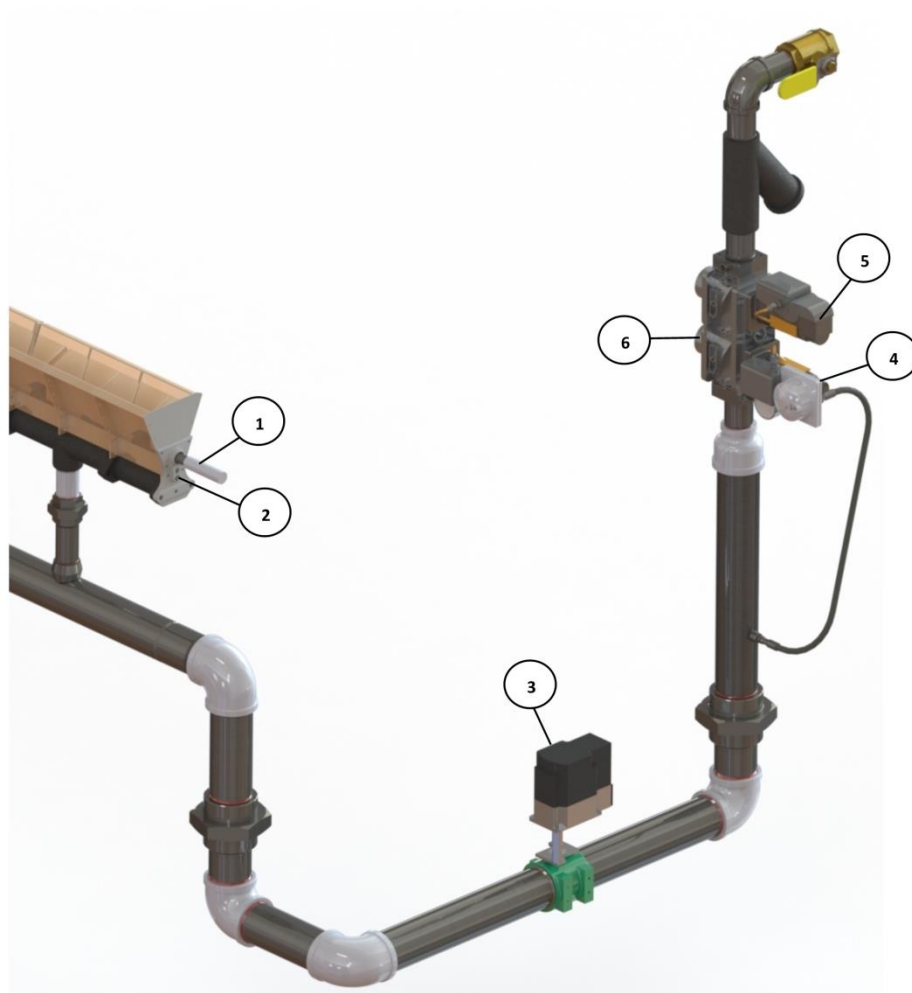
- b. The PLC with Touch screen HMI has a control panel that will be mounted to the corner of the dryer with a separate disconnect. The HMI screen can be mounted in the control panel or remotely. A CAT5 cable will be required between the control panel and the remote HMI panel.



