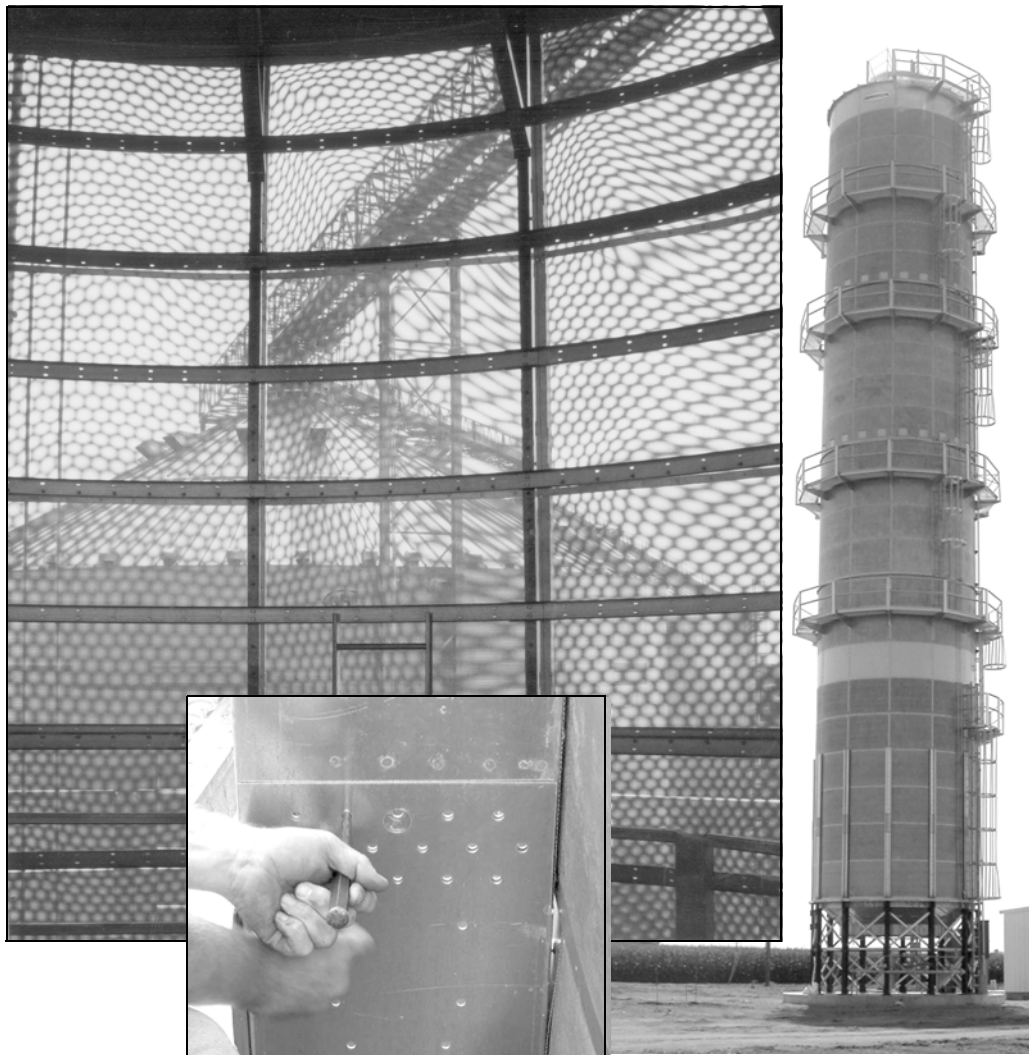




Commercial Tower Dryer **BASE INSTALLATION MANUAL**

Installer SAFETY References, Anchoring, Foundations,
Building and Lifting Tower Rings, Moisture Equalizer Area,
Stiffeners, General Specifications



BCT Part Number Prefix Reference Chart

3201	Base Frame	3230	Plumbing
3202	Braces (Rings)	3231	Plumbing Braces
3203	Stringers (Baffles)	3232	Belt Guards
3204	Unload Components	3233	Motor Assemblies
3205	Access Doors	3234	Decals
3206	Grain Turns	3235	Profiles / Installation Dimensions and Engineering Data Drawings
3207	Augers	3237	Transition / Air Ducts
3208	Burners	3240	External Braces
3209	Entrance Doors and Stairs	3241	Centrifugal Blower Bases/Assemblies
3210	Plenum Divider	3242	Dryer Data Plates
3211	Burner Frame	3244	Discharge Auger Component (Metering Device)
3212	Suction Cool Shroud (Return Ducts)	3245	Flow Gates
3213	Air Seal	3247	Concrete Pad
3214	Dampers	3248	Anchors
3215	Vaporizer	3250	Electrical Reference / In-House Assembly Prints
3216	Roof (Outer Roof, Garner Inner Roof)	3251	Trailer Components / Assembly Hardware
3217	Motor Cover	3252	Wiring Harness
3218	Bin Switch (Option)	3254	Ship Loose / Field Installation Assembly
3219	Skin	3255	Shipping Braces
3220	All Heat / Oval Openings	3257	Module Assemblies (Lift Modules)
3221	Access Platform, Ladder and Cage	3260	Power Panel kits
3222	Leg Extension Package	3261	Control Panel/Inner Door
3223	Control Cabinet	3262	Electrical Sub Assembly Kits
3224	Electric Circuitry	3263	Emergency Cleanout
3225	Moisture Sensor Components	3264	Upper Grain Sampler
3226	Electrical Assemblies	3265	Final Assembly
3227	Fans	3266	Power Panel/Disconnect Sub-Assemblies
3228	Control Box Mounting/Electrical Brackets	3267	Control Cabinet/External Electrical Pull Sheets
3229	Conduit	3270	Moisture Equalizer

SAFETY



SAFETY First! Recognize SAFETY Information

This symbol is used throughout this Manual to identify particular stages where the bin Contractor and/or Operator need to take special note and precautions regarding the danger described in these Instructions. Please read all the SAFETY information and the instructions completely prior to beginning the construction.

This is the Safety-Alert Symbol. When you see this symbol on your equipment or in this Manual, be alert to the potential for personal injury.

Signal words **DANGER**, **WARNING**, or **CAUTION**, are used with the Safety-Alert Symbol. Be sure to follow ALL National and Local Safety Standards governing each installation site.



Understand Signal Words

DANGER indicates an imminently hazardous situation which, if not avoided, **WILL** result in death or serious injury.



WARNING indicates a potentially hazardous situation which, if not avoided, **COULD** result in death or serious injury.



CAUTION indicates a hazardous situation which, if not avoided, **MAY** result in minor or moderate injury.

ATTENTION! Dryer Contractor, Installer, Owners, Operators:
Read and follow THIS MANUAL—especially this SAFETY Section! Reading and understanding this Manual is REQUIRED before Dryer usage.

Keep this Manual in a safe, dry place where the Dryer Operator can easily obtain it for future reference. Contact your Brock Dealer to replace a Manual should it become lost or damaged.

WARNING!



Do not attach yourself to, or carry loose or dangling rope on structures near or adjacent to the Tower Dryer entry area. Loose rope or material can be suddenly sucked into the Dryer Fans (which may start automatically). This can cause equipment damage, severe personal injury or death.

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About This Manual and Supplemental Manuals

This Base Manual

The intent of this Manual is to help you follow step-by-step instructions for identification and installation of your BROCK® Commercial Tower Dryer.

IMPORTANT!

Pay particular attention to all SAFETY Information in this Manual and all Supplements.

CAUTION!



Read and understand this Manual. Failure to follow proper procedures may cause damage to equipment or personal injury.

Contact your Brock Dealer to replace this Manual should it become lost or damaged. Store it in a convenient place for easy reference.



Definition of Terms, Symbols, Measurements and Pictures

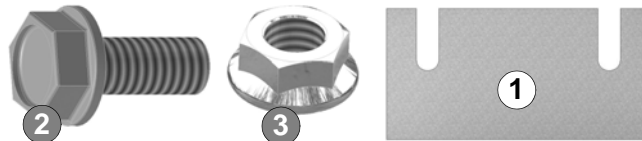
- This **Planning** Symbol is used in areas where planning needs to take place **before** assembly and/or installation can continue.
- This **Hand-Tighten-only** symbol appears next to assemblies that *must be hand-tightened*, where impact-tightening will damage the integrity of the hardware/connection.
- “Horizontal,” “vertical,” “bottom,” and “top” refer to the Dryer as it is **standing**. The symbols (") equal *inches* and (') equals *feet* in English measurements.
- Metric measurements are shown in square brackets **following** the English measurement. For example: 15' [4 572 mm] 90' [27 432 mm]



Identification of Parts and Hardware

- Names for some components which have BROCK® Part Numbers have been **capitalized** throughout this Manual to **call attention** to them.
- Parts and basic components are identified in **Figures** and their accompanying Tables as “Items” with a black number in white circle. See **Figure 1** below.
- Hardware is identified by a shaded circle and table item cell.
- Dimensions and lengths are noted with a white circle **on** an arrow or line, then identified with numeric values in a **Figure** Table.
- Pictures may vary slightly from actual components, which may have been modified for better fit or function.

There are some instances where the appearance of parts shipped may vary slightly from Manual photographs. Apply the general assembly and construction principles to the component of that Part Number shown.



Item	Part No.	Description
1	9-29702	Shim, Stiffener Base
2	2331-00004	Screw, 5/16-18 x 3/4" HWH
3	2363-00006	Nut, 5/16"-18 HWH Ser. Flange

Figure 1.
Part and Hardware Identification

Hardware Basics:

Hardware used only in **this** Manual is identified in a Usage Chart on Page 89. An 8-page Hardware Usage Chart (MFH1953) for the complete Tower Dryer (located in the Supplemental Manuals).

Plan to sub-assemble and add Hardware any parts that can be prior to installation. As a general rule, all Whiz (Flange) Nuts used on the Dryer **exterior** are **stainless steel**.

Make sure to use proper Hardware. Organize all hardware so the packages and buckets are easy to locate. When leaving for the day, remember where you are in the installation, which connections are tight, and which connections are loose.

Always have a second person check all tightening!

This **Pre-Assemble Symbol** (left) suggests that a particular assembly can be **finished ahead of time**. Plan to **sub-assemble** and add hardware any parts that can be prior to installation. Make sure to use proper hardware.



Supplemental Manuals Cover Other Tower Areas

Additional Manuals numbered 2-8 are located inside the QUANTUM® Control Box. These Supplemental Manuals divide Dryer components into easier segments for installation. They contain information and Parts Lists necessary to complete those assemblies. Refer these Manuals when they are pointed out in this Manual. The Control Box also contains the *Owner-Operator Manual*.

Part No.	Manual	Title	Contents / Description
MFH1933	1	BASE Manual (This Manual)	Overviews, General Contractor Requirements and Safety, Foundation and Anchors; Tower Body: Stringers, Screens, Moisture Equalizers, Legs and Base Frame, Wet Grain Sampler Tube
MFH1942	2	Roof Module	3216 - Inner Roof Parts Wet Grain Sampler Start Prefix 9 - Outer Roof Parts, Fillhole Platform, Roof Handrail
MFH1980			Wet Grain Sampler Installation for Tower Dryers (not shown; see Page 51)
MFH1947	3	Ladders and Walkways	Prefixes 3121, 3221, 3321 - Internal and External Walkways and Platforms Prefixes 9- and U- Inside and Outside Ladders
MFH1946	4	Plumbing and Electrical	2012, 2032 - Burner Plumbing Parts 3237 - Air Duct and Transition 2431, 3208, 3211 - Burner and Support Upper and Lower Plumbing, Control Box and Electrical
MFH1964	5	Plenum Area with Duct and Burner	3208, 3211 - Burner and Burner Profile Plates 3210 - Heat Deck (Plenum Floor) 3237 - Air Duct 3358 - Fines Recirculator 3105 - Access Doors
MFH1952	6	Blower Assembly	3241 - Blower Platform and Blower Motors/ Platforms 2483 - Centrifugal Fans 3232 - Belt Guards
MFH1943	7	Unload Module	3204 - Unload Module Parts: Unload Wheel and Discharge Hopper 3213 and 3244- Gear Reducer and Mounting 3210 - Cooling Deck, Guardrail and Bird Screens 3214 - Louvers Inner and Outer Unload Hopper
MFH1953	8	Hardware Quick-Reference Chart	Hardware pictured (approximately actual size) by diameter and usage Prefixes 2300- and 39- Parts families
MFH1944	9	Owner-Operator Manual	Start-Up Form (must be completed by the Installer), SAFETY Decal Overview and Complete Parts List Owner-Operator Warranty and maintenance information

The above Manuals are intended to organize and supplement the Installer's looseleaf binder of directions which have been used to aid in construction to date.

Brock Grain Systems makes every effort to design these Supplements for easier management of this installation. Some Supplements may be in-process; if they are referenced therein but not included in the Manual packet, reference the corresponding section in the Installer's looseleaf binder.

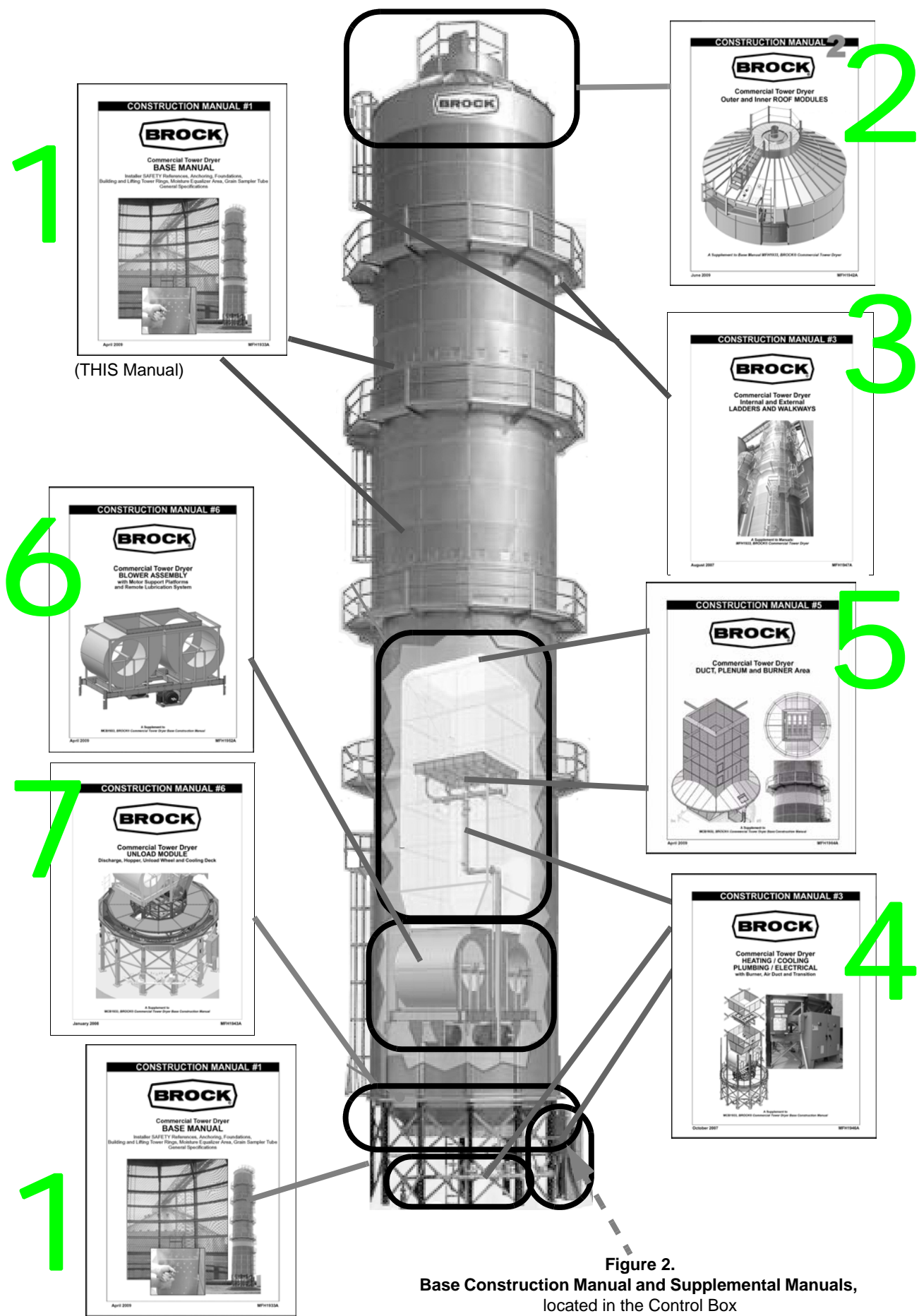


Figure 2.
Base Construction Manual and Supplemental Manuals,
located in the Control Box

Contractor/Installer Requirements and SAFETY

Dryer Installation Sites

WARNING!



Dryer installations must be done in accordance with all national, state and local codes and shall meet the National Fire Protection Association Standard 61B for the prevention of fires and explosions in grain elevators and facilities handling bulk raw agricultural commodities. All components must meet the National Fire Protection Association Standard NFPA No. 70, American National Standard Inst. ANSI-C1, as well as state and local requirements. Failure to follow these standards could result in death or serious injury.

IMPORTANT!

Qualified professionals and/or millwrights should be contacted prior to the installation to provide adequate electric power, gas and other components. BROCK Grain Systems is not responsible for these installations.

Contractor Qualification Criteria

Expect to raise 6-7 rings per work day.

One day approximate: Foundation and Roof

One day approximate: Unload construction

Construction of the BROCK® Commercial Tower Dryer is a **Commercial** installation and therefore must meet certain minimum requirements. The Contractor will receive, understand and sign the Company "Contractor Safety Guidelines" and agree to abide by them in all work performed. All employees, agents, representatives and any subcontractors engaged will be made aware of these guidelines before work starts on this Project.

The Contractor is responsible for knowing and complying with all applicable federal, state and local safety laws and regulations. The Contractor shall supply all SAFETY equipment necessary to maintain safe conditions on the worksite. The Contractor is responsible for imparting the full content of these guidelines to any subcontractors that might be used on the job.

The Contractor's SAFETY requirements include maintenance of an OSHA log, documentation of safety training, and compliance with all other applicable OSHA regulations.

The Contractor must be bonded and insured a minimum of \$1 million per occurrence; and a Certificate of such insurance must be provided for each jobsite. The same Contractor must be bonded for the amount of the project, and must provide bond documentation to the CTB Credit Department upon request.

Documented SAFETY Training of the Crew Is REQUIRED.

This documentation may be reviewed by Brock upon reasonable request. Facility SAFETY training (as required by applicable regulations and as recommended by Brock).

- Contractor's supervisory personnel shall be responsible for instructing their employees, agents, representatives, and subcontractors in the location and operation of the nearest fire alarm box, fire extinguishers, emergency phone numbers, etc.
- The project leader or supervisor assigned to the worksite will acquaint the personnel working at the worksite with emergency plans for fire or tornado, which might involve the worksite, and with the procedures which should be followed in the event of such emergencies.
- The Contractor shall immediately inform the property owner or other designated person of any emergency situation at the worksite which might endanger property or personnel.

In the event an accident occurs to one of the Contractor's personnel or one of the personnel of Contractor's subcontractors, basic first aid must be made available by the Contractor. If medical attention is not available at the worksite, Contractor must contact emergency personnel if needed. All accidents or injuries will be documented in writing in the Contractor's records. Contractor further agrees to establish and follow reasonable accident investigation reporting procedures for all worksite locations for which Contractor is engaged by the Company.

Electrical SAFETY



DANGER!



Electricity can KILL! Use extreme CAUTION around electrical components. Disconnect electrical power BEFORE inspecting or servicing the Dryer. Your Installer should have your electric company check the transformer and lead wires. Be sure the wires are an adequate gauge to carry the load of your Dryer Motors, including starting and full-load operating conditions. Failure to follow these instructions will result in death or serious injury.

IMPORTANT!

All electrical wiring must be done by a QUALIFIED ELECTRICIAN. Brock Grain Systems neither assumes responsibility for the electrical wiring used with this Dryer, nor will be liable for damage to the Dryer because of improper electrical installation or use. Improper installation or use will void the Warranty.

CAUTION!

*All SAFETY devices, including wiring of electrical devices shall be arranged to operate in a "FAIL-SAFE" manner. That is, if a power failure or failure of the device occurs, a HAZARDOUS CONDITION will not result. To prevent a hazardous condition, the machine and all associated equipment **MUST** be PREVENTED FROM RESTARTING on its own after a power failure when power returns or a jam is cleared. A MANUAL re-start is required.*

Do not install or use any method to start or restart the Dryer which bypasses factory -installed SAFETY features. Bypass of factory SAFETY controls and switches is strictly prohibited.

IMPORTANT:

To guard against electrical shock, all Dryers shall have a GROUND connection. Make sure electrical equipment and the Dryer are properly installed and GROUNDED by a qualified electrician according to the National Electrical Code and all applicable state and local codes.

IMPORTANT!**DANGER!**

Use extreme CAUTION around all electrical parts on the Dryer. Shut off, LOCK OUT and Tag out electrical power BEFORE opening removing any servicing . Keep all Guards and Covers CLOSED during Dryer operation. Failure to do so could result in death or serious injury.



IN the Event of a Dryer FIRE, act immediately!

IMPORTANT!**WARNING!****Follow a Hazardous Energy LOCKOUT Policy**

A LOCKOUT device/lockable disconnect switches must be installed on Dryer Control enclosures containing hazardous voltage wiring to prevent the Dryer from restarting during a safety check, maintenance, etc.

Contractor, its employees, agents, representatives and subcontractors shall comply with the all applicable national or State lockout and/or tag out procedures as set forth by the Occupational Health and Safety Administration. In the event that no such national or State regulations or procedures apply to a particular project or worksite, Contractor acknowledges that Contractor, its employees, agents, representatives and subcontractors will still comply with equally effective lockout and/or tag out procedure whenever work is performed on energized equipment by Contractor or its subcontractors.

Contractor shall maintain a full copy of the applicable lockout and tag out procedures for reference by personnel at all worksites at which Contractor is engaged by the Company to provide services.

Review and follow the "Electrical Connection/Disconnection Procedures for Dryer Testing" below, OSHA Lockout/Tagout regulation 1910.33(b)(2) through 1910.333(c)(2), and the "Manufacturer's Recommended Minimum Lockout/Tagout Energy Control Procedures" (Pages 91-92) in this Manual.

Fire SAFETY and Prevention

It shall be the responsibility of the Contractor to comply with the safety provisions of all national, State and local fire codes pertaining to the work contractor is engaged to perform, and the contractor shall be responsible for all damage resulting from a failure to so comply. Dispose of flammable materials safely and promptly.

ACT IMMEDIATELY at the FIRST APPEARANCE of smoke/smolder.