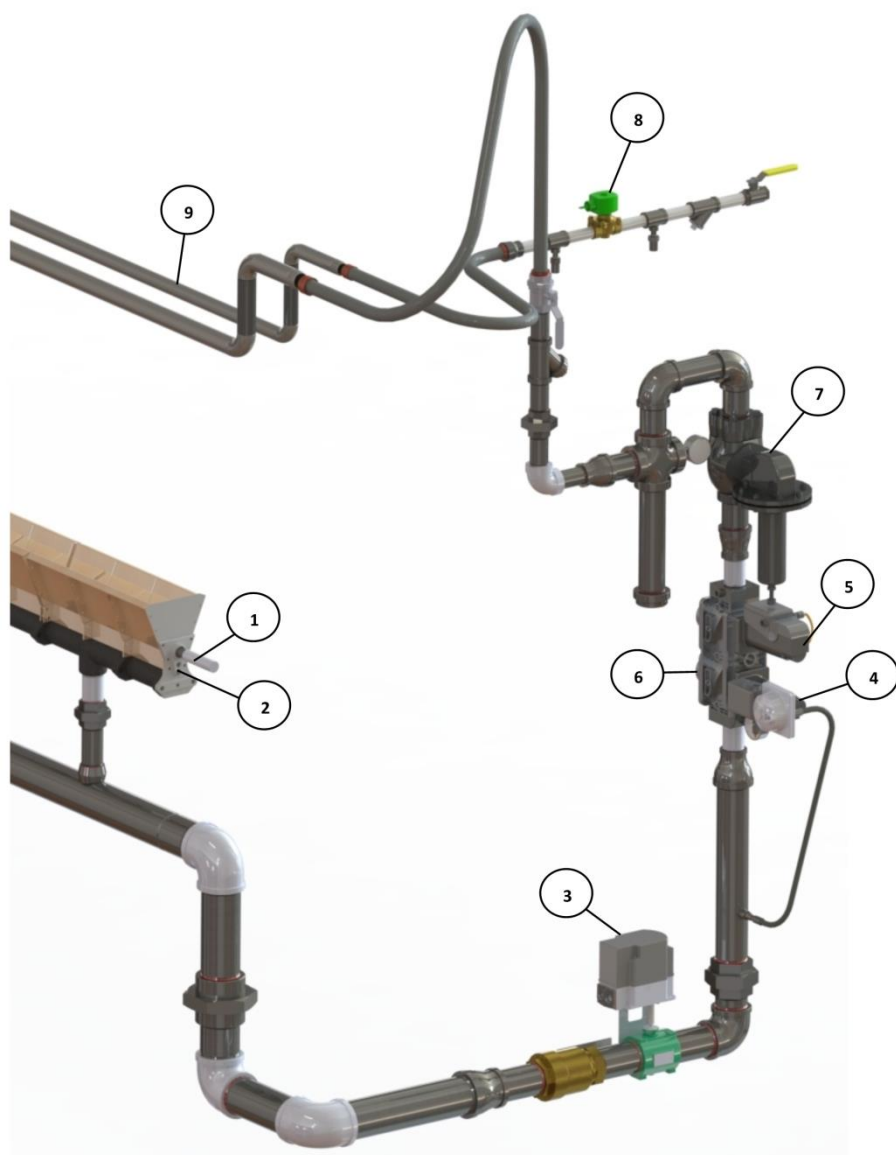
Gas Supply Installation

1. The gas supply is required to be connected to the dryer gas train. With the dryer fuel control valve in the “off” position, the gas supply connections need to be checked for leaks from all fittings and lines feeding the dryer.

Natural Gas



1. UV Flame Sensor
2. Spark Plug, EL, 14MM Thread, Maxon
3. Modulating (Butterfly) Valve
4. Gas Pressure Regulating Actuator (SKP25)
5. Gas Shut Off Actuator (SKP15)
6. Dual Gas Valve (VGD)

Liquid Propane

1. UV Flame Sensor
2. Spark Plug, EL, 14MM Thread, Maxon
3. Modulating (Butterfly) Valve
4. Gas Pressure Regulating Actuator (SKP25)
5. Gas Shut Off Actuator (SKP15)
6. Dual Gas Valve (VGD)
7. Primary Pressure Regulator
8. Liquid shut off valve
9. Internal Vaporizer