ACT IMMEDIATELY if there are gas FUMES or unusual noises or vibrations.

- Shut off the fuel/gas/power supply.
- Shut off any fans to eliminate air supply.
- LOCK-OUT all electrical current to the Dryer. Stop all nearby equipment.
- Introduce CO₂ or nitrogen to starve the fire of oxygen.
- Protect and move nearby moveable equipment and other combustibles. Monitor the temperature in adjacent bins and tanks.

It is the responsibility of the crew to have properly rated and operating fire extinguishers available in the event of a fire during construction. It is the responsibility of the contractor to see all crew members are properly trained in the use of such fire extinguishers.

Provide Personal Protective Equipment and Avoid Hazards

Always wear proper Personal Protective Equipment (PPE) when on the Dryer jobsite. Failure to do this could result in death or serious injury.

The Contractor is responsible for providing **Personal Protective Equipment** (or PPE, as required by applicable regulations and as recommended by Brock), and ensuring its proper use at all times on the jobsite by all the Contractor's personnel, employees, agents, representatives, and subcontractors.

Because of substantial noise of power equipment in close or enclosed spaces, require **hearing protection** around Grain Dryer installations.

Because of the DANGER of flying debris to eyes, protective eyewear/safety glasses **must** be worn during assembly, installation, maintenance or servicing of this Dryer.

This is a Commercial-class construction. Required SAFETY equipment includes, but may not be limited to: (continued)

- Safety Glasses
- Ear Plugs
- Hard Hats
- Gloves
- Safety Harnesses of Climbing
- Steel-toed construction shoes
- Other Clothing Requirements, such as headgear for welding,

Prohibit hazardous clothing from being worn on the worksite. Never wear loose-fitting clothing or flowing scarves around moving parts. Keep long hair secured. Wear suitable footwear for grain handling areas. Keep shoestrings secured.

Follow policies restricting or prohibiting jewelry (some types of rings, earrings, and body jewelry) that poses an entanglement hazard.

Avoid DANGER Inside and Outside This Tower Dryer Structure

For installations to be done inside the Dryer Roof, note that the Inner Roof angle is sixty degrees (60°) on 18' [5.5 m] models and 45 degrees on 24' [7.3 m] models. It is always advisable to have three people involved, two on the outside and one inside. When entering from above, the person in the Dryer should be secured or fastened to a safety harness (over-the-back type) with the two persons outside capable of lifting that person out without entering the Dryer.

IMPORTANT!



It is an inherent factor in a building process of this nature—that any SAFETY feature (i.e., rails) in-process will not be secure for the crew until all components of it are properly installed. Take all reasonable precautions to avoid slippage on and inside the Tower. Do not assume that any SAFETY component is secure to bear weight unless that installation is complete. Maintain an inspection system to eliminate risk to the installer AND end-user.

Never depend on a second person, either on the roof, on the ground, or any remote point to whom you shout instructions to start or stop equipment. Equipment noise can block out commands or cries for help from heights 82' -122' [25 - 37.2 m].

The element of height is central in an installation of this type. You must use all SAFETY devices and harnesses as required by national, state, and local codes and the contractor/building this Dryer.

Additional Personal SAFETY Rules

- Keep Ladders and Stepladders, Cranes and Forklifts away from live power lines.
- Face the Ladder when ascending or descending. Maintain a firm grip. Center your body between Side Rails.
- **Do not** use Ladders if you tire easily, are in poor health, are subject to fainting spells, use medicine or alcohol, or are physically handicapped /tired.
- Keep steps and rungs free from slippery material such as ice, snow, mud, grease, manure, etc. Wear slip-resistant shoes.
- Never climb a damaged Ladder. Before use, inspect the Ladder carefully for deterioration from chemicals or weather. If it is damaged or exposed to fire or damaging chemicals, replace it.
- Do not stand in the suction area of the Dryer Fans while they are in operation.
- Work alert after adequate rest. Never operate equipment if you are tired or distracted. (National occupational accident reports indicate that operators are typically getting tired and anxious to get work completed just before lunch, and between 3 pm and 5 pm. when their energy reserves are depleted). Any worker who is tired and/or under pressure increases his/her chances of having an accident. Give extra breaks and/or varied jobs to all workers.
- Never operate the Dryer or other equipment on the construction site while intoxicated or under the influence of alcohol or drugs.
- Never work alone after all other personnel have left the site. You may find yourself injured and unable to reach help or a way out.

Confined Space Policy

Contractor, its employees, agents, representatives and subcontractors shall comply with the applicable national and State regulations relating to work in confined spaces, or an equally effective procedure wherever applicable. Contractor shall maintain a full copy of the applicable work in confined space procedures for reference by personnel at all worksites at which Contractor is engaged by the Company to provide services and will be made available to contractor personnel for use or reference if requested.

Avoid DANGER During Dryer Startup Testing

DANGER!



DO NOT enter the Tower Dryer through the Manhole during the filling/unloading operation or while the Dryer is in use!

When the Dryer and auxiliary equipment are not LOCKED OUT, grain fill may start at any time without warning.

DO NOT allow the Dryer to run while any adjustments are being made. SHUT OFF, LOCKOUT and TAGOUT all electrical power BEFORE working on or near the Dryer. Keep hands, feet, hair, and clothing away from all parts in motion. Failure to shut off, LOCKOUT and TAGOUT power to the Dryer will lead to personal injury or death.

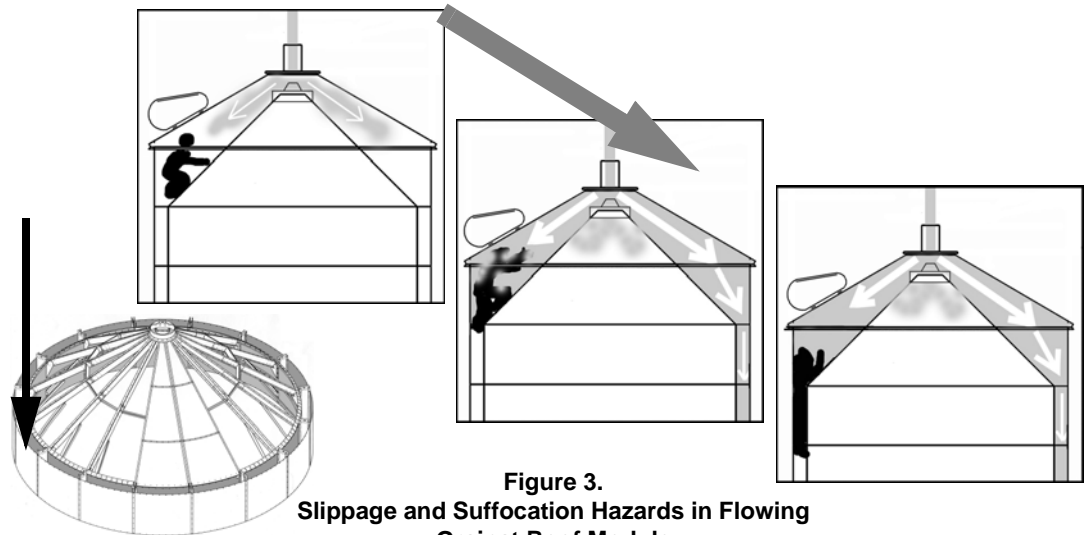


Figure 3.
Slippage and Suffocation Hazards in Flowing Grain at Roof Module

Manpower and Training / Skills Requirements

Plan an average of 7-10 days on 18' models and two weeks on 24' models.

Split the crew to work inside and outside.

A recommended crew of 6 to 8 persons (all must be legally authorized to work in the U.S.) should include:

- Designated Crew Leader who must be able to speak and read English and be proficient in all steps of Brock Commercial Tower Dryer Training, with some computer skills.
- Licensed Crane/Forklift Operators
- Licensed electrician/electrical contractor (wiring, switches, fuses or electrical machinery and equipment wiring) and 1 or 2 helpers
- Licensed millwright (could be part of crew);

Whenever cutting, welding, or conducting electrical work of any kind, a written permit must be issued and maintained at the worksite by the contractor in advance, if such a permit is required under national, State or local law or regulation. In such case, all work shall be performed in compliance with established procedures set forth in the applicable laws, regulations and/or permits.

IMPORTANT!

All plumbing and electrical wiring must be done by QUALIFIED and LICENSED ELECTRICIANS and FUEL PROVIDERS. Brock Grain Systems neither assumes responsibility for the electrical wiring and fuel installations used with this Dryer. Brock Grain Systems will NOT be liable for damage to the Dryer because of improper electrical or fuel installation or use. Improper installation or use will void the Warranty.

Basic Skills and/or Abilities of all Crew Members Should Include:

- Operation of the hydraulic jacking system, fork truck and/or crane.
- Reading and interpretation of prints (drawings)
- Installation of Stringers and Skins
- **Electrical skills** to install sensor, probes and conduit; wire motors.
- **Plumbing skills** include installation of gas piping to the pilot line and Burner.
- **QUANTUM®** Programming and initial setup. NOTE: Installing a non-BROCK® (another manufacturer's) Controller or any type Congratulate other than the QUANTUM® on this Dryer WILL VOID THE WARRANTY.

Provide Tools and Material Handling Equipment

IMPORTANT!

All electrical equipment and machinery must conform to applicable codes and be operated in a safe and proper manner.



**Figure 4.
Essential Equipment**



Primary needs include restroom facilities, electricity for installation, and a trash bin.

- Air Compressor with brush nozzle attachment
- Gas-powered generator and fuel/100' power cord and box
- Hilti® Anchor Bolts, epoxy and epoxy gun
- Masonry drill bit 340707 (supplied with the Hilti® Anchor Bolts)
- Hole brush 255785 (supplied with the Hilti® Anchor Bolts)
- Impact drills, 3/8" -14v with adapters, one per crew member
- Concrete drill
- Impact wrenches 3/8" and 1/2"
- Hand wrenches, all sizes
- Sockets, all sizes
- Pipe wrenches 1/2" to 4"
- Knockout kit or slug buster
- Drill bits, all sizes
- Concrete Drills and Bits
- Step-drill bits or vari-bit to enlarge/ream holes
- Stepladders, five (5) - 6'
- Stepladders, five (5) 4' (managing jacks)
- Stepladders, five (5) 2'
- Stepladder, one (1) 10'
- Wire cutters
- Tin snips and hole cutters
- Hammers, mallets (Blower Frame)
- Sledge hammers, 8# and 16#
- Rotary sledge hammer (for driving ground rod)
- Pry bars
- Punches, four (4) per person
- Transit for leveling of Dryer base
- Assembly and layout tables, sawhorses
- Lifting Straps (Different for 18' and 24')
- Come-a-longs and hoists (6)
- Crane or Forklift, extending reach with boom:
Minimum 6000 pounds for 18'; minimum 8000 pounds for 24'
- Caulk, 1-2 tubes gutter and flashing-type for trough and roof
- Bainter Jacks, as required for installation, with means to transport them
- Crew trucks must have miscellaneous fasteners/fittings inventory
- Greenlee hole cutter
- Sandpaper
- Paint: alkyd gloss industrial enamel safety yellow
- Paint: rustproof primer for pipes
- Oil can
- Grease gun (for lube tube)
- Scrubs for grease
- Fire extinguisher
- Vacuum and push broom for cleanup
- Magnets for hardware cleanup
- Pipe bender and pipe threading stand
- Rigid pipe threaders all sizes 1/2" through 2"
- Pipe dope
- Grinder for field-cutting
- Safety harnesses, over-the back type
- Caulk guns
- Mini-torch to solder electrical boxes
- Low-rolling carts, two (2)
- Levels: 6", torpedo, and magnetic
- Shovel
- Chains for jacks and lifting
- Transit for leveling base
- Cardboard as paint guards
- Tape measures, one per crew member
- Laser level



Housekeeping

The Contractor shall be responsible for keeping the worksite clear of debris and keeping it clean so there is no hazard to the safety of individuals at the worksite. All waste material shall be removed in accordance with established procedures and good housekeeping practices. The project leader or shift supervisor will monitor the adequacy of worksite housekeeping. Large shipping crates can be recycled as dumpsters. Remember to recycle cardboard as paint guards.

WARNING!



Inventory all tools and pieces of hardware near the Dryer during installation or servicing. Leaving these items inside in the Dryer could cause damage or injury. Inventory all tools at the end of each work day.

Contractor/Installer Responsibility to the Customer/Owner

Proper Installations Protect Lives, Property and the Dryer Warranty

Damage to a Dryer can occur due to improper **installations**. This Dryer is designed and built with SAFETY features. Under no circumstances shall the SAFETY characteristics of this Dryer be altered. Use **all hardware specified** in the instructions. Make no substitutions.

IMPORTANT!

Improper installation of electrical or fuel sources will void the Warranty on the BROCK® Dryer and may cause death or serious injury. Installing any non-BROCK® (another manufacturer's) components to this Dryer WILL VOID THE WARRANTY.

DANGER!



DO NOT use tanks for liquid propane (LP) that have been used for anhydrous ammonia! This includes previously purged tanks that have been used for anhydrous. Gas train components may be damaged, causing a Dryer malfunction which could lead to serious SAFETY hazards and/or fire, and loss of life and/or property.

IMPORTANT!

Installing any tank (for an LP fuel supply to the Dryer) which has previously been used for anhydrous ammonia poses a safety threat. Brock Grain Systems will not be held liable for any purging and cleaning methods used for such tanks. If such a tank is used, this will void the Dryer Warranty.

CAUTION!



Service and program the computer component properly. Installing a non-BROCK® (another manufacturer's) Controller or any type Controller other than the QUANTUM® on this Dryer WILL VOID THE WARRANTY.

It is the responsibility of the Contractor, Installer, Owner and Operator to supplement the Dryer furnished by Brock with any necessary ELECTRICAL or STRUCTURAL items to make the Dryer installation comply with the National Electric Code, National Electric Safety Code, OSHA, and all other applicable federal, state and local laws and ordinances. Follow recommended precautions and safe operating practices of national and local codes at each installation site.

Do not modify or attach any other equipment (to the Dryer) that is not reviewed and approved by a qualified and appointed Brock representative. DO NOT take shortcuts or bypasses in installation by using electrical tape instead of proper means. DO NOT remove any SAFETY devices installed on the Dryer.

Train Dryer Operators Properly

It is the **responsibility** of the Contractors, Installers, Operators, Owners and Supervisors to:

- **Read and follow** this Manual, SAFETY instructions, and SAFETY Decals and procedures herein
- **Make the above known** to all who work with the equipment or be in the working area
- **Read and follow** the SAFETY procedures and Decals in your Manuals to **supplemental equipment** and accessories
- **Know** and observe proper grain industry operating precautions, practices and requirements to comply with all federal, state and local laws and ordinances and applicable safety codes.

DANGER!



This Grain Dryer is operated by AUTOMATIC CONTROLS that drive high-speed fans and rotating parts, high voltages, burners, moving augers, and other hazardous components. The Dryer may start without warning. Work around Dryers with extreme CAUTION! DO NOT OPERATE the Dryer with Guards off. Failure to follow these instructions could result in death or serious injury. Failure to follow proper operational procedures will cause damage to equipment and/or death or personal injury.

(continued)

Train Dryer Operators Properly (continued)**DANGER!**

KEEP HANDS, LIMBS, and ALL PARTS OF YOUR BODY AWAY from Dryer parts and openings when the Dryer is running. Severe personal injury will result if equipment is operated without Guards properly installed/latched. Do not operate the Dryer unless all SAFETY devices and Guards are in place. If the Dryer is to be opened for inspection, cleaning or observation, all Dryer power is shut off and **LOCKED OUT** so the Dryer **CANNOT** be restarted by anyone remote from the area. Failure to follow this instruction will result in death or serious injury.

Use CAUTION When Servicing Exposed Parts!

DANGER!

Electricity can KILL! Moving parts, fires, and explosions can KILL!

Use extreme **CAUTION** around electrical, mechanical and plumbing components of this Dryer.

Always shut off, disconnect and **LOCK OUT/TAG OUT** all power before adjusting, inspecting servicing, or cleaning, repairing, unclogging, collecting grain samples, doing any maintenance on the Dryer or opening it in any way.

DANGER!

Electricity can kill! Startup inspections MUST be done with the MAIN POWER LOCKED OUT and TAGGED OUT. Failure to follow these instructions will result in serious injury or death.

IMPORTANT!

With **MAIN POWER LOCKED OUT** and **TAGGED OUT**, and with **NO VOLTAGE** detected, inspect electrical controls and wire connections for tightness.

Review and follow the "Electrical Connection/Disconnection Procedures for Dryer Testing" below, OSHA Lockout/Tagout regulation 1910.33(b)(2) through 1910.333(c)(2), and the "Manufacturer's Recommended Minimum Lockout/Tagout Energy Control Procedures" (Pages 91-92) in this Manual.

If testing instructions specifically state otherwise or if power must be on to check voltage, or use extreme **CAUTION**.

Failure to follow these instructions will result in death or serious injury.

- **Never enter a Dryer while in operation.** Be sure all safety Doors are functioning properly to shut down power if they are open.
- **Never enter a Dryer that has automatic unloading equipment without LOCKING OUT** the control circuit.
- Inspect wiring, cords, plugs, tools and equipment for obvious external damage. Watch for shorts and sparks in fittings, or loose wiring.

DANGER!

Use extreme CAUTION around electrical components. Shut off, LOCK OUT and Tag out electrical power BEFORE opening the AC Control Box for service. Keep the Door CLOSED during Dryer operation. Failure to do so could result in death or serious injury.

The AC Drive must be grounded.

DANGER!

It is very important with an AC Drive to WAIT for capacitors to discharge stored electrical energy BEFORE any service is begun on the Drive. If a capacitor explodes, there will be a shotgun-like blast. The danger of a capacitor explosion is similar to that of an arc flash. WAIT at least fifteen (15) minutes for the energy to dissipate from the capacitors. VERIFY THAT NO VOLTAGE IS PRESENT before proceeding. Failure to observe this instruction will result in death or serious injury.

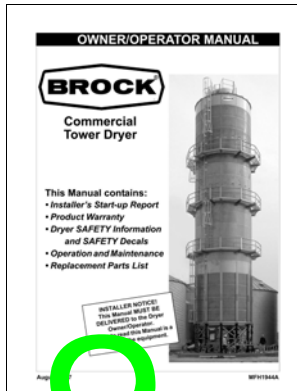
DANGER!

Use extreme CAUTION around electrical components, including the Service Disconnect Box. Shut off, LOCK OUT and tag out electrical power BEFORE opening or servicing any electrical control boxes or motors. Failure to do so could result in death or serious injury.

The Installer Will Need the Owner-Operator Manual for Final Startup Testing

It is the Installer's responsibility to see that the Owner/Operator Manual is delivered to the Customer with the Warranty Validation/Start-up Report inside completed.

Figure 5.
BCT Owner's Manual
MFH1944
located in the Control Box



SAFETY Decal
Overview Page



This **final test** (less grain and with grain) and release of equipment to the Dryer Owner—is outlined in more detail in the **Owner/Operator Manual** on the **Warranty Validation /Startup Report Form**, which needs to be completed for the Customer. This test includes areas such as:

Dry Start-up

Inspect the total **outside** of the Dryer: checking for, but not limited to: tightness on hardware, screens, sensors, wiring/proper voltage, motor and fan rotation, conduit and sealite, safety platforms/ladders and safety cages, the unload system. Check the anchoring to the concrete pad. Check gas plumbing for supply and leaks.

Inspect the total **inside** of the Dryer the same as above, removing all foreign material and checking the following systems:

- Start Fans and check direction.
- start unload and check direction and smoothness of operation.
- Test-fire the Burner.
- Inspect the Fill Switch.
- Inspect program settings for QUANTUM® Controller, including AC Drive and soft starts.

Start-up with Grain

Make the same checks as above, including an inspection of Burner temperature, Wet and Dry Grain Samplers, and auxiliary fill and unload equipment interlocks when running.

The Owner-Operator Manual also contains a description of ALL SAFETY DECALS and their location.

Along with the Dryer shipment will be DANGER, WARNING and CAUTION Decals which must be placed on the Dryer to insure safe and proper use of the product.

SAFETY Decals to be installed in the field are in a package in the Control Box. Supplemental Manuals describe SAFETY Decal applications for their particular areas. There is a complete list of BCT Decals in the back of this Manual on Page 89. The Owner-Operator Manual contains a complete pictorial location and description of all SAFETY Decals as factory- and field-installed.

Keep SAFETY Decals clean and grease-free; install them in areas specified **at the end** of the installations, so Decals will not be damaged. Keep extra Decals on hand.

Confirm that all SAFETY Decals are in place and secure **BEFORE** operating the Dryer.

IMPORTANT!

Never release equipment as complete if Decals are missing, improperly placed, damaged or altered. If the SAFETY Decals are not properly placed or if they are in any way damaged or altered, call the Manufacturer for immediate replacement. Do not remove any SAFETY Decals unless they are being replaced with proper Decals.

Site Planning and Preparation

IMPORTANT!

Always follow all national, state and local building codes for such grain facility structures when building the BCT. Check distances to comply with minimum clearances from other structures.

Dryer Location and Layout

Plan your layout to with the following considerations in mind. Leave space for future equipment. A minimum of eight (8') feet [2.438 m] should be maintained between the Dryer and driveways or between the Dryer and the nearest combustible / storage structures.

Plumbing must be right or left of the Blower, not on the ends. Write on the Foundation where the plumbing pipes must exit through Leg Weldments. Write where the Unload is.

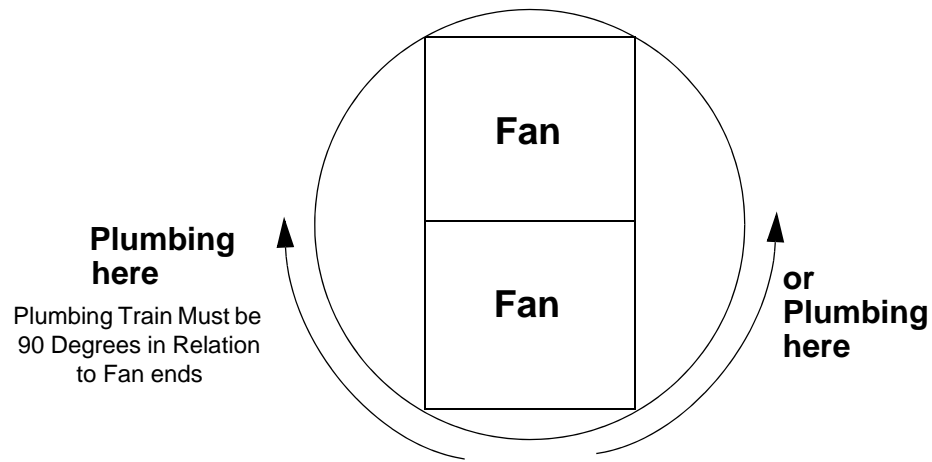


Figure 6.
BCT Top View Diagram



Figure 7.
Left: BROCK® MEYER® Tower Dryer
Right: BROCK® BCT Dryer 18'
(construction)

Foundation Requirements

IMPORTANT!

The Dryer *MUST* be mounted on a level concrete foundation which meets all requirements of applicable IBC standards and ACI codes.

The Dryer must be properly anchored to avoid damage in excessive winds.

Foundation Drawings are supplied for 90 and 120 mph wind load regions and are based on 3000 psf soil bearing. Other conditions or local building codes may require additional foundation design work for your particular installation. The diameter of the Brock-designed foundation is a minimum diameter requirement. Consult Brock for any foundation design that may be smaller than this diameter.

Refer to the 11" x 17" **Foundation Drawing**¹ for your model BCT Dryer. Use these figures to position the Dryer Leg Anchor Bolts. All Models are based on these specifications:

- Peak Load: 5000 LBF
- Grain density: 48 pcf
- Roof Live Load: 17.1 psf
- Ground Snow Load: 40 psf

Drawings reproduced here on Pages 18-21 are included for documentation purposes and are not intended to take the place of the large Foundation prints generated for your particular installation.

General Notes

1. Installation to comply with all applicable *2006 IBC Standards* and ACI Codes adopted by reference therein.
2. Foundation design based on 3000 psf soil bearing. It is the Owner's responsibility to ensure that this allowable bearing pressure exists at the site.
3. Concrete compressive strength to be 3000 psi at 28 days.
4. The Foundation shall bear at or below the local frost depth, if necessary. The Footing depth may be increased beyond that shown. In lieu of increasing the Footing depth, the Footing may bear on a frost-free base that extends to or below the frost depth. The frost-free base shall consist of 8" lifts of free draining granular fill compacted to 98% of the maximum dry density as obtained by the *Standard Proctor Compaction Test* (ASTM D698).
5. Reinforcing Bars shall comply with ASTM A615 Grade 40. Woven wire fabric shall comply with ASTM A185.
6. Splices in reinforcing steel shall have a lap length of 27" [68.6 cm] for #5 bar and 21" [53.3 cm] for #4 bar.
7. Approximate material quantities as follows: Steel quantities include a 10% overage for laps. Select either #4 Rebar or WWF6x6—W6.5xW6.5 for slab reinforcement, but not both.

Model	BCT3000-3500		BCT4000-4700		BCT5000-7000	
wind load mph-exposure	90-C	120-C	90-C	120-C	90-C	120-C
Lbs uplift per leg	5,650	11,310	15,720	27,800	7,660	18,020
Lbs shear per leg	1,970	2,090	2,460	2,930	2,800	3,150
foundation dia	24' 0"	24' 0"	24' 0"	24' 0"	30' 0"	30' 0"
foundation thickness	1' 11"	3' 0"	3' 10"	5' 8"	2' 3"	4' 9"
foundation width	6' 0"	6' 0"	6' 0"	6' 0"	6' 0"	6' 0"
Yds of concrete	27	40	51	74	43	85
Lbs of rebar	1,240	1,765	2,250	3,310	2,305	3,545
Bolt circle	18' 1 5/8"		18' 1 5/8"		24' 1 7/16"	

1. Based on load conditions (2006 IBC), U.S. only; if outside the U.S., these standards must be followed in addition to any and all national, state/provincial, and local engineering codes, as long as the resulting installation meets at least the minimum requirements set forth in these specifications.

90 MPH Wind Loads

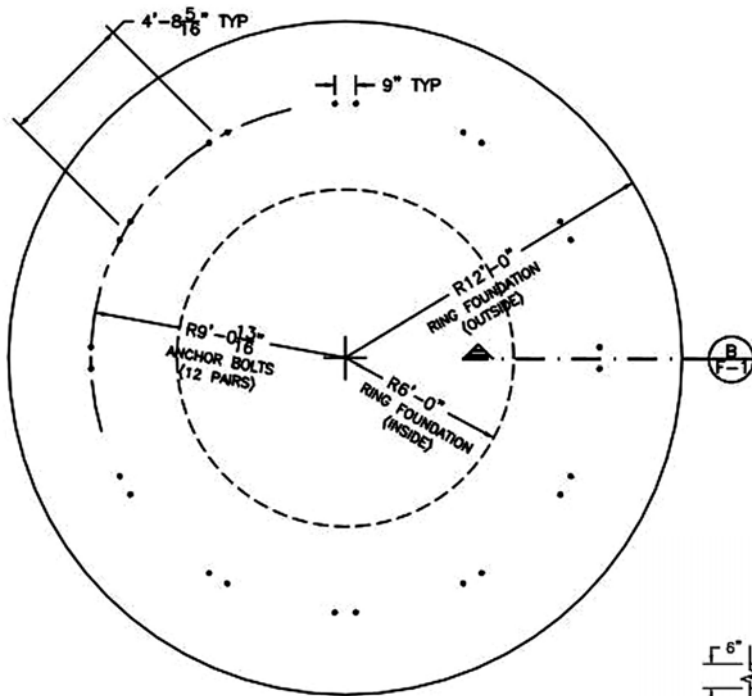


Figure 8.
3000-3500 BCT Foundation
at 90-C Wind Load

3000-3500 at 90-C Wind Load

Description	Requirements
WWF6x6—W6.5xW6.5	440 pounds
#4 Rebar (Footing)	640 pounds
#4 Rebar (Slab)	440 pounds
#5 Rebar (Footing)	160 pounds
Concrete	27 cu yd

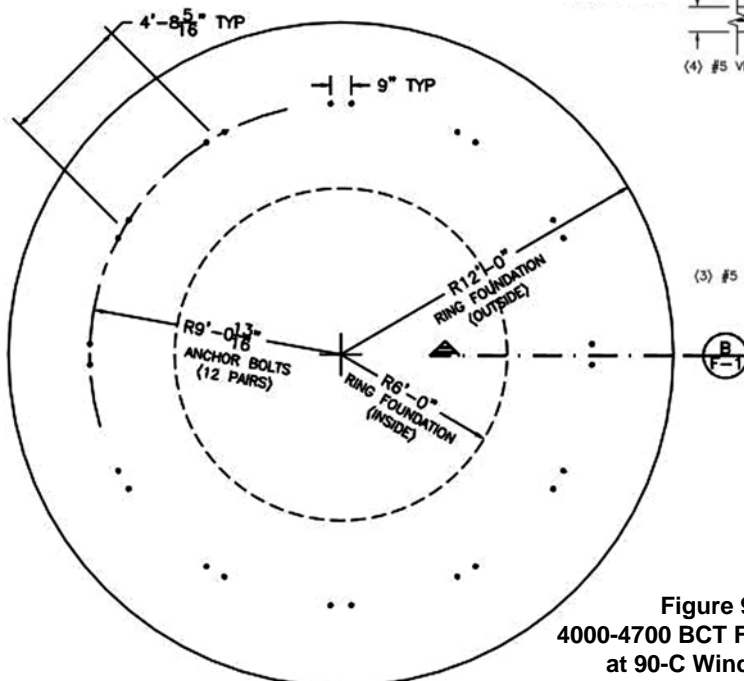
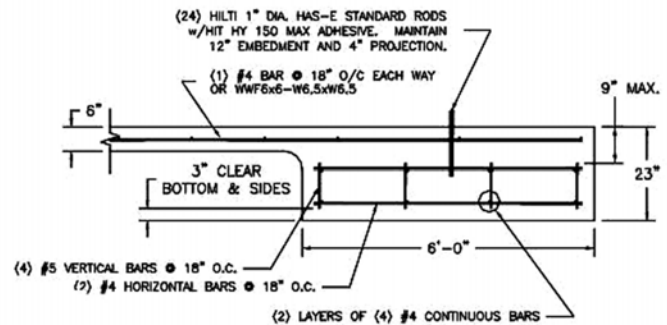
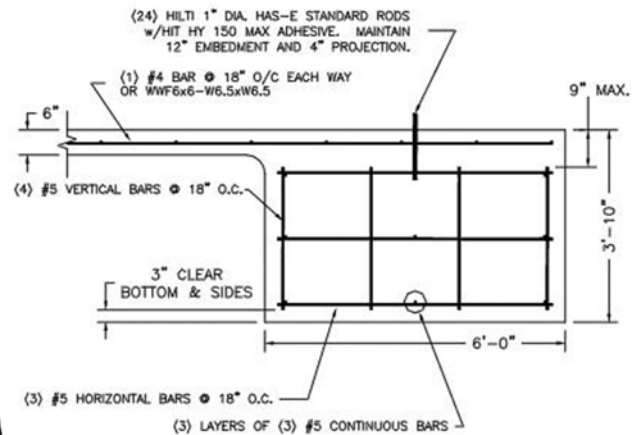


Figure 9.
4000-4700 BCT Foundation
at 90-C Wind Load



4000-4700 at 90-C Wind Load

Description	Requirements
WWF6x6—W6.5xW6.5	440 pounds
#4 Rebar	450 pounds
#5 Rebar	1800 pounds
Concrete	51 cu yd

90 MPH Wind Loads

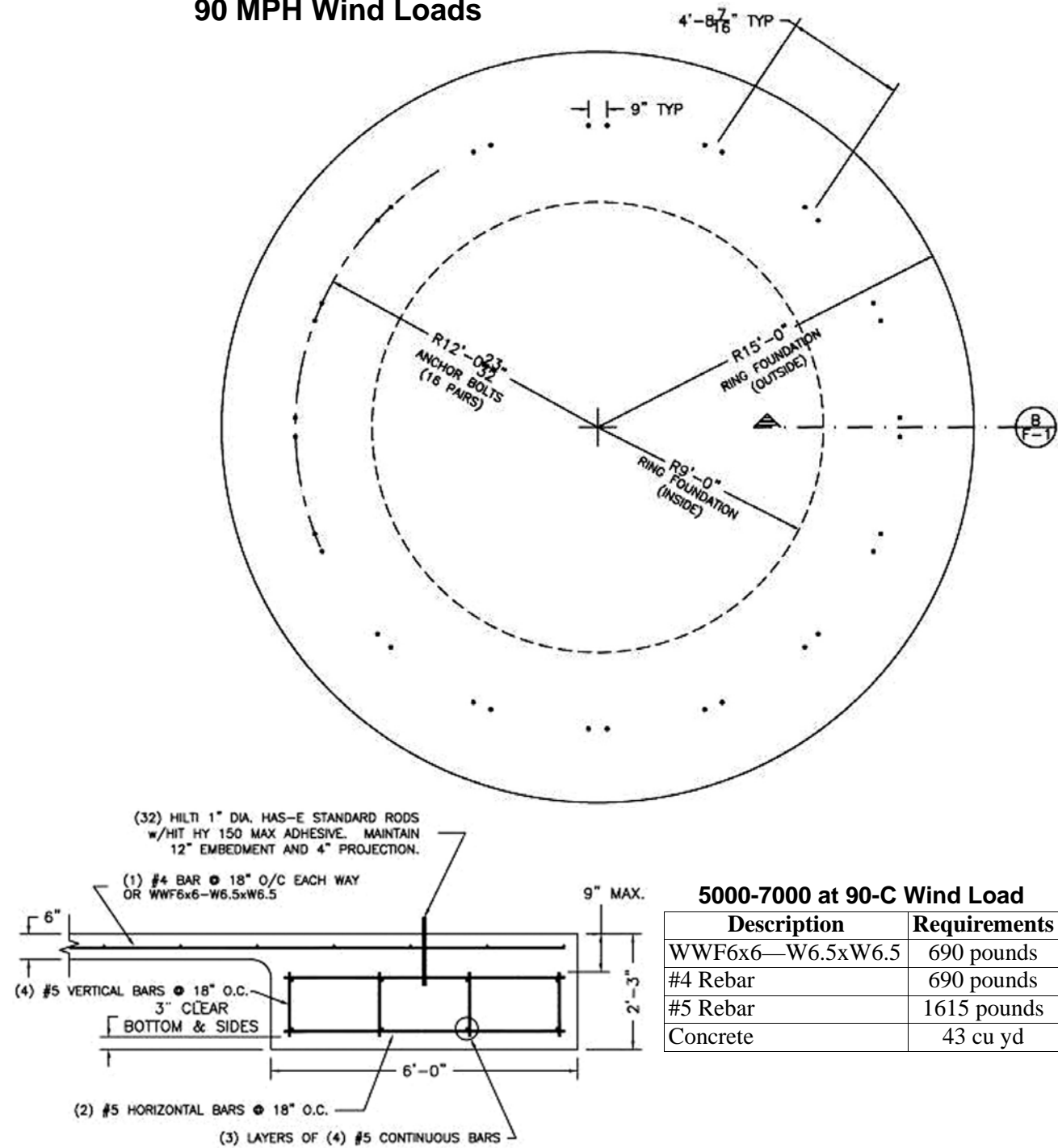


Figure 10.
5000-7000 BCT Foundation
at 90-C Wind Load

120 MPH Wind Loads

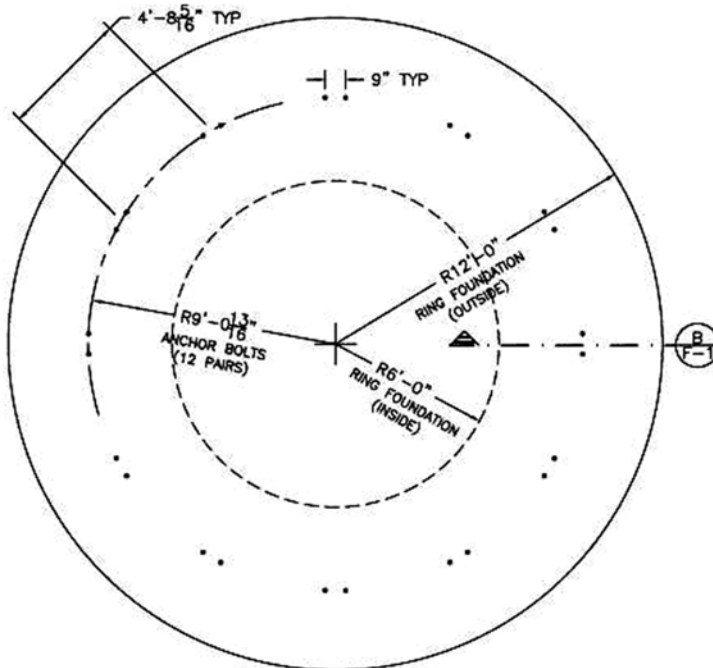


Figure 11.
3000-3500 BCT Foundation
at 120-C Wind Load

3000-3500 at 120-C Wind Load

Description	Requirements
WWF6x6—W6.5xW6.5	440 pounds
#4 Rebar (Footing)	460 pounds
#4 Rebar (Slab)	440 pounds
#5 Rebar (Footing)	865 pounds
Concrete	40 cu yd

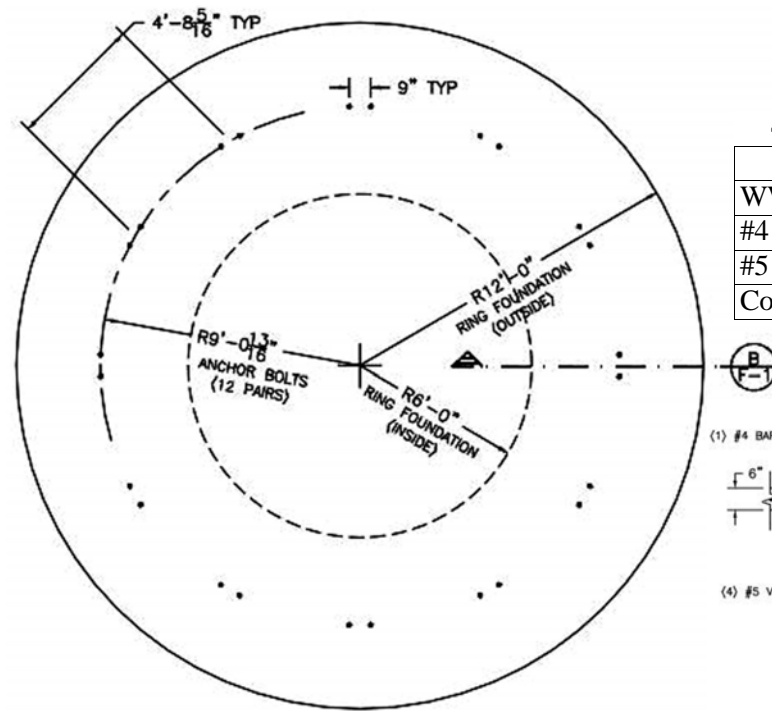
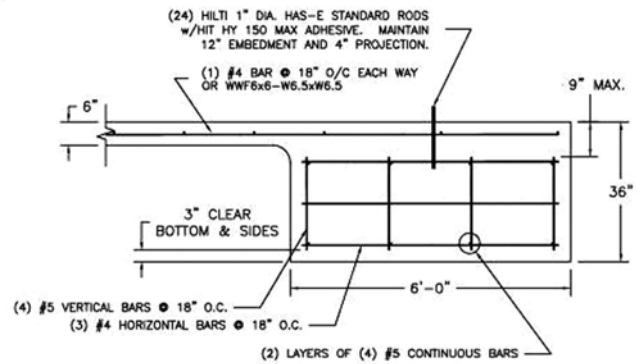
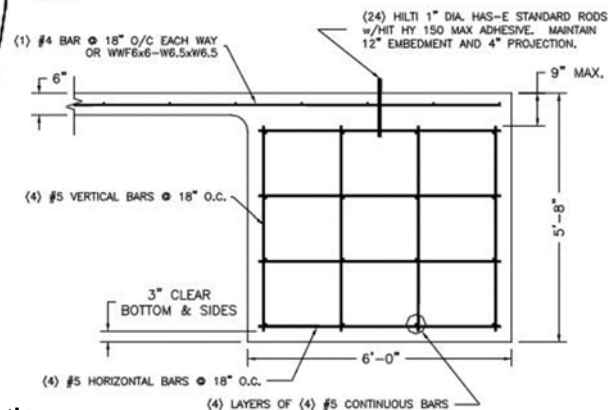


Figure 12.
4000-4700 BCT Foundation
at 120-C Wind Load

4000-4700 at 120-C Wind Load

Description	Requirements
WWF6x6—W6.5xW6.5	440 pounds
#4 Rebar	450 pounds
#5 Rebar	2860 pounds
Concrete	74 cu yd



120 MPH Wind Loads

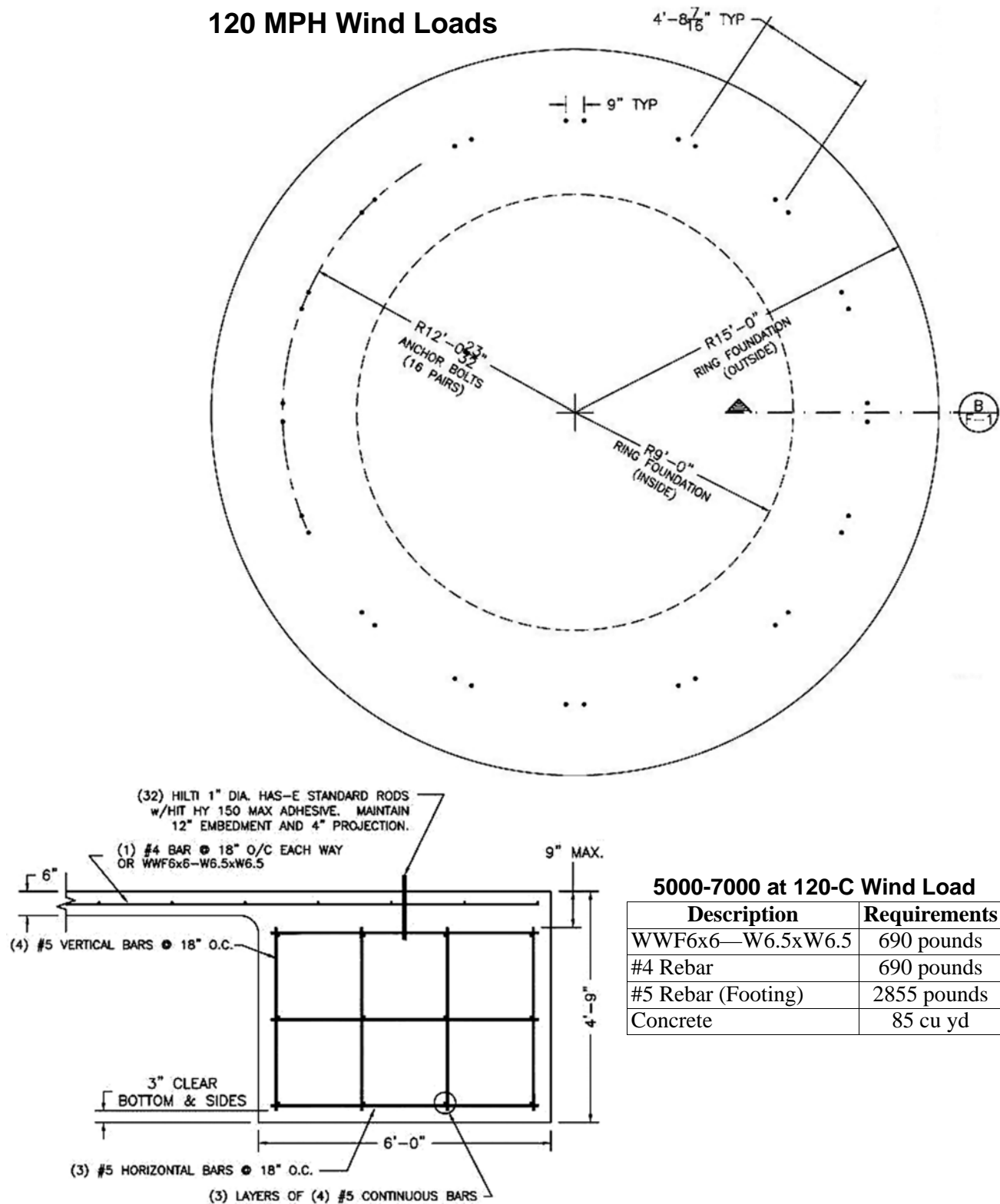


Figure 13.
5000-7000 BCT Foundation
at 120-C Wind Load

Delivery and Management of the Shipment

Unloading and Job Site Layout

Domestic (U.S.) loads will arrive in two trucks for 18' models, or three trucks for 24' models. The Centrifugal Fans and Fan Base are shipped unassembled. The Maxon Burner is shipped factory-assembled to its frame, ready to connect to the Air Duct. Watch for shifting loads when unloading. Use hand carts for smaller items.