Prior to Commissioning

1. Inspect dryer inside and out to ensure hardware is installed correctly. Verify all components are installed correctly, including the following:
 - a. Splice plates between fans
 - b. Cooling zone splice plates
 - c. All electrical components
 - d. Ladder/platforms
 - e. Dryer Master if applicable – [see Dryer Master Installation Manual](#).
2. Loading equipment (installed and operational).
3. Unloading equipment (installed and operational).
4. Electrical to control panel is complete and accurate.
5. Electrical to the main junction box on dryer is complete and accurate.
6. Power up the control panel and remote HMI panel if applicable. Check for error messages/faults. Reset if possible.
7. Check rotation of the horizontal drag conveyor.
8. Check rotation of the metering rolls.
9. Air prove switch and line is installed and positioned correctly.
10. Check rotation of the fans – if fans fail to start completely, check air prove switch for proper positioning.
11. Chain detect sensor is set correctly.
12. Fill switch is functioning correctly.
13. Set hot air temp from the control cabinet/HMI Panel – [see operator manual for details](#).
14. Set hot air temp limit from the control cabinet/HMI Panel - [see operator manual for details](#).

Commissioning

1. Fill the dryer with wet grain. Verify burner is covered with rubber mat. Remove rubber mat when full. Clean out any accumulated grain from burner and fans.
2. Tune the fans – adjust baffles.
3. Turn fuel supply line on.
4. Set the fuel line pressure. Any adjustment should be made with 1 person located at the control panel and 1 person on the platform next to the fuel train. For liquid propane models, adjust the main regulator to approximately 5 psig. The Siemens regulator will need to be adjusted lower than the main regulator. This pressure will vary for each installation. **Note:** Pressure is determined once the dryer has attempted to start up. Verify the fuel switch on the panel is on. Do not discharge any grain at this time.
5. Verify the modulating valve is working correctly. It should open slightly when dryer attempts to ignite.
6. Look at flame to ensure it has a consistent blue pattern.
7. Liquid propane models may require vaporizer adjustment.

8. Test the hot air temperature limit by adjusting the hot air temperature above the limit.
9. Open slide gates if not already open.
10. With metering roll operating at low speed, start the unload system. Verify the unload equipment taking grain away from dryer and is routed to fill the correct bin. **Note:** Initially, the grain coming out of the dryer will still be wet until the dryer has been functioning for a period of time. If capable, it is recommended to recycle the initial flow of grain back through the dryer.
11. Continue to monitor the dryer, taking samples every 15-30 minutes. If adjustments are required, wait 30-60 minutes between adjustments.
12. If a Dryer Master is installed, follow the commissioning manual provided with the Dryer Master unit. It will provide progressive set up procedures. The Dryer Master does not need to be on in order to run the dryer.
13. Continue to monitor the filling of the dryer. Make adjustments to the “wet grain load delay” and/or fill switch. Monitor the grain temperature, moisture, to verify consistency during the dryer start up.
14. Check the reverse switch for the metering rolls.

Electrical Installation

The electrical installation must be performed by a certified electrician, in accordance with the appropriate national and local electrical codes. **Note: Any violation of electrical wiring codes could jeopardize the Caldwell standard limited warranty.**

The electrician will need to supply the following:

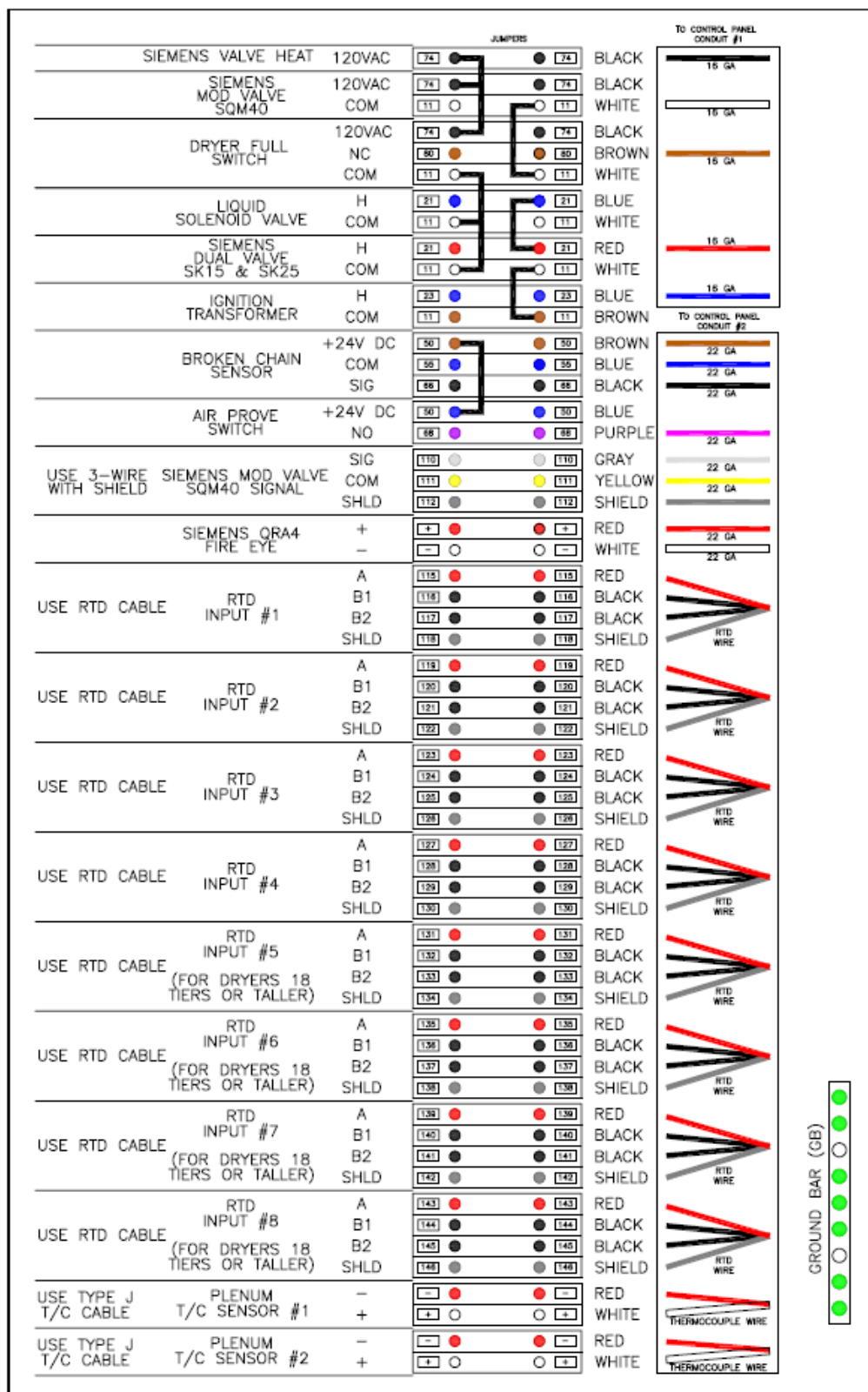
- Protective conduit from the gravity fill section junction box, to the tier #5 small junction box. Wires are provided and labeled.
- Protective conduit from tier #5 to the main junction box on tier #2. Wires are provided and labeled.
- Protective conduit and wire from each fan motor to the control panel.
- Protective conduit and wire from the horizontal conveyor motor to the control panel.
- Protective conduit and wire from the metering roll motor to the control panel.
- Protective conduit and wire from the tier #2 junction box to the control panel. **Note:** Wire is not needed if harness is provided.

Thin wall zinc plated conduit or similar shall be used.

Most of the electrical components on the dryer are connected prior to shipping. All wires provided will be labeled to match the junction box as well as the electrical panel. The harness if purchased will also be labeled to match the junction box and electrical panel.

Note: Electrical Supply will need to be connected to the main disconnect. (Main disconnect is provided by others).

Main Junction Box on Dryer:



STANDARD LIMITED WARRANTY

Grain Dryer Products

1. **Definitions.** The following terms, when they appear in the body of this Standard Limited Warranty for Grain Dryer 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 twelve (12) 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 Ninety (90) 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 ninety (90) 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

4815-1214-5953, v. 1



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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www.agri.chiefind.com