Figure 14.
Unload Trucks with Care



Take care not to bend lighter-gauge items like Ladders and Screen Panels.



Figure 15.
Unload Ladders with Care

CAUTION!



Carefully unload trucks. Manage WEIGHTS with care. DO NOT stand under heavy items. DO NOT overload the forklift or crane for its maximum rated weight capacity. To avoid damage, use care with unloading the Electrical Cabinet, Burner, Blowers, Motors, and other heavy or fragile parts!



Figure 16.
Manage Weights and Fragile Items



Check Delivery

The BCT Dryer is made up of many parts and checked carefully at the time of shipment. However, use the packing slip and check your shipment on arrival to be sure it is complete. Always check the packing lists for location of parts. Some parts may be dropped-shipped in some locales. In the event of shortages, call Brock at 1-800-541-7900.

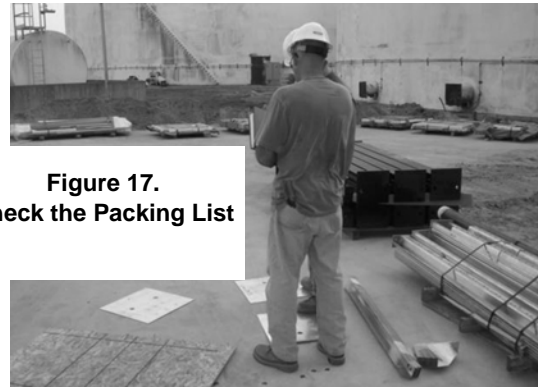


Figure 17.
Check the Packing List

Stage the Material in Secure Areas

Identify Parts to be used on Main Tower.

Identify parts to be used in major assemblies to be carried into the Tower (Blower Frame, Motor Platforms, Gear Reducer), and locate those in a different area outside the Tower (if space permits).



Stage the material for easy access and assembly. Stage material (that will be used first) close to the assembly area. Use wood blocks, and disassemble crates to make new platforms so that material is not directly on the ground.

Figure 18.
Stage the Material



IMPORTANT!

How to control “Wet Storage Stain” (RUST!) on galvanized Sheets: Do not permit moisture from weather, condensation, or other sources to remain between sheets. If moisture is present, separate Sheets IMMEDIATELY for good air circulation. Where possible, store sheets in a warm, dry place. Where possible, store all Dryer components in a warm, dry place away from contaminants such as fertilizer, chemicals and road salt. If this is not done, white/red rust will appear.

Paper covers on Decals (BROCK® Decals on the Garner Ring, and the paper over the Control Box glass cover) help prevent damage to the Decal during construction. However, the paper may be difficult to remove if left in direct sunlight for several hours.

Overall Construction Steps

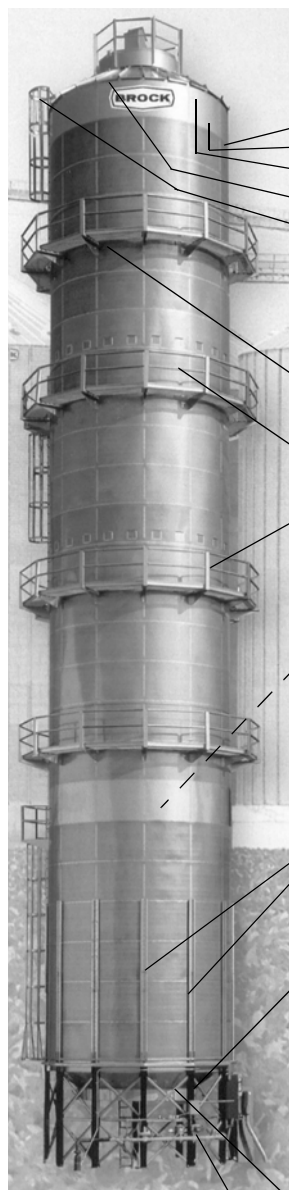


Figure 19.
Tower Overview
(Exterior, 18')

Building Tower walls can begin as soon as the Stub Leg Fixtures and Hydraulic Jacks are secured to Anchor Bolts. The Outer Roof can be assembled at this time outside the pad.

Build the **Starter Ring** and **Tower Roundness Assembly**. See Pages 48-54.
Build and attach the **Inner Roof** to the Starter Ring Inner Screens. See Manual #2.
Build the **Solid Garner Ring** outside and above the Starter Ring. See Page 50.
Crane the **Outer Roof** (built separately) to the top rings and attach it to the Tower.
Build the **Eave Platform**. See Manual #3.
Begin lifting the Tower with jacks, and assemble the following continually as the Tower is raised:

- Wet Grain Sampler Tube (Page 51).
- Electrical Conduit: See Manual #4.
- Inner and Outer Catwalks, Ladders and Safety Cages. See Manual #3.

Install Moisture Equalizers at the proper levels: See Pages 56-60.

Continue raising rings to the Plenum Level. See Page 61 and Manual #5.

- Build the Air Duct (with Ladders/Platforms) and Plenum Floor.
- Raise the Burner into the Air Duct.
- Begin the Burner electrical and Upper Plumbing.

Continue raising rings until you reach the bottom four (4) Stiffened Rings.

Install Stiffeners (Pages 62-65).

Install the Support Structure below the bottom Stiffened rings (Pages 66-81).

- Install Upper Leg Weldments (Page 70).
- Install the Base Frame (Pages 71-74).
- Install the Base Roundness Fixture and Leg X-Braces (Pages 75-78).
- Install Lower Leg Weldments and Bracing (Pages 78-79).

Remove jacks and move four inside the Tower (Page 82).

Build the Blower Assembly and raise it inside the Tower. See Page 83 and Manual #6.

Install the Hopper and Unload Ring. See Page 83 and Manual #7.

Install the Cooling Floor and Handrails. See Page 83 and Manual #7.

Install the Blower Remote Lube system. Return to Manual #6.

Complete the Lower Plumbing and electrical. See Manual #4.

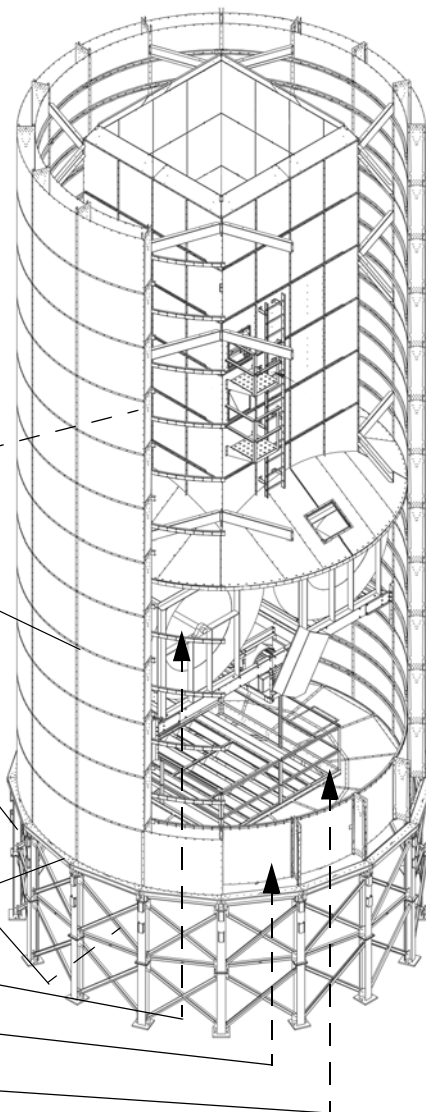


Figure 20.
Tower Overview
(Interior, 24')

There are common assemblies on the Tower that vary in location according to Dryer Model. Check diagrams in the Supplemental Manuals for placement of Service Platforms/Catwalks, Ladders, Moisture Equalizers and Access Doors. Many of these parts can be pre-assembled:

- Screen, Bolts on the bottom edge; and Stringers, Grade 8 Tap Bolts;
- Cleanout Pull-doors and Door Retainers on the Tower and Hopper
- Fan Motor Turnbuckle Bolts
- Handles on Duct/Access Doors
- Grain Stops to Wheel back wall
- Trough Covers Decals and Latches
- Cage Hoop Halves, Catwalk Arms, Catwalk Gates
- Plenum Port Cleanouts
- Unload chute (4 pieces)



Build the OUTER ROOF Outside the Concrete Pad

While the Dryer Foundation is being prepared (see the next section), use part of the crew members to assemble the Outer Roof on a level area close to the concrete pad. As soon as the first two Rings (Starter and Garner Rings) are built on the Stub Leg Fixtures, the Outer Roof will need to be ready to lift onto the Tower. Follow the instructions in Manual Supplement **TWO** (MFH1942). This Roof Manual and other Supplemental Manuals are located inside the QUANTUM® Control Box.

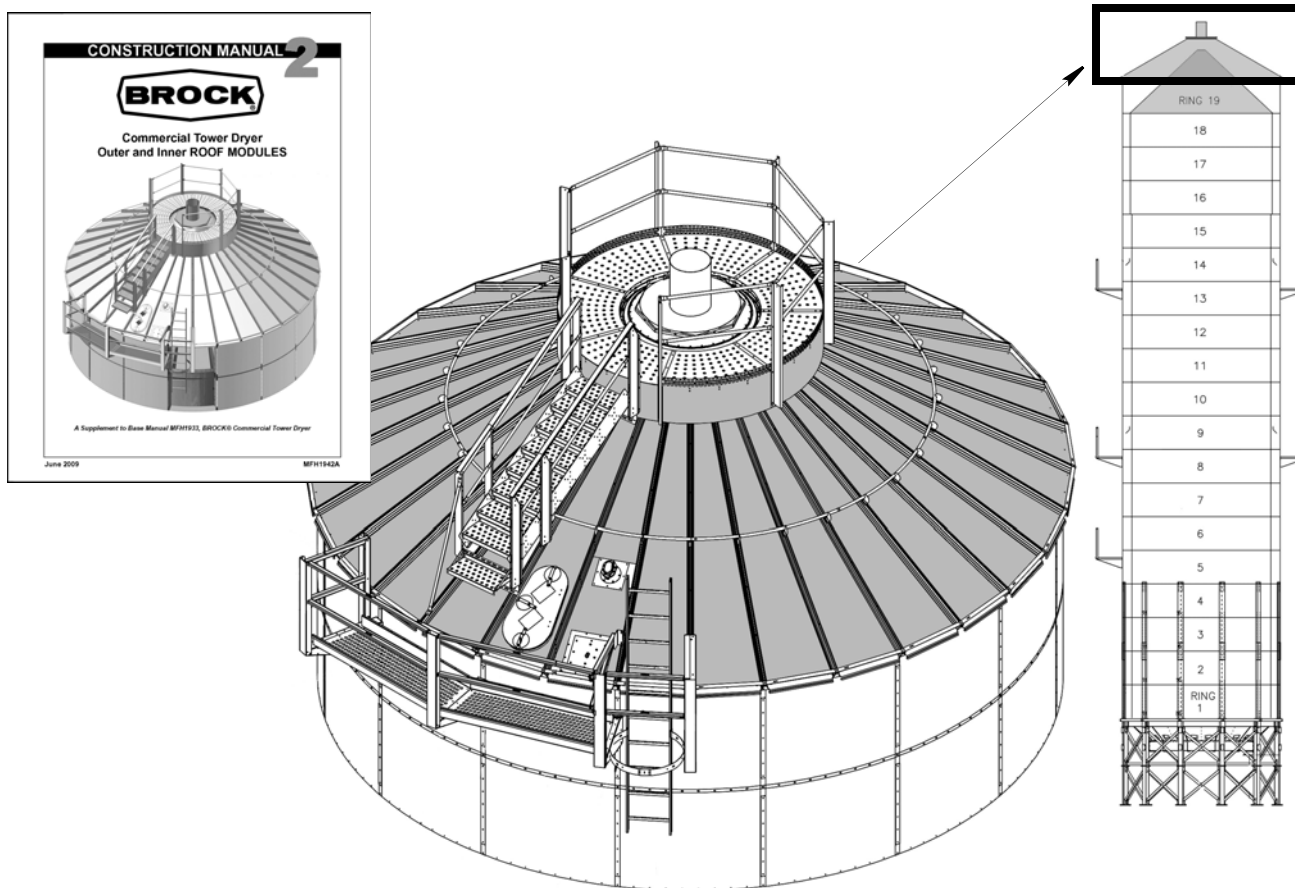


Figure 21.
Roof Module Supplement (TWO)
MFH1942

Anchor Bolts to the Concrete Pad

IMPORTANT!

To minimize damage from high winds, the Dryer must be firmly anchored to the foundation.



Level the Pad

Check for Pad levelness. Correct any variations by placing one or more Base Shims (3208-00018) where needed.

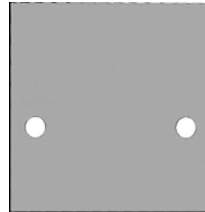


Figure 22.
Shim (above) the Pad
to Level



Create Anchor Bolt Locations



Figure 23.
Locate Holes with Templates

Locate and mark the center of the concrete pad.

Anchor Bolt locations must be carefully measured, marked and drilled for:

- Leg locations, where lifting jigs will be bolted until the structure is almost complete and the Leg Weldments are installed in place of the jigs; and
- Hydraulic jack bolt locations outside the Leg locations, which will support the weight of the structure until the Legs are installed.

Use Concrete Drilling Templates

The V-shaped **Anchor Bolt Drilling Template** locates Anchor Bolt locations precisely. The **Jack-to-Leg Drilling Template** bolts to the Anchor Bolt Template so that holes for the hydraulic jack bases can be drilled at the same time the Anchor Bolt holes are being drilled. This ensures correct measurements in the relationship of all the holes to each other.

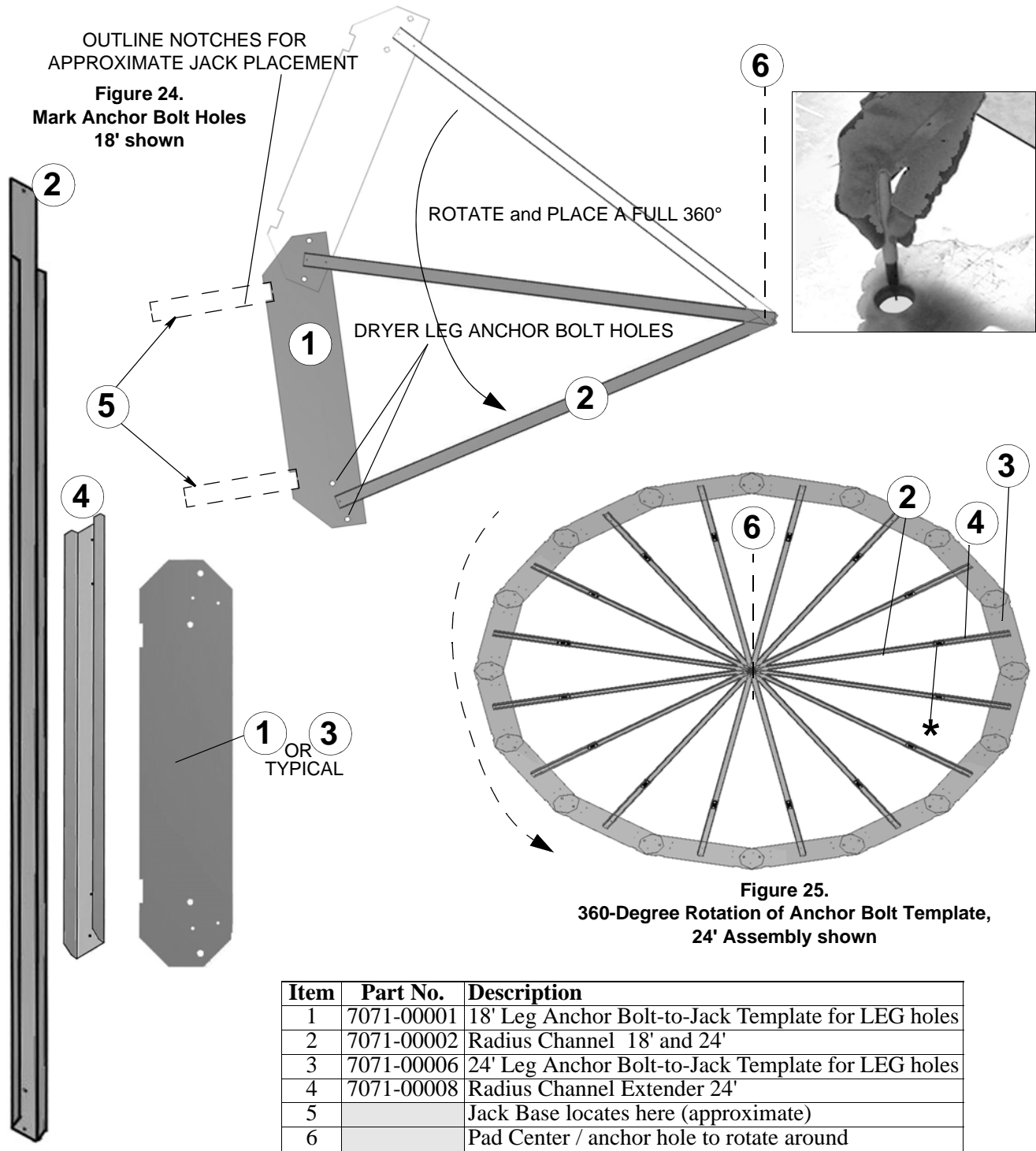
Check Bolt Circles

Models 3000 - 4700: 18' - 1 5/8"
[552.77 cm]

Models 5000 - 7000: 24' - 1 7/16"
[735.16 cm]

Mark and Drill Anchor Bolt and Jack Holes

Using a 3/8" dia. Bolt, bolt the V-point of the **Leg Bolt Drilling Template** to the center of the pad so the Template will rotate freely around the pad. Using the Template as a guide, lift and move the end plate to rotate it around the pad 360 degrees and mark all Anchor Bolt holes. Drill down through the Template. Mark/outline the outer pair of notches carefully, as this is where Jack bases will be positioned. Take extreme care in the measuring process. Move the Template out of the way to move Jacks into position. 18' models use Channel 7071-00002 (Item 2) and Plate 7071-00001 (Item 1), which bolt together. Use Item 1 for Leg and Jack Bolt Placement. 24' models also use Channel 7071-00002 (Item 2), with an additional *bolted-on Radius Extender (Item 4). Bolt on Plate 7071-00006 (Item 3) for Leg and Jack Bolt Placement.



Install Anchor Bolts

The Anchor Bolt manufacturer recommends drilling Anchor Bolt holes with a carbide bit.

1. Mark a depth of 12" on the 1 1/16" x 21" TE-YX masonry drill bit 340707 (supplied with the Hilti® Anchor Bolts), to see when drill depth has been reached.

2. **Drill the holes where they have been marked with the Anchor Bolt Template.**

3. **Blow and brush the holes out clean with an air compressor.**

Use hole brush 255785 or 255784 supplied with the Hilti® Anchor Bolts. Insert the air nozzle to the bottom of each hole at least three (3) times and blow out all dust and debris from the hole using compressed air. Clean the hole with a wire brush at least three (3) times. Proper cleaning is essential.

Once again, insert the air nozzle to the bottom of the hole and blow out any remaining dust and debris.



Figure 26.
Drill Anchor Bolt Holes

The approved Anchor Bolt for the BROCK® Commercial Tower Dryer is the carbon steel threaded Hilti® Anchor # 333212 (BCT Part No. 3248-00002). The Bolt includes two (2) 1 x 16" zinc-plated, threaded rods; two (2) Hex Nuts 1"-8; and two (2) Flat Washers with 1" inside diameter. The Bolts are installed using a Dispenser 229154 and Extension 63993 provided by the Manufacturer.

IMPORTANT! *Remove the Washer and Nut from each Anchor Bolt before use.*

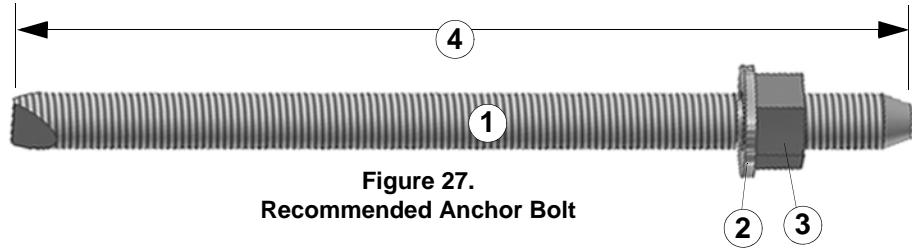


Figure 27.
Recommended Anchor Bolt

Discard at least the first two (2) trigger pulls of adhesive from each 330 ml dispenser, and the first three (3) pulls of adhesive from each 500 ml dispenser.

Item	Part No.	Description
1	3248-00002	Hilti® Anchor Bolt 333212, 1 x 16" HAS-E
2		Flat Washer 1"
3		Hex Nut 1"-8
4		16"
5	3248-00001	Adhesive, Anchor HY 150 16.9 oz (not shown)

Use Anchor Adhesive HIT HY150 (11.1 oz. / 330 ml] Hilti® #371957 (also 3248-00001 in BCT parts).

IMPORTANT! *The temperature of the HY 150 MAX adhesive must be between 32°F (0°C) and 104°F (40°C) at the time of installation.*

Consult the Hilti® instruction regarding use of the dispenser and extension.

1. Put the foil pack into the foil pack holder.
2. Remove the cap covering the threaded projection.
3. Screw on the static mixer.
4. Put the holder and foil pack into the appropriate dispenser.
5. Inject adhesive into the hole without forming air pockets, starting at the bottom of the hole until it is half to two-thirds full of adhesive. Use mixer filler tube extensions when needed to reach the hole bottom. See the next .
6. After injecting adhesive, depressurize the dispenser by pressing the release button.

CAUTION!



Epoxy anchoring adhesive is a skin and eye irritant and may cause severe burning if eyes or skin come into contact. Use proper PPE for cleanup around Anchoring Hardware and Base Plates.

Insert each Anchor Bolt, **twisting** it during installation. Turn each Bolt continually until it the adhesive works around the Bolt and comes up through the hole around the Bolt.

The Anchor Bolt may be adjusted only during its **gel time**. After any necessary straightening to vertical, do not disturb the Anchor Bolt during its specified gel time and cure time. Be sure to wipe off any excess epoxy adhesive that flows out of the hole onto the concrete around the Anchor Bolt.

The GEL TIME for this Anchor Bolt installation depends on the surrounding temperature. Adjustments can be made during this time. Be sure all bolts are standing 90 degrees to the concrete pad. before they are set and the Cure Time begins. CURE TIME also depends on the surrounding temperature. (continued)

Install Anchor Bolts (continued)

IMPORTANT! *Adjustments can be made during the GEL time. Be sure all bolts are standing 90 degrees to the concrete pad. before they are set and the CURE Time begins.*

IMPORTANT! *The CURE TIME must elapse for these Anchor Bolts to proceed with the installation and bear weight.*

Install Shims over the Bolts where needed (according to the previous levelness check). Put the Washers and Nuts aside to go over the Stub Leg Fixtures (see below and next page).

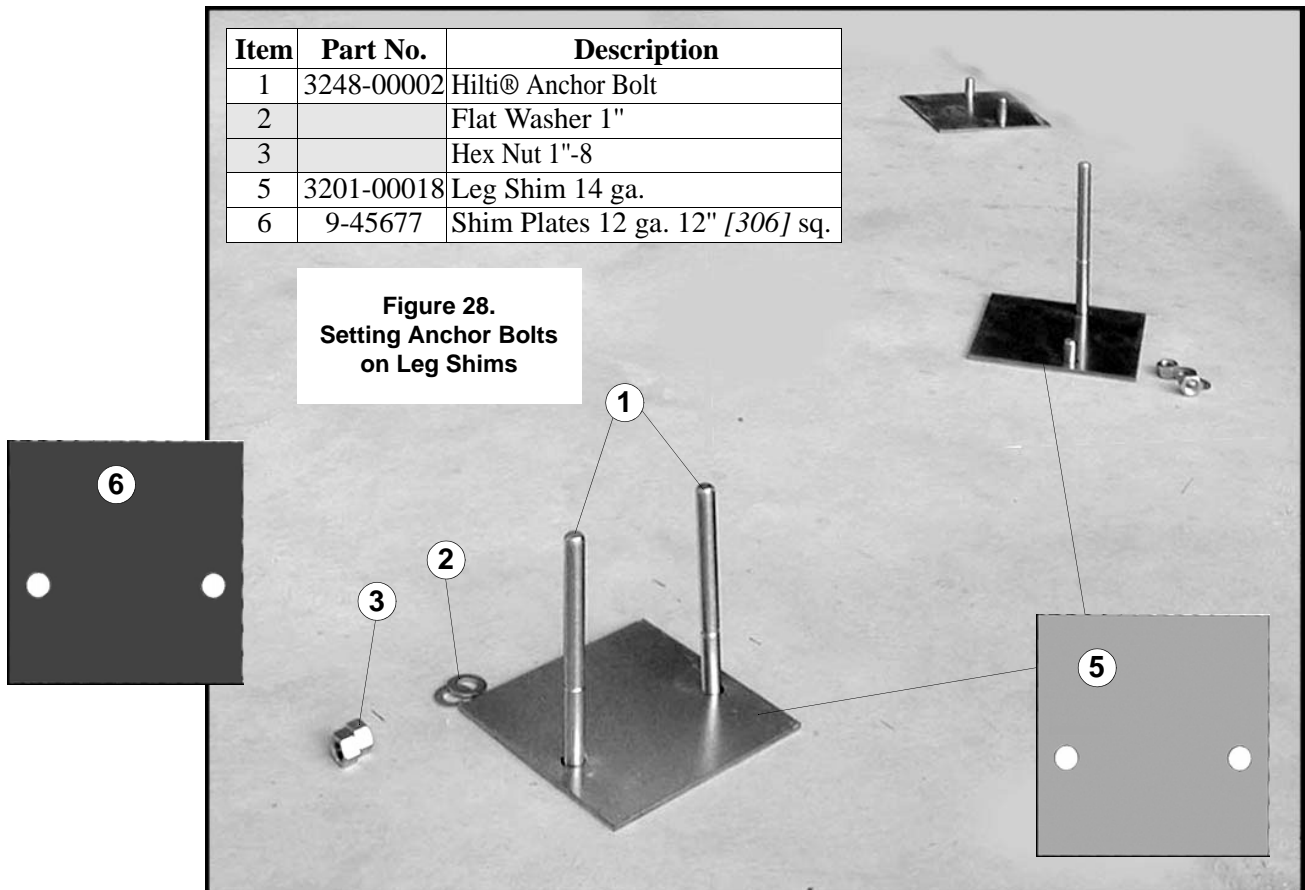
GEL and CURE TIMES (approx.)*

Base Material Temperature		Open GEL TIME	Final CURE TIME
°F	°C		
14	-10	100 min.	12 hours
23	-5	40 min.	4 hours
32	0	20 min.	2 hours
50	10	8 min.	1 hour
68	20	6 min.	30 minimum
86	30	3 min.	25 minimum
104	40	2 min.	20 minimum

*The temperature of the HY 150 MAX adhesive must be between 32°F (0°C) and 104°F (40°C) at the time of installation.

Item	Part No.	Description
1	3248-00002	Hilti® Anchor Bolt
2		Flat Washer 1"
3		Hex Nut 1"-8
5	3201-00018	Leg Shim 14 ga.
6	9-45677	Shim Plates 12 ga. 12" [306] sq.

Figure 28.
Setting Anchor Bolts
on Leg Shims



IMPORTANT! *Stub Leg Fixtures MUST BE LEVELED at this time to insure proper Tower installation! Use a laser level to level Jack stands. Shim as needed.*

Set Stub Leg Fixtures onto Anchor Bolts / Shims

Locate the Pallet of SAFETY-yellow Stub Leg Fixtures (3251-00012). This Fixture may also be commonly referred to as a *lifting jig*. Place these Fixtures around the concrete pad directly on the Bolt Circle, over the Shims and Anchor Bolts.
18' Dryer Models have twelve (12) Fixtures.
24' Dryer Models have sixteen (16) Fixtures.

IMPORTANT!



HAND-TIGHTEN ONLY!

Stub Leg Fixtures cannot be set over the Anchor Bolts until after the Anchor Bolt CURE TIME has passed.

Lift the Fixtures onto the Anchor Bolts, Attachment Tabs (Item 3) facing **inward**. Be sure the Leg Shims are under the Fixtures, and the concrete pad is leveled with Shims.

Connect and **hand-tighten** the Fixtures and Shims to the concrete pad with the Anchor Bolt hardware. **Securely hand-tighten.**



Item	Part No.	Description
1	3251-00012	Stub Leg Fixture
2	3208-00018	Leg Shim
3		Attachment Tab

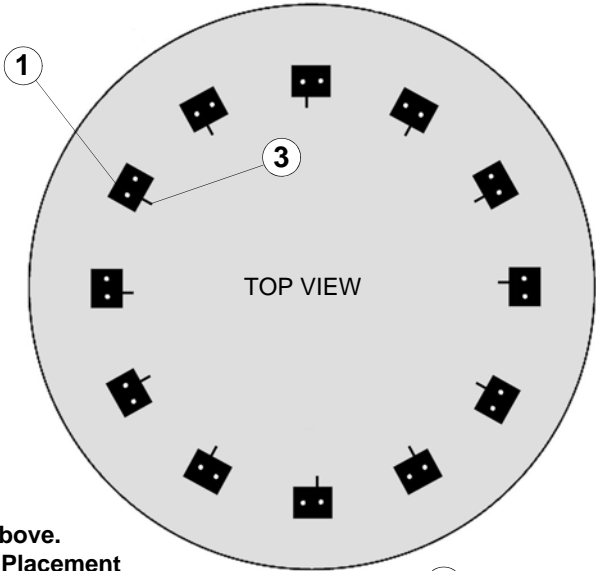


Figure 29, above.
Stub Leg Fixture Placement
(12 on 18' BCT)

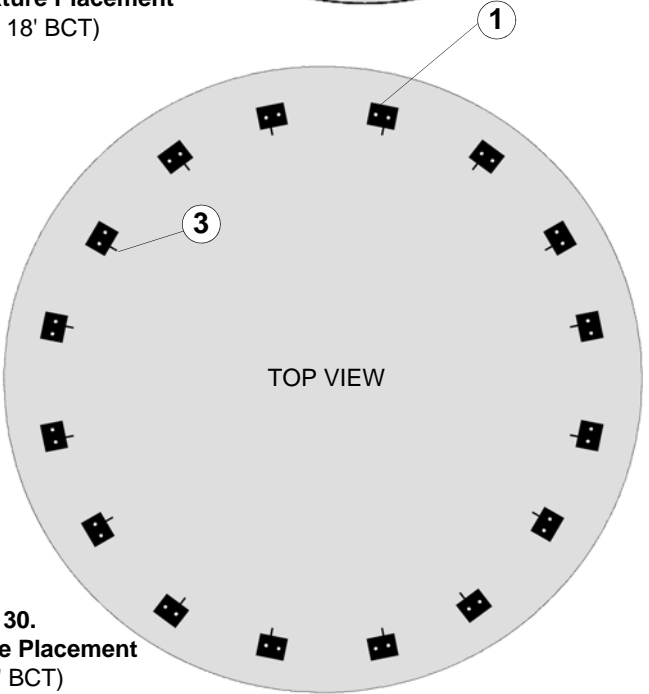
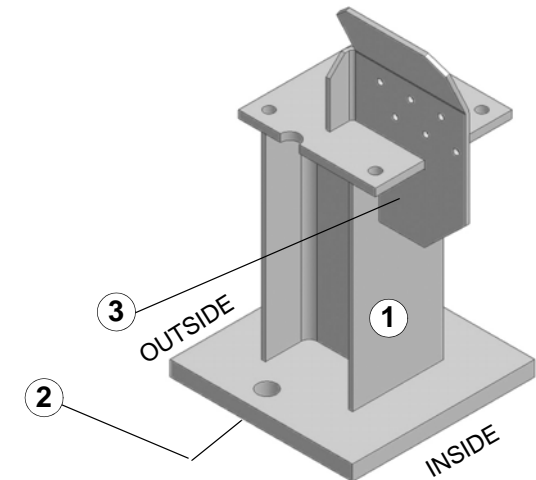


Figure 30.
Stub Leg Fixture Placement
(16 on 24' BCT)

Add the Washer and Nut (which were previously removed from the Anchor Bolts) to secure the Anchor Bolts. Do not use adhesive on the Washer and Nut.
You are now ready to set Hydraulic Jacks into position. Proceed to the next section.

Hydraulic Jacking System

The only **approved hydraulic jacking system** for the BROCK® Commercial Tower Dryer is the Bainter® 4-Stage Jack. Proper operation of these jacks is included in Brock's training for building this Dryer. Obtain and read the Jack Manufacturer's operation manual, delivered with the jack system. The crew leader should also have a copy of this manual (see left).

Jacks are connected to move smoothly and evenly with each lift. To avoid danger, the **lifting must be even** all the way around.

VERY IMPORTANT!

DANGER!



Uneven lifts may be warning signs of equipment failure. To prevent possible damage, or even destruction, to the Tower, ANY VARIANCES IN LIFT HEIGHTS BETWEEN ANY JACKS MUST BE ADDRESSED IMMEDIATELY AND THE LIFTING STOPPED until the problem is corrected.

Lifting Basics

With the hydraulic jack system: Large assemblies are moved into the structure through an opening where a Leg Weldment has been removed, then the connection is completed near the ground then lifted into place.

Place new Stringers around the structure so they are ready to slip into place when the Ring is lifted. With the Jacks extended to height and supporting the structure, install the new Stringer in place beneath the last one. Position it between the Inner and Outer Sheets and lock it onto the Stringer above it. Bolt the Stringers to the Stub Leg Fixtures.

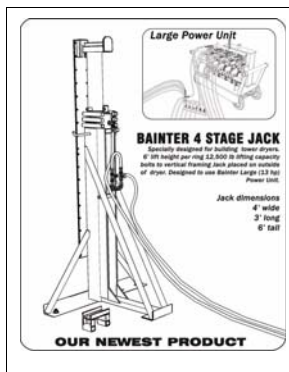
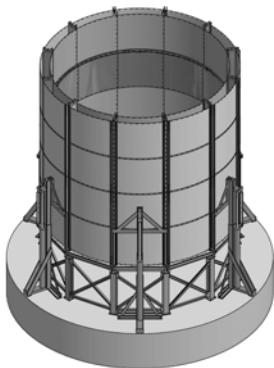
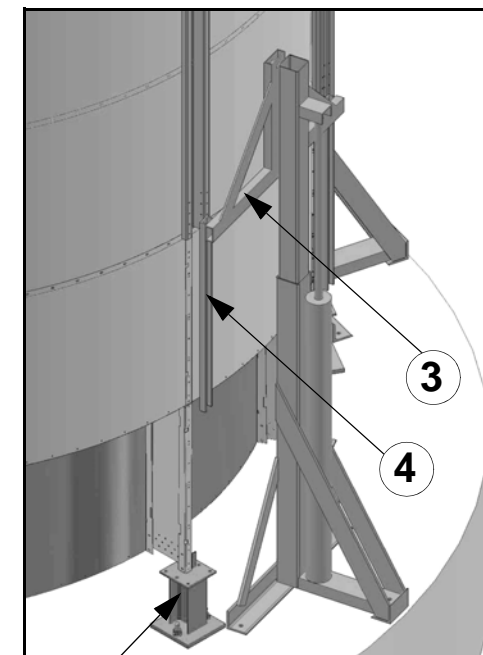


Figure 31.
Hydraulic Jack Manual



DANGER!



Item	Description
1	Jack Anchor Bolts
2	Stub Leg Fixture
3	Jack Arm
4	Lifting attachment

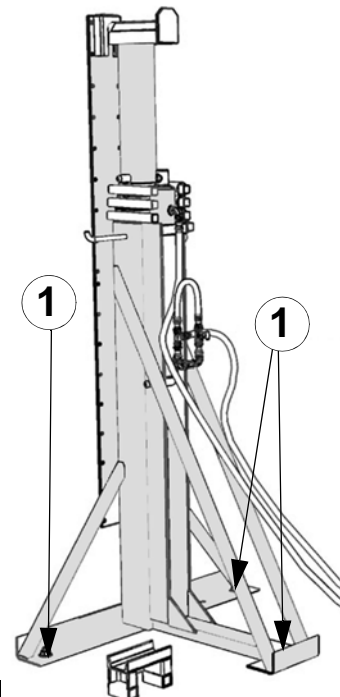


Figure 32.
Jack Anchoring and Use

SAFETY Procedures During Lifting

DO NOT jack under windy conditions! Wind can be hazardous. DO NOT leave your jacks unattended while lifting, even to step a short distance away! This could result in one jack becoming 2-3" out-of square and could create a hazardous situation. Jacks must be manned at all times. Failure to follow this instruction will result in death or serious injury.

- Be sure Jacks are anchored securely.
- Start assembly of each new Ring on the **windward** side of the Tower.

- Leave all Bolts **loose** in the new Ring until all Screens have been attached.
- **Follow** the jack manufacturer's recommendations for capacity and operations.
- Secure jack pins with each lift. See **Figure 33**.

Raising and Repositioning Hydraulic Jacks

IMPORTANT! *When repositioning jacks: bars first, arms second.*



Figure 33.
Hydraulic Jack Usage

Types of Lifting Attachments

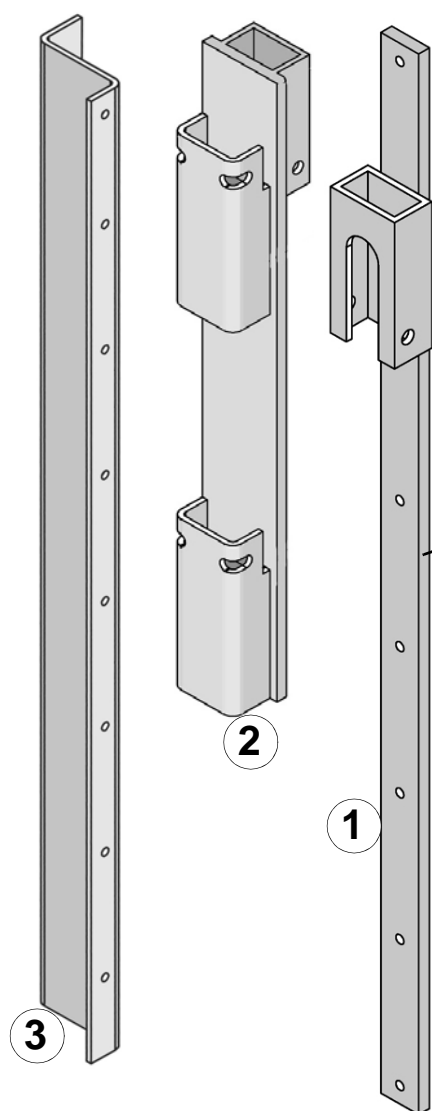


Figure 34.
Types of Jack Attachment Brackets

Item	Description
1	Jack-to-Base Weldment 29"
2	Universal Jack Attachment 31.75"
3	Jack-to-Stringer/Stiffener Bracket 46"

Anchor Jacks Around the Tower Circle

18' Dryers require six (6) Jacks, at 7000 pounds per jack, rated at 12,000 pounds per jack. See **Figure 35**.

24' Dryers requires eight (8) Jacks, at 7000 pounds per jack, rated at 12,000 pounds per jack. See **Figure 36**.

Anchor each Jack on the three (3) Anchor Bolts drilled with the **Jack Extension Template**. See Pages 26-27.

Use a 3/4 x 7" Bolt (Contractor-supplied), three (3) per Jack, to anchor Jacks to the concrete pad.

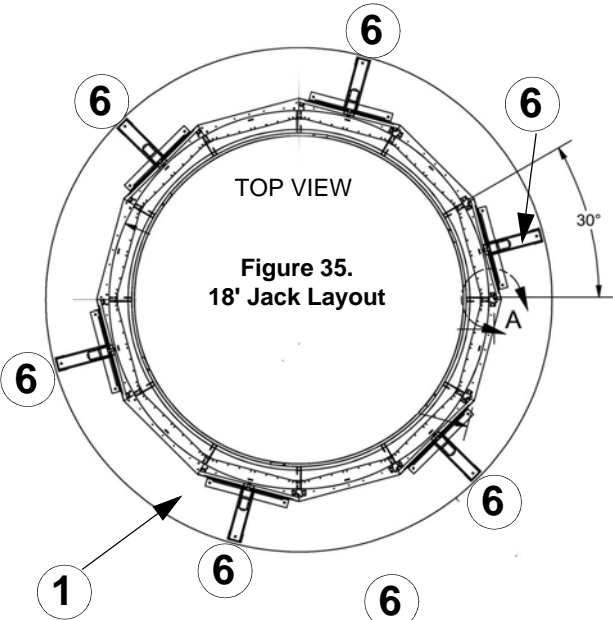


Figure 35.
18' Jack Layout

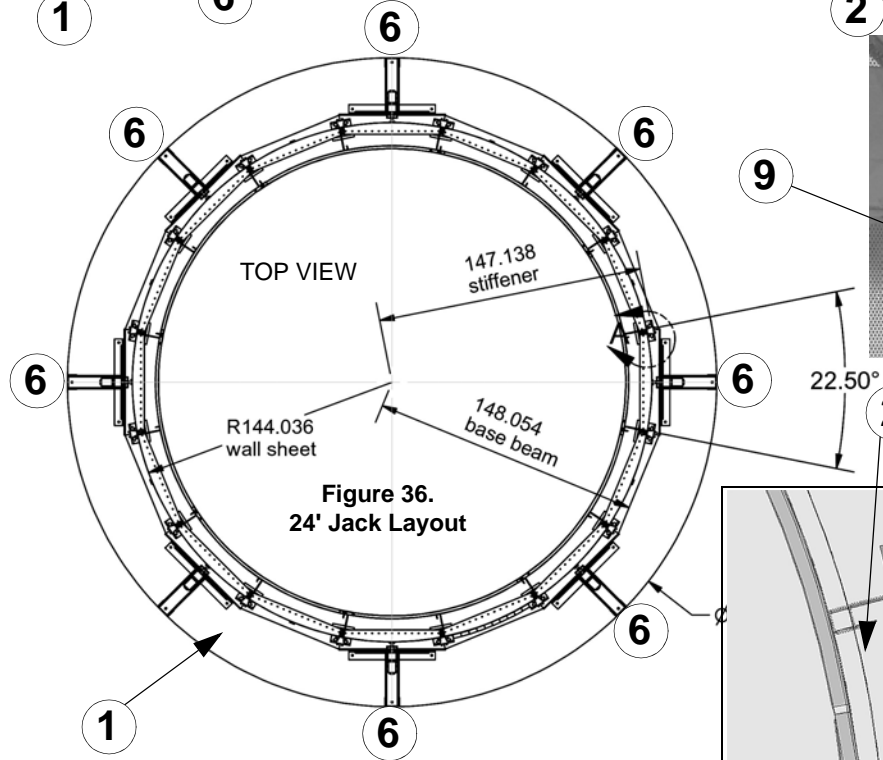
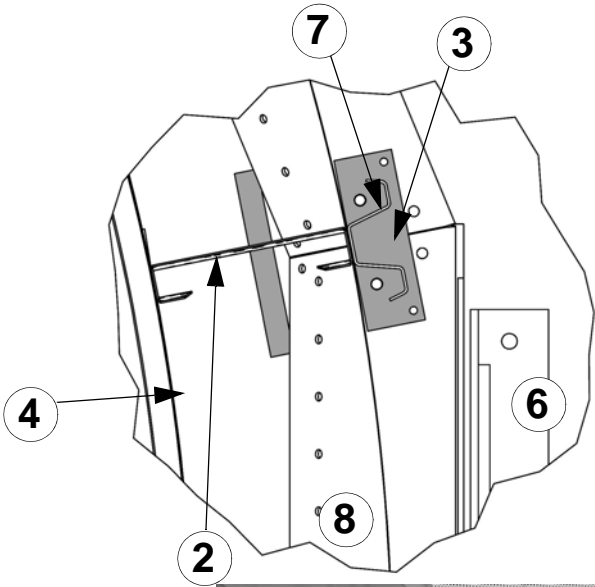
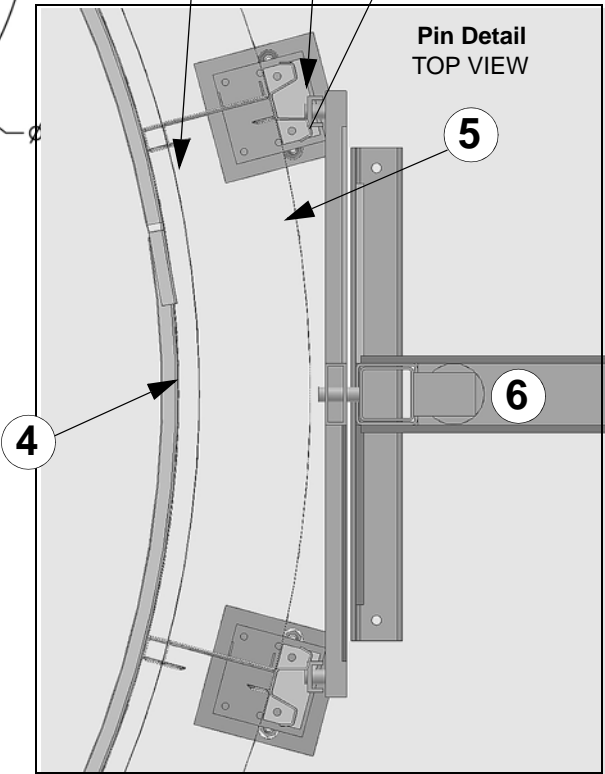
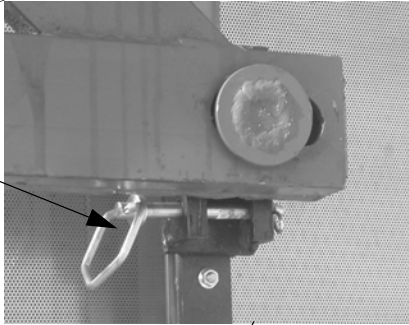


Figure 36.
24' Jack Layout



Item	Description
1	Concrete Pad
2	Stringer
3	Stub Leg Fixture
4	Inside Screen
5	Outside Screen
6	Hydraulic Jack
7	Stiffener
8	Base Ring
9	Attachment Pin

Raising the Tower with Hydraulic Jacks (Model 3500 shown)



First (Garner) Ring done,
Ring 2 Inside Screens



4 Rings



4 Rings UP, Building 5th



5th Ring, Inside Screens



5 Rings UP, Building 6th



7 Rings, Inside Screens



7 Rings, (Jacks lowered to
build Walkway)



7 Rings UP, Building 8th

Figure 37.
Raising the Tower with
Hydraulic Jacks



9th Ring Inside (showing
Moisture Equalizer)



10 Rings



12th Ring, Inside Screens



12 Rings UP, Lifted for 13th

Raising the Tower with Hydraulic Jacks (continued)



13 Rings UP, Lifted for 14th



16th Ring, Inside Screens



19 Rings with Upper Stiffeners



19 Rings with Base and Legs

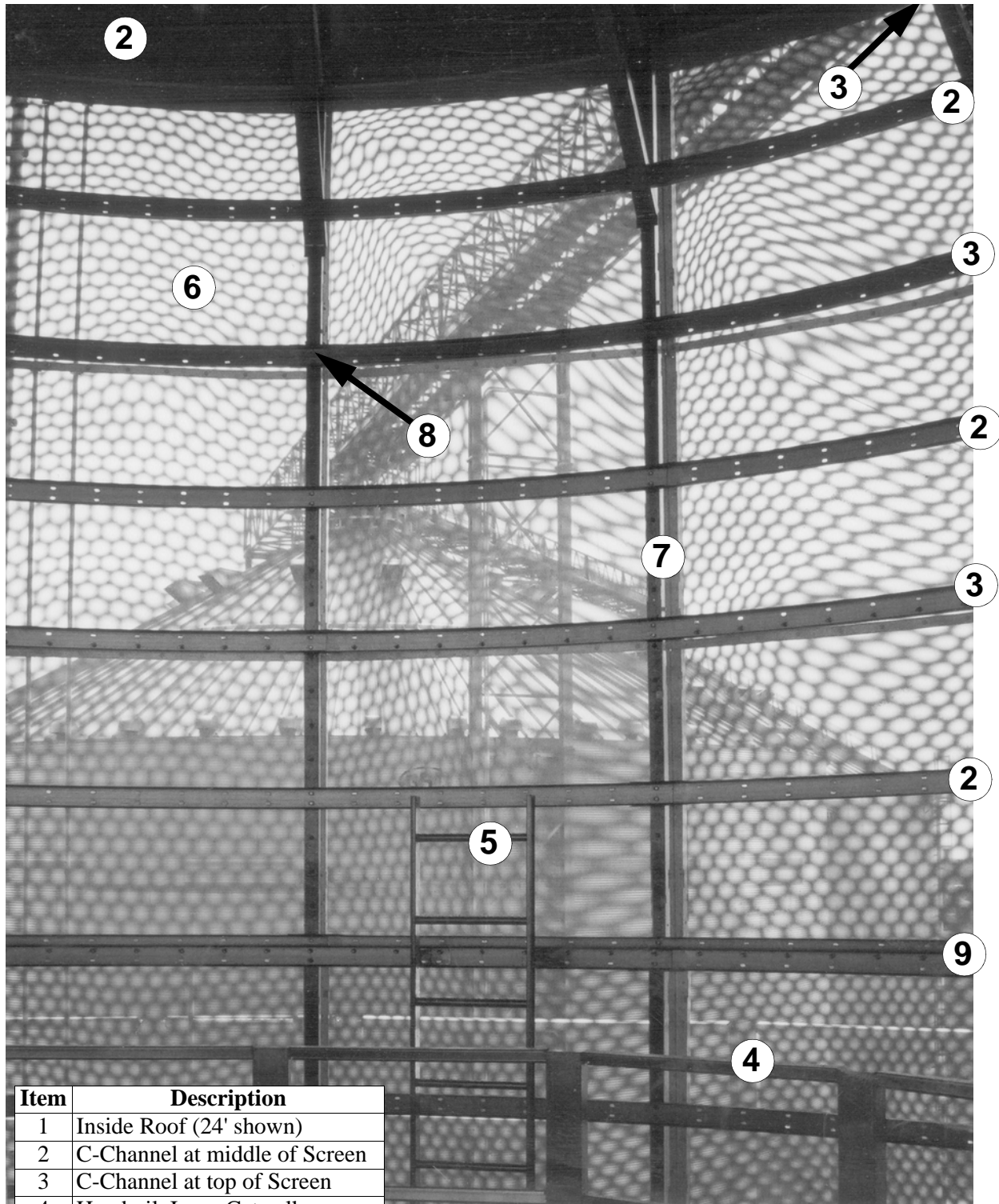


15 Rings

Figure 38.
Raising the Tower with Hydraulic Jacks



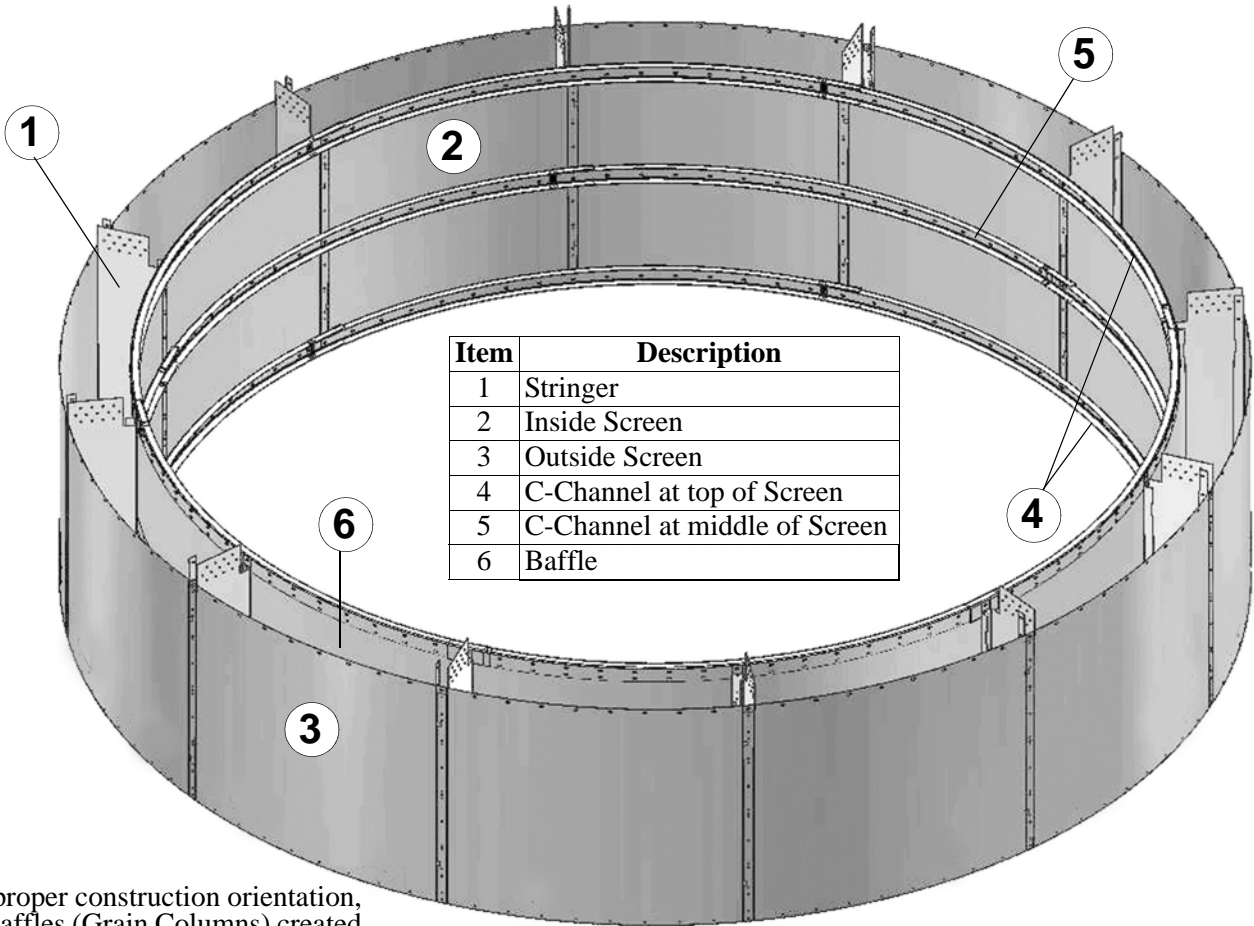
Tower Building Basics: Stringers and Screens



Item	Description
1	Inside Roof (24' shown)
2	C-Channel at middle of Screen
3	C-Channel at top of Screen
4	Handrail, Inner Catwalk
5	Inside Ladder
6	Inside / Outside Screens
7	Stringer
8	Stringer-to-Stringer connection
9	10.75" to 12.75" column transition

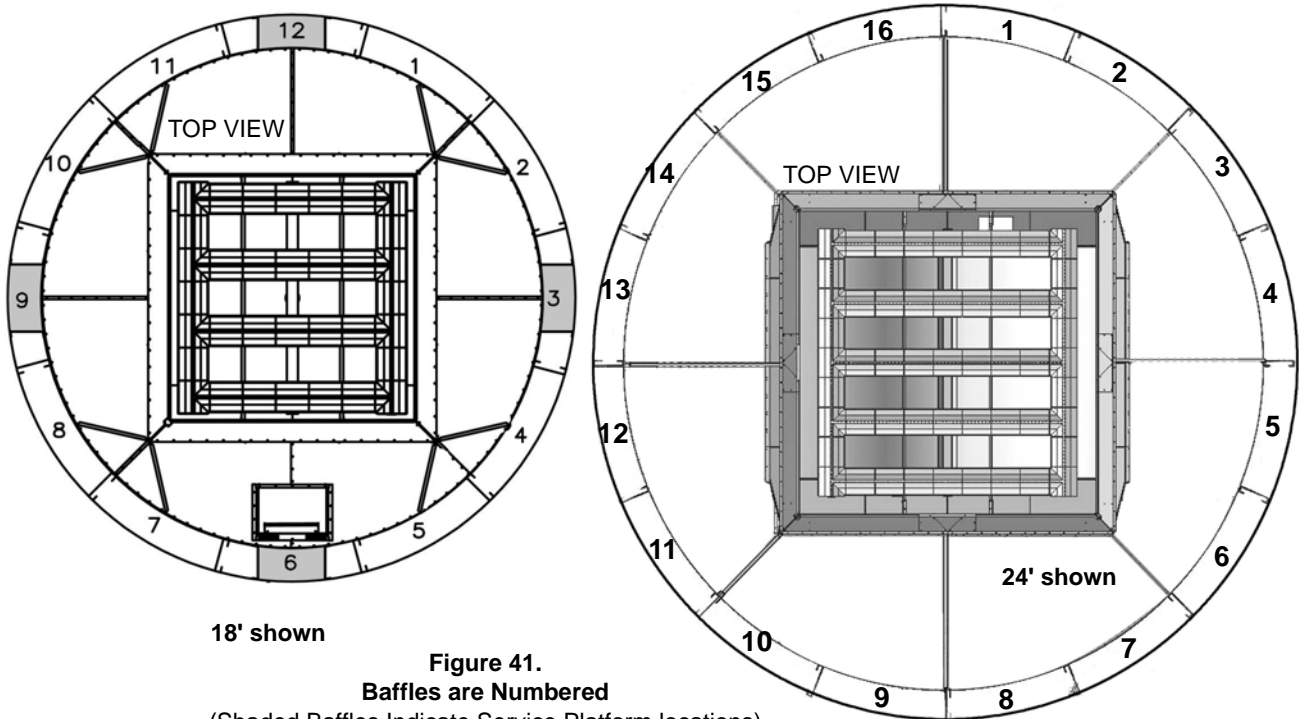
Figure 39.
Stringers, Screens and C-Channels
 (View from Inside, 24')

Overview of Rings and Baffles/Columns



For proper construction orientation, the baffles (Grain Columns) created between Stringers are **numbered**. Position the UNLOAD upon installation as per Customer layout.

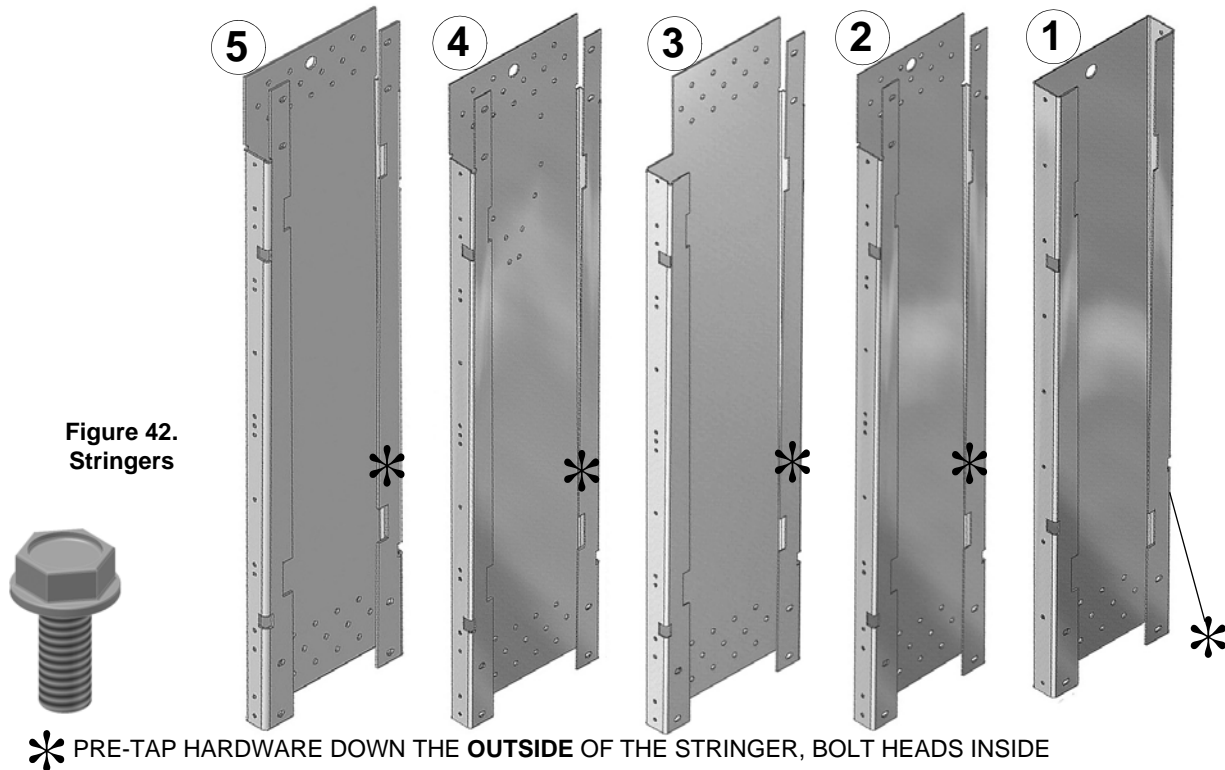
Figure 40.
Stringers, Screens and C-Channels





Stringers: Vertical Supports (Grain Column Separators)

There are several varieties and gauges of Stringers to be used at different Tower heights. Refer to Diagrams on Pages 84-87 of this Manual to see Stringer types at various ring levels of your model Dryer. Lay out Stringers in place before the lift. Double-check all gauges to be sure of placement.



Item	Part No.	STRINGER Description	Where Used
1	3203-00004	12 ga. Roof Stringer	top ring only
2	3203-00002	12 ga. Upper Heat 10 3/4" Wall	second ring down until Transition
3	3203-00005	12 ga. Trans-Heat 10 3/4" - 12 3/4" Wall	longer tab at 10/12 Transition
4	3203-00001	12 ga. Upper Heat 12 3/4" Wall	below Transition including solid Plenum ring
5	3203-00003	7 ga. Lower Cool	one ring below Plenum down to Base Ring
6	2331-00004	Screw, Self-Tapping 5/16" x 3/4 Gr. 8	pre-tap Stringers INSIDE , Screw heads inside
7	39-20070	Bolt, Hex Head 5/16"-18 x 1" Gr. 8	pre-tap 7 ga. Stringers at Stiffeners, Bolt heads inside



Stringer hardware length increases where there are additional layers to secure, such as Catwalk Arms and Stiffeners.

Stringers may be shipped with a PEM® self-clinching Nut for 5/16" x 3/4" Self-tapping Screws (Item 6). If this is not the case, pre-assemble these Screws to Stringers (all types **except** Lower Cool 3203-00003), Bolt heads inside.

IMPORTANT! *Catwalk areas: Be sure to secure the Stringer Bolt **WITH A NUT**; do NOT use the Bolt with the Stringer alone. Refer to the Ladder Manual Supplement.*

Lower Cool Stringers for the Stiffened bottom four (4) Dryer Rings: Pre-tap with 5/16"-18 x 1 1/4" Gr. 8 Bolts (39-20070).

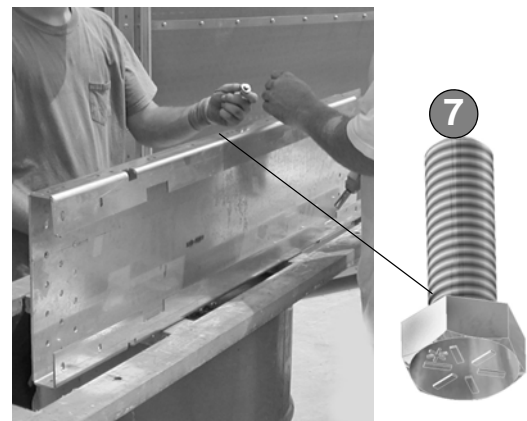


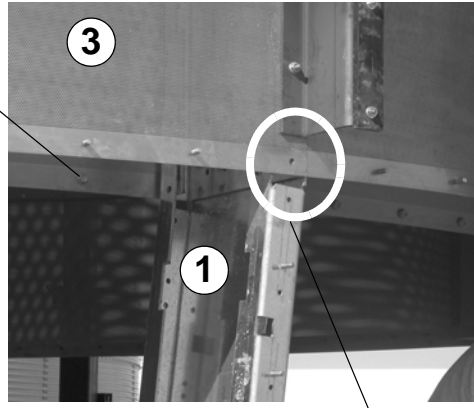
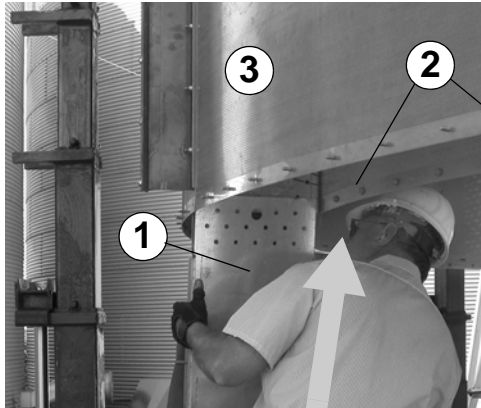
Figure 43.
Pre-Install Stringer Hardware

Stringer Order of Assembly

1. Lift the Tower up one ring height (48", or 122 cm) with the jacks.

2. Insert the Stringer, locking into the Stringer above.

Because of their notched design, 48" Stringers will slide into place when the Tower is raised 47". This is helpful to know when lifting heights at all jacks become a more critical issue as the Tower grows taller during the construction. The crew should set in all Stringers for one ring at approximately the same time; those assigned to set in an additional Stringer should coordinate this move as efficiently as possible.



Item	Part No.	Description
1	varies	Stringer
2	varies	Inside Screen
3	varies	Outside Screen
4	3251-00012	Stub Leg Fixture
5	2363-00001	Nut, 3/8" Whiz Lock
6	2330-00001	Bolt, 3/8 x 3/4" Whiz Lock

NO HARDWARE HERE YET
BOLT GOES IN FROM OUTSIDE

Figure 44.
Lifting a Stringer into Place

IMPORTANT!

Drift-punch to align Stringer holes. Secure the new Stringer to the Stringer above with a few 3/8" Bolts and Nuts (Items 4 and 5).

Leave Hardware loose until inside Screens and C-Channels are installed and tightened. (continued)

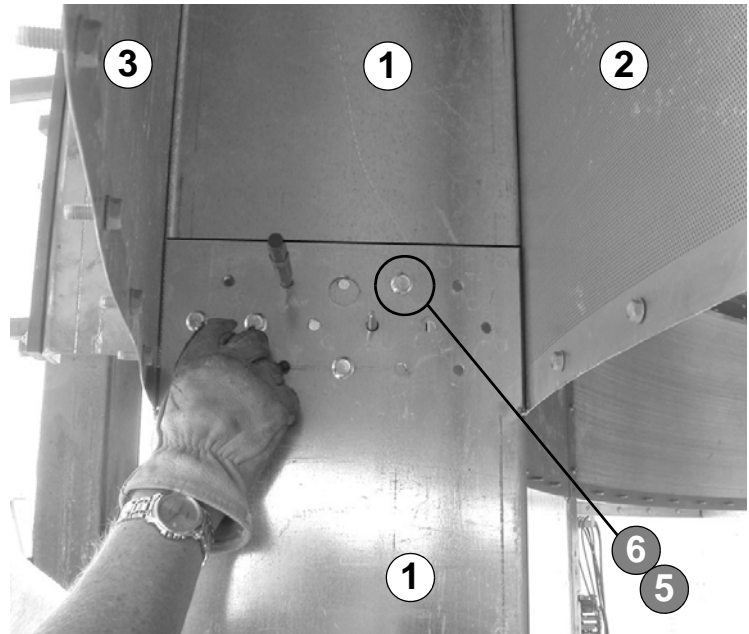
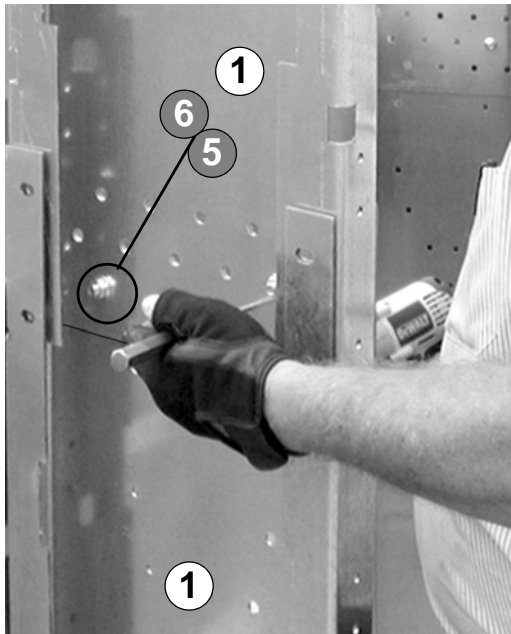


Figure 45.
Make Stringer-to-Stringer Connection First

After a lift, Bolt the Stringer into place **as quickly as possible** to the **LEFT SIDE** of the Stub Leg Fixture with the same hardware, 3/8 x 3/4" Whiz Lock Bolts (2330-00001) and Nuts (2363-00001). To insure tower roundness during lifting times, use a drift punch to line up the Stub Leg Fixture and Stringer holes.

IMPORTANT!

Put hardware in EVERY hole. Do not leave out any hardware in Stringer connections. When leaving the incomplete structure at night, be sure this hardware is complete and securely tightened.

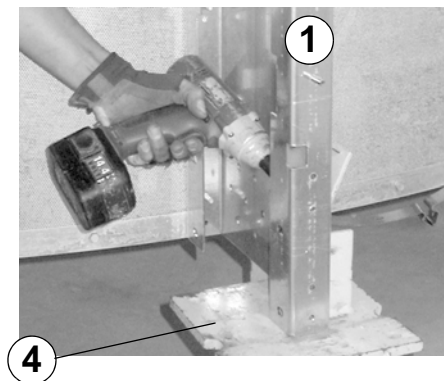
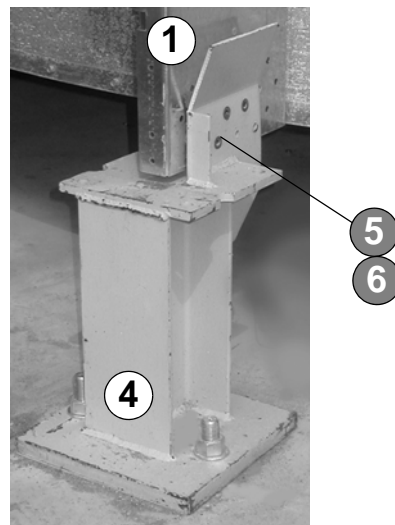


Figure 46.
Stringer Left of Stub Leg Fixture



Put **all remaining Hardware** in the holes where Stringers meet. Use hardware in **all** Bolt holes. At the bottom, secure it to the attachment tab on the Stub Leg.

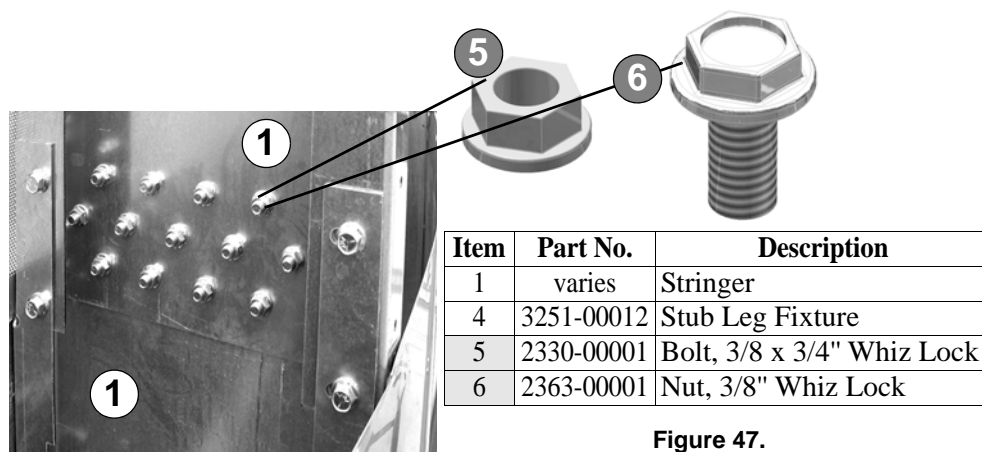


Figure 47.
Stringer Connection

3. Immediately Hang Inside Screens (see next section).

Stringer joints are tightened outside as C-Channels are tightened inside.

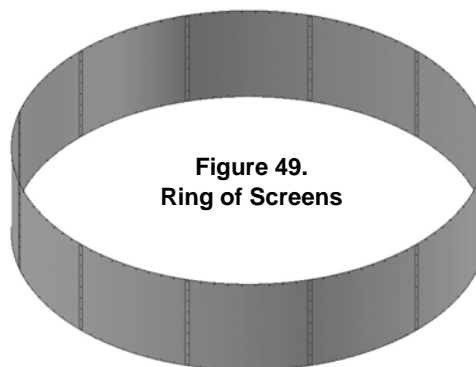


Figure 49.
Ring of Screens

Dryer Screens (“Skins”) Order of Assembly

Check the **Dryer Level Profiles** on Pages 84-87 for the correct Screen Part Number per Ring/Level on your BCT model.

Screen **Part Numbers** are stamped on the smooth-perforated side in the lower border. To find the Screen (stainless or galvanized) smooth-perforated side: Use your fingernails to feel the smooth and rough sides.

Double-check all gauges to be sure of Screen placement. Stack Screens by ring number, **smooth side up**.



Pre-assemble Bolts (heads inside) along the **bottom** of the Screen. This way the new Screen below it will hang over these Bolts on the Screen above it. Stack pre-assembled Screens with the smooth side **UP**.

Outside Tower Rings require 5/16" Grade 8 Bolts. Until all Screens are installed, leave out Bolts at corners, where Screens will overlap.

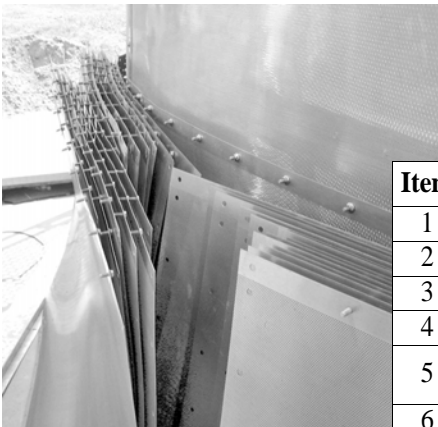


Figure 48.
Pre-Assemble Bolts
(Bolt heads on smooth side)

Item	Part No.	SCREENS, 48" high
1	3219-00001P10	Outer Stainless, SOLID
2	3219-00001P17	Outer Stainess Perf. .078
3	3219-00003P27	Inner Galv. .078 - 10¾" wall
4	3219-00002P27	Inner Galv. .078 - 12¾" wall
5	3219-00004P17	Outer Stainless .078 w/Cleanouts
6	3219-00001P16	Outer Stainless .062
7	3219-00004P16	Outer Stainless .062 w/Cleanouts
8	3219-00005P20	Inner Galv SOLID w/Cleanouts
9	3219-00002P26	Inner Galv .062 12¾" wall

When hanging Screens, secure it first with two (2) 5/16" Flange Nuts here.

Put on remaining Flange Nuts. Leave Nuts loose. Tighten Nuts from the center of the screen moving outward.

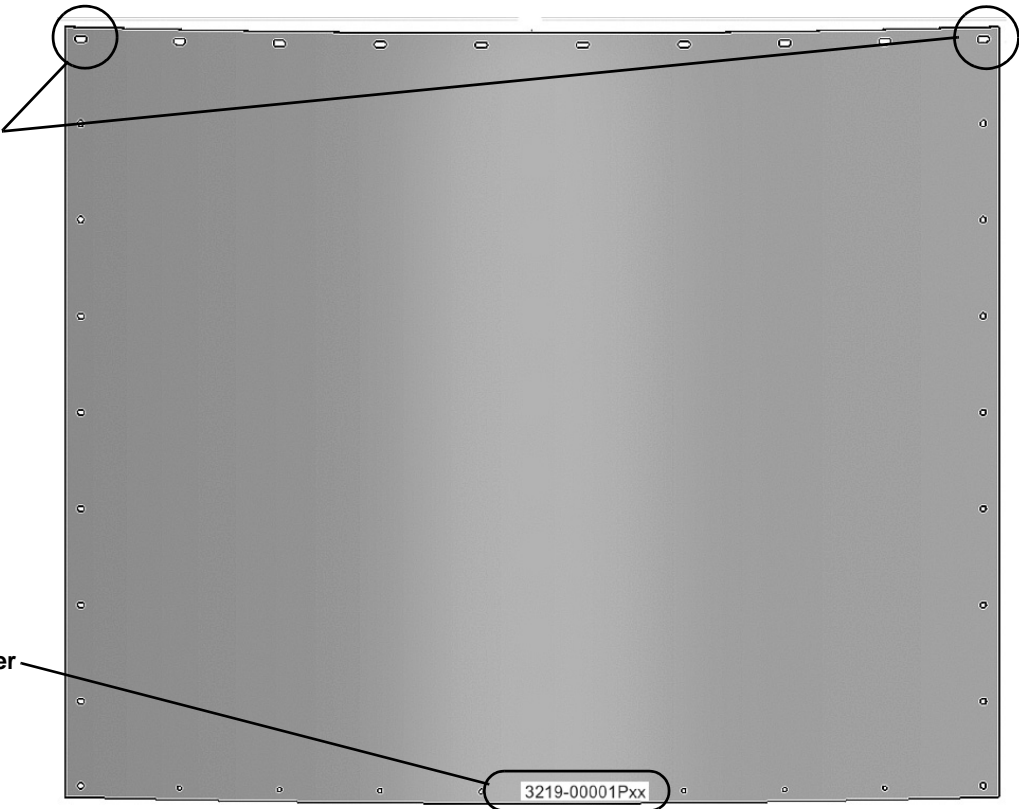


Figure 49.
Screen Part Number
(smooth side)

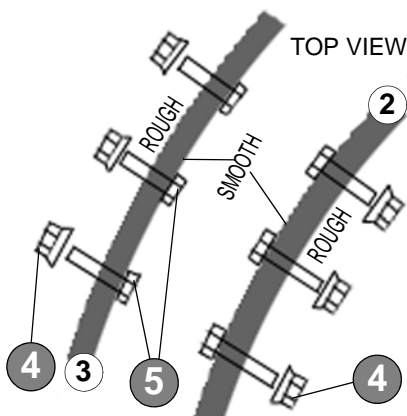
Hang INSIDE Screens immediately when Stringers are in place.

Overlap Screens the same direction all around the Ring. The INSIDE Screen Ring is put on before Outside Screens on the same level,



Figure 50.
Bottom Inside Screen (See also page 64)

IMPORTANT! Screens must be installed with **SMOOTH SIDES INSIDE**, to facilitate grain flow.



The SMOOTH side of the perforated Screen goes to the Inside of the grain column.

The rough punch should always be away from the grain (flow).

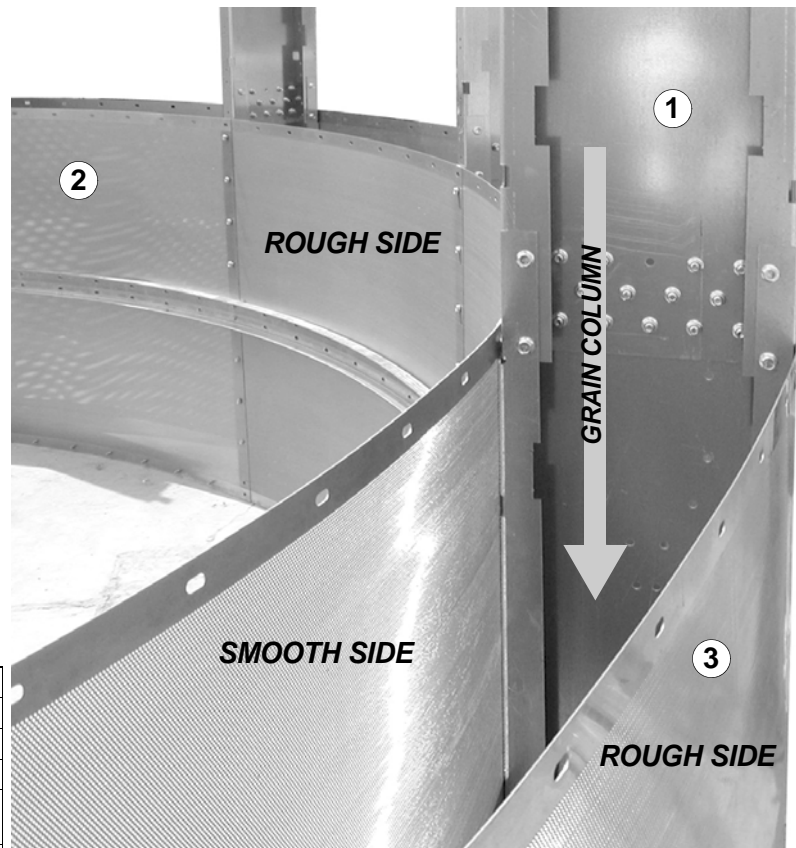
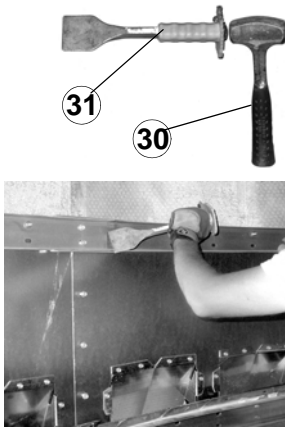


Figure 51.
Grain Column Between Stringers
and Inside the Smooth Sides of Screens

Item	Part No.	Description
1	varies	Stringer
2	varies	Inside Screen
3	varies	Outside Screen
4	2363-00004	5/16" Whiz-lock Nuts SS
5	2331-00004	Bolts, 5/16-18 x __1"

IMPORTANT!



C-Channels Connect Inside Screen Rings

Proper alignment of C-Channels is extremely CRITICAL. There are two types of C-Channels: one is to be used above the Upper-Heat Stringer transition at the top of the tower; the second type is to be used at and below that transition. See Page 55. C-Channels span two (2) Screens in width, so connections should be **staggered** every other Screen level so that connections are not one directly above the other.

Use punches to line up Channel slots to achieve proper diameter and tight fit.

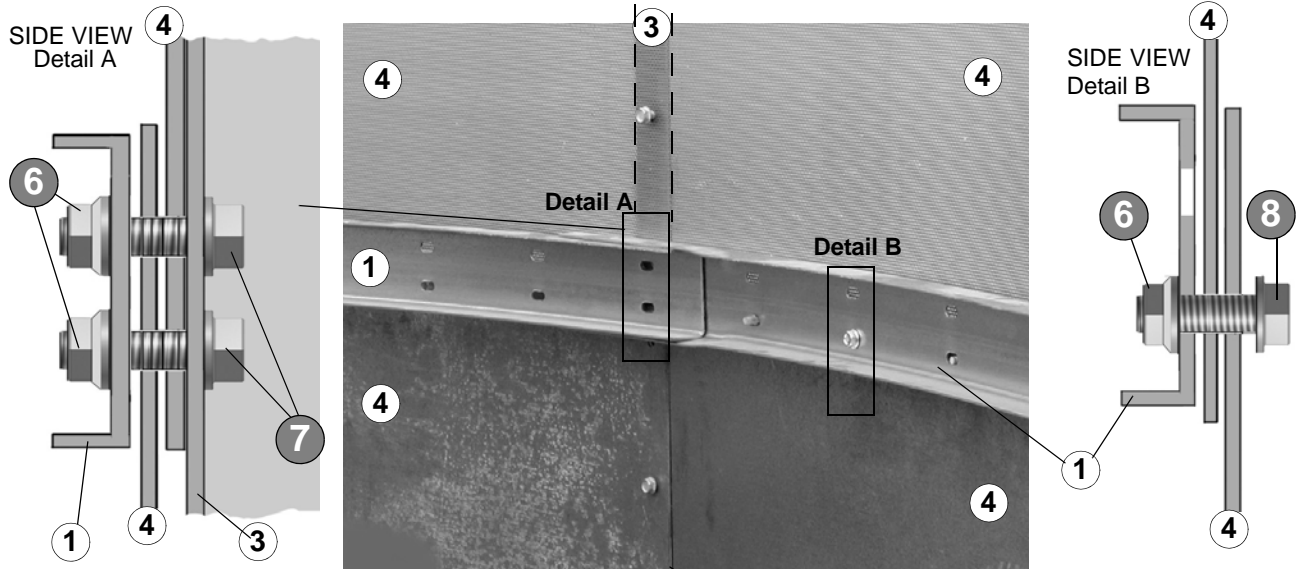
C-Channel is first added at the **top** of the Inside Screen, after a new ring of Inside Screens is installed. Then **C-Channel** is installed in the middle of the Inside Screen:

C-Channel at Screen top: Install C-Channels to connect a ring of Screens to the Ring above it. Overlap (all the same direction) C-Channels at Inside Screen vertical seams (over Stringers). When starting a new ring below an existing ring of Screens, position a C-Channel over the horizontal seam. Add Flange Nuts over C-Channel at the **middle** of the Screen first.

Add hardware in the **bottom** row of Channel holes throughout, except over Stringers, where both Bolt holes are used. To bolt C-Channel to Stringers, use 5/16 x 1" Bolts (2331-00019).

Repeat the above steps for the C-Channel at the middle of the Screen.

Before tightening hardware, use a hammer or mallet (2# minimum) and chisel (see left) to pound the end of the C-Channel to drive it to round.



Item	Part No.	Description
1	varies	C-Channel at top/bottom of Screen
2	varies	C-Channel at middle of Screen
3	varies	Stringer
4	varies	Inside Screen
5	varies	Outside Screen
6		5/16" Flange Nuts
7	2331-00019	Bolts, 5/16-18 x 1"
8	2331-00019	Bolts, 5/16-18 x 1"
30		2# Hammer or Mallet
31		Chisel

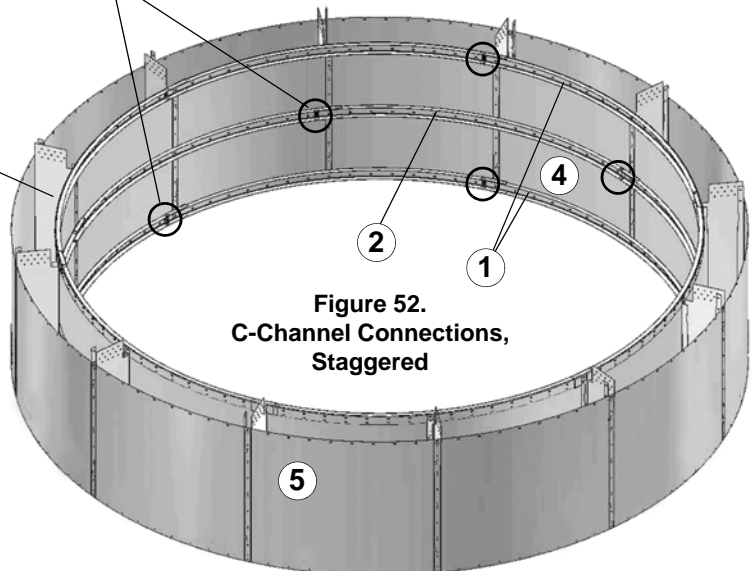
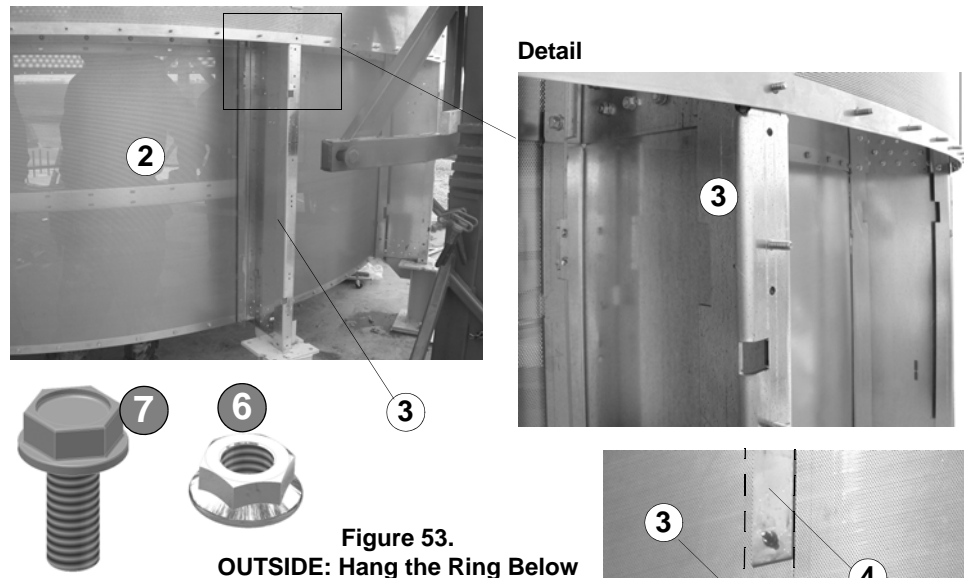


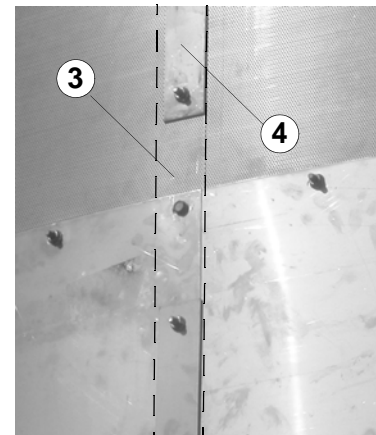
Figure 52.
C-Channel Connections,
Staggered

Install OUTSIDE Screens

Hang and secure a new ring of Screens by placing 5/16" Flange Nuts over the 5/16" x 3/4" Grade 8 Bolts of the finished ring above. All Whiz (Flange) Nuts used on the Dryer exterior Screens are **stainless steel**. Overlap Screens the same direction. As each ring of Screens is added, **leave out the bolt at the Stringer** so it can be inserted through the Stringer from the outside.



Item	Part No.	Description
1		Upper Ring, outside
2		Lower Ring, inside
3	varies	Stringer
4	3240-00006	Vertical Strap
5	2331-00004	Bolt used for Skins to Stringer
6	2363-00006	Nut, 5/16" Whiz Lock Inner Skins and Stringer

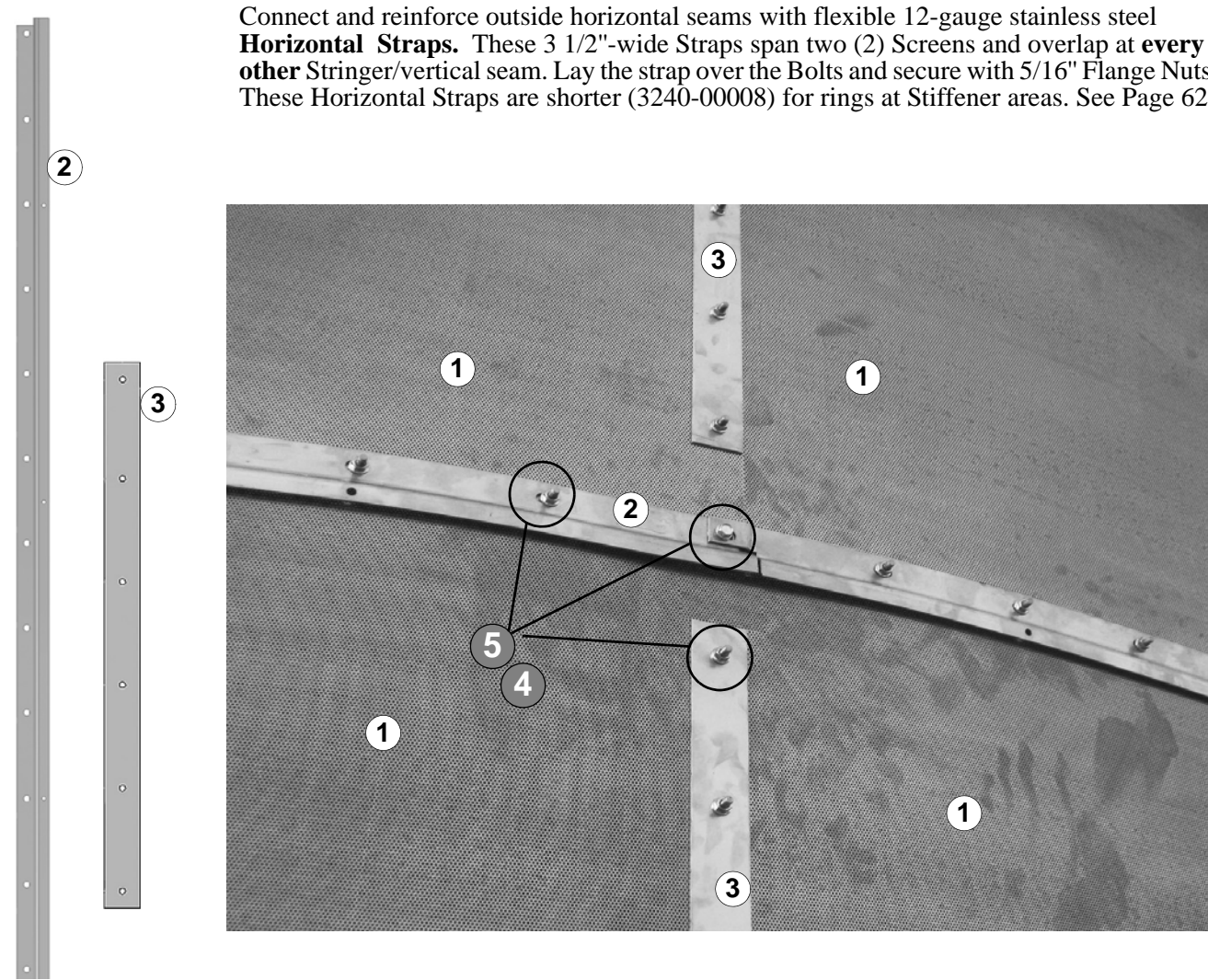


SHOWN AT SOLID SCREEN

Connect and reinforce every outside vertical Screen seam onto the Stringer with 2 1/2"-wide stainless steel **Vertical Straps**. Secure with Whiz Nuts by hand at Strap ends. Leave the top bolt until last. To flatten the Screen seam: tighten corners last. The top bolt is left out of the Straps around a ring until all Screens are in place. Then the tightness of the top Bolts can be adjusted to minimize bubbles in the screens.



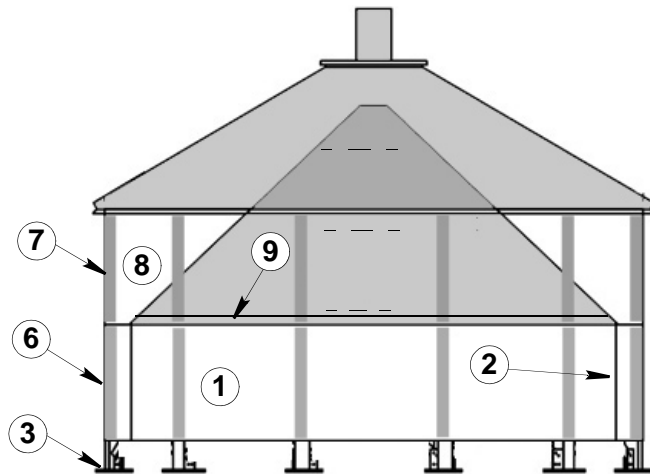
Connect and reinforce outside horizontal seams with flexible 12-gauge stainless steel **Horizontal Straps**. These 3 1/2"-wide Straps span two (2) Screens and overlap at **every other** Stringer/vertical seam. Lay the strap over the Bolts and secure with 5/16" Flange Nuts. These Horizontal Straps are shorter (3240-00008) for rings at Stiffener areas. See Page 62.



Item	Part Number	Description
1	3219-00001	Outer Screen
2	3240-00007	Horizontal Strap SS, 115.337"
3	3240-00006	Vertical Strap
4	2331-00004	Bolt used for Skins to Stringer
5	2363-00006	Nut, 5/16" Whiz Lock Inner Skins and Stringer

Figure 55.
Vertical Straps Throughout,
Moisture Equalizer Ring shown

Upper Rings from the Top Down



IMPORTANT!

*While the Outer Roof is being built on a level area, start building the second Dryer Ring down—the **STARTER RING**—on the Stub Legs. Read through **TOWER BUILDING BASICS** in the previous section **BEFORE** beginning this Starter Ring.*

The Tower begins with the **SECOND** ring from the top, which is built on the Leg Stubs and serves as a start for the **FIRST**, or uppermost Garner Ring.

Figure 56.
Top Two Rings (with Inner
and Outer Roof Location)

Starter Ring (Ring Below the Garner Ring—Second Ring Down)

1. Attach **Upper Heat Stringers** (10" wall, Item 6) to Stub Leg Fixtures. Hand-tighten hardware. Bolt Stringers to the **left** side of the Leg Stubs as shown on Page 41. Verify levels of 10"-to-12" wall transitions by checking the profile prints on Pages 84-87.
2. Attach the **Inner Screen** (.078 ga.) circle to on the Stringers as described in the previous section on Pages 43-44.
3. Install the **Tower Roundness Fixture** after the Inside Screen ring is added to the Starter Ring. This insures the roundness of the rings is maintained throughout the installation. See Pages 52-54.
4. Install Inner Roof Attachment Flashing to the Inner Screen This will be easier if it is done before the Outside Screens are added, and must be done before C-Channel is added. See Page 49.
5. Install C-Channels at the top and middle of Inside Screens. Tighten only if the Roundness Fixture has been installed.
6. Tighten Stringers, Inside Screens and C-Channels.
7. Do **not** install Outside Screens at this time.



Figure 57.
Starter Ring Inside (18' shown)

Item	Description
1	Starter Ring Outer Screen: Construction may be easier if this is not put on until after the Inner Roof Cone.
2	Starter Ring Inner Screen
3	Stub Leg Fixture
4	C-Channel at top of Screen
5	C-Channel at middle of Screen
6	Upper Heat Stringer
7	Roof Stringer: install after Inner Roof is assembled (Figure 50).
8	Garner Screen (solid)
9	Inner Roof Attachment Ring

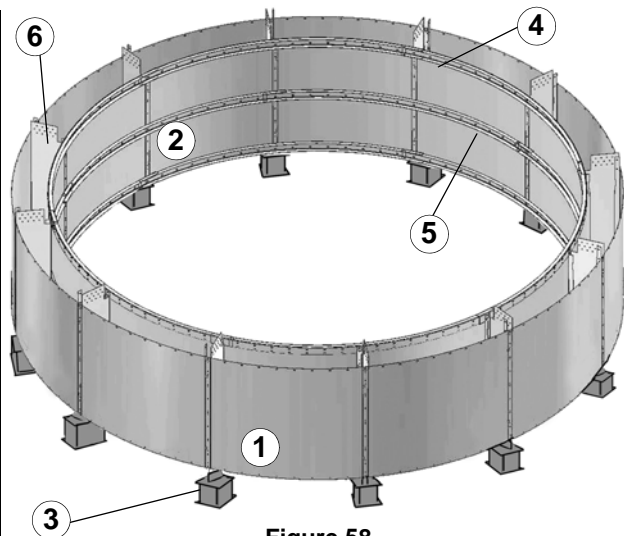


Figure 58.
Starter Ring (18' shown)

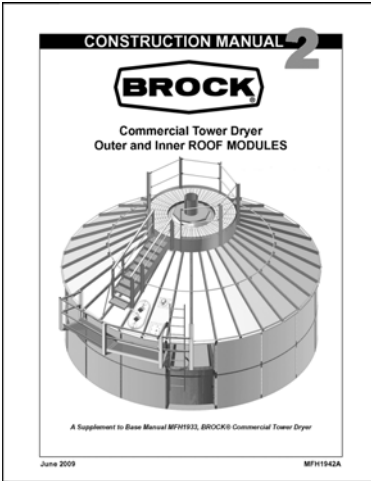
Install C-Channels on the Starter (Inside) Ring

Install 10".75" C-Channel pieces (brown spray paint on the ends of 18' pieces and black paint on the ends of 24' pieces) completely around the Inside Screen of the Starter Ring. Use 5/16" x 1" HWH Screws (2331-00019). Use punches to insure proper roundness and full diameter. Follow directions for C-Channels as described on Page 45. Drive and spread C-Channels to proper alignment and diameter.

IMPORTANT! *Inner Roof Attachment Flashing to Starter (Inside) Ring*
Before installing C-Channel at the Screen top, the Inner Roof Attachment Flashing must be added. See the Roof Manual MFH1942.

Before rounding and tightening C-Channels in the Starter Ring, install the Tower Roundness Fixture. See Pages 52-54 in this Manual.
Tighten C-Channel hardware only after all pieces are installed and properly spaced.

Anchor the Inner Roof on the Starter (Inside) Ring



As soon as the Starter Ring Inside Ring is completely finished and tightened, the **Inner Roof Attachment Flashing** can be installed to the Inside Ring. Return to Manual Supplement **TWO** (MFH1942) for Inner Roof Instructions. See left.

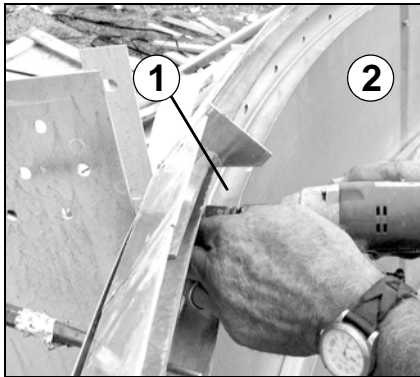
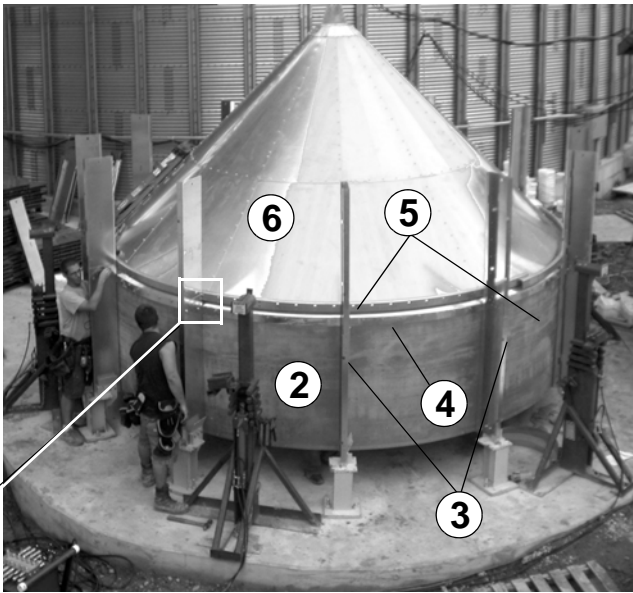


Figure 59.
C-Channel on Attachment Flashing, Starter Ring



Item	Description	18' Part No.	24' Part No.
1	C-Channel, 10.75" Wall (Top)	3202-00001	3202-00007
2	Inner Screen Ring, 10.75" Wall	3219-00003	3219-00003
3	Stringer 12 ga. Upper Heat 10.75" Wall	3203-00002	3203-00002
4	Inner Roof Attachment Flashing	3216-00012	316-00015
5	Roof (Garner Ring) Stringer	3203-00005	3203-00005
6	Inner Roof, Lower Panel	3216-00007	3216-00024

Figure 60.
18' Inner Roof, Showing Roof Stringers

IMPORTANT! *Tighten from the Inside Screens OUT.*

Top / Garner Ring Above the Starter Ring

IMPORTANT! *The Top Ring, or Outer Garner Ring, is not installed until the Inner Roof is complete. The Garner Ring is the outer ring ABOVE the Starter Ring. The Screens of the Garner Ring are SOLID.*

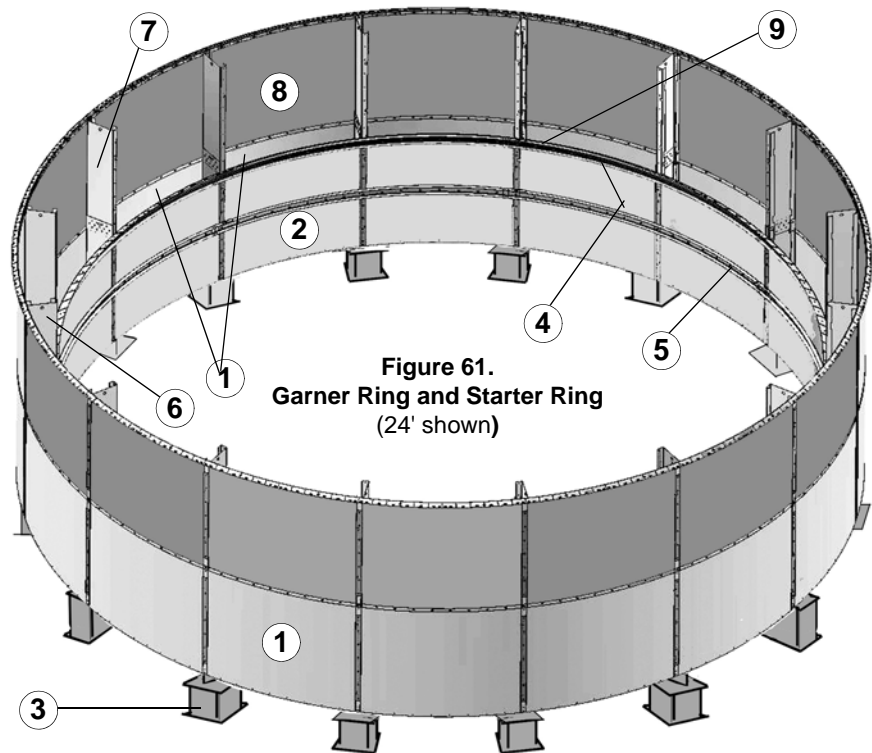
Add Roof Stringers for the Garner Ring

IMPORTANT! *When the Inner Roof Cone is complete and tightened, add the Upper Heat (Roof) Stringers (3203-00002) for the Top/Garner Ring.*

Add the Outside solid Garner Ring Screens (Item 8) above the Starter Ring. The Garner ring has **no inside Screen ring**. Begin by connecting Roof Stringers (Item 7) above the Upper Heat Stringers (Item 6).

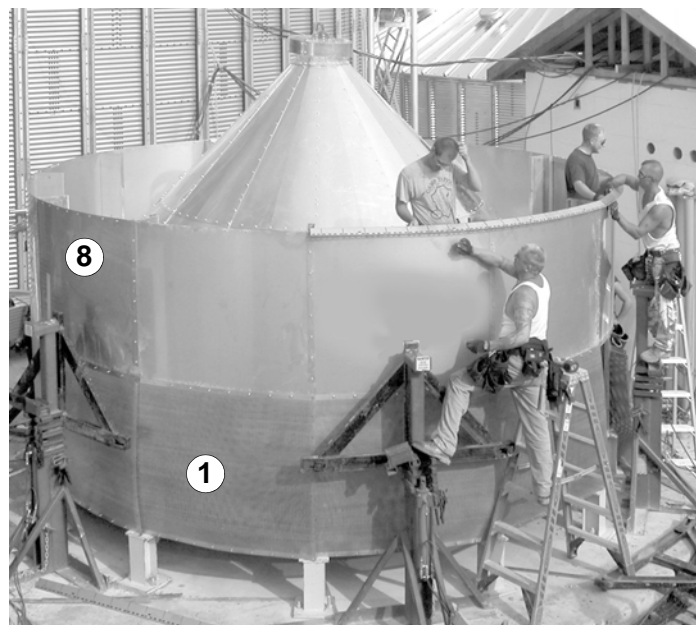
Below the solid Garner Outside Screens, hang **Starter** Ring Outside Screens (Item 1) Check perforation size according to the Diagrams on Pages 84-87.

Item	Part No.	Description
1	Starter Ring	Outer Screen
2		Inner Screen
3	3251-00012	Stub Leg Fixture
4	3202-00001	C-Channel at top of Screen
5		C-Channel at middle of Screen
6	3203-00002	Upper Heat Stringer
7	3203-00004	Roof Stringer
8	3219-00001P10	Garner Screen (solid)
9	varies	Inner Roof Attachment Ring



Do not attach/tighten the second outer ring at this time, as it may may the Outer Roof attachment difficult.

Figure 62.
Garner Ring and Starter Ring
(18' shown)



BROCK® Decals

Apply large BROCK® Decal left-right pairs (3236-00018, 3236-00019) around the Garner Ring: three (3) sets on 18' models, four (4) sets on 24' models. The paper cover helps prevent damage to the Decal during construction. However, it may be difficult to remove if left in direct sunlight for several hours

Figure 63.

BROCK® Decals Garner Ring

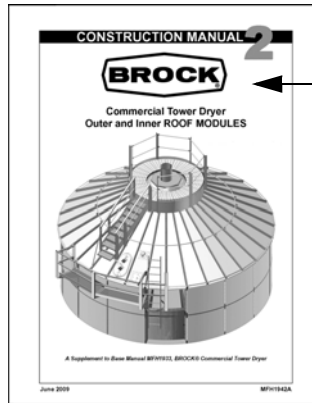


Figure 64.
Roof Supplement (TWO)
MFH1942A

Lift and Attach the Outer Roof to the Garner Ring

Refer to the Roof Supplement Manual TWO.

Begin the Wet Grain Sampler on the Garner Ring

When the solid Garner Ring has been installed, the Wet Grain Sampler pulley may be installed in the Garner Ring. Once the Tower has been lifted two-to-three rings, continue installing the white PVC Sampler Tube down the outside of the Tower. The Tube runs to the **left** of the nearest Vertical Strap. Every three rings or so, add another section of Sampler Tube.

Install a Tube Clamp Bracket on every ring down the Tower. Attach it to the Vertical Strap. On each Bracket, install a Tube Clamp. The hardware at this connection will also hold a Cable Guide. As the Tower structure progresses, unwind the loop of Cable and run it through the hook in the Cable Guides.

The instruction for the Wet Grain Sampler, MFH1980, is packaged with the Grain Sampler parts.

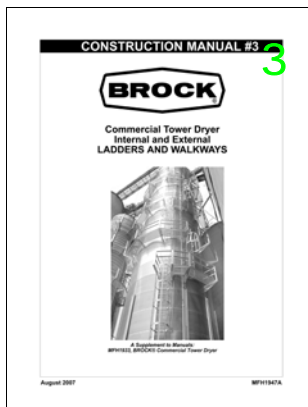
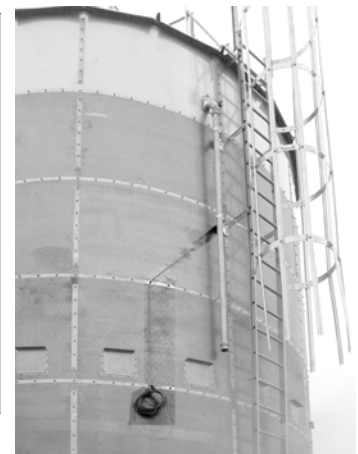
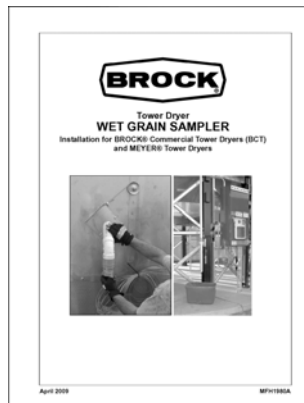


Figure 66.
Ladder Supplement (THREE)
MFH1947A

Figure 65.
Wet Grain Sampler
Tube in Progress



Begin the Eave Platform and Ladder on the Garner Ring

By the first and second lifts (third and fourth Rings down) you will need to attach the Eave Platform and begin other Outside Ladder. Refer to the Ladder Supplement Manual **THREE**. Continue building Ladders and Walkways as you build the Tower.

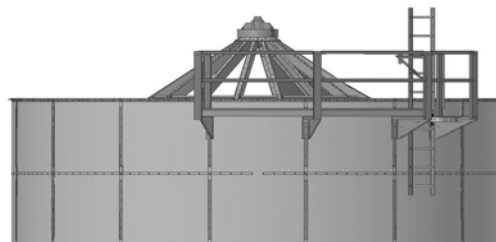


Figure 67.
Eave Platform on
Garner Ring

IMPORTANT!

Extra Stringers are installed where Catwalk Arms and Ladders attach to the Tower.

Tower Roundness Fixture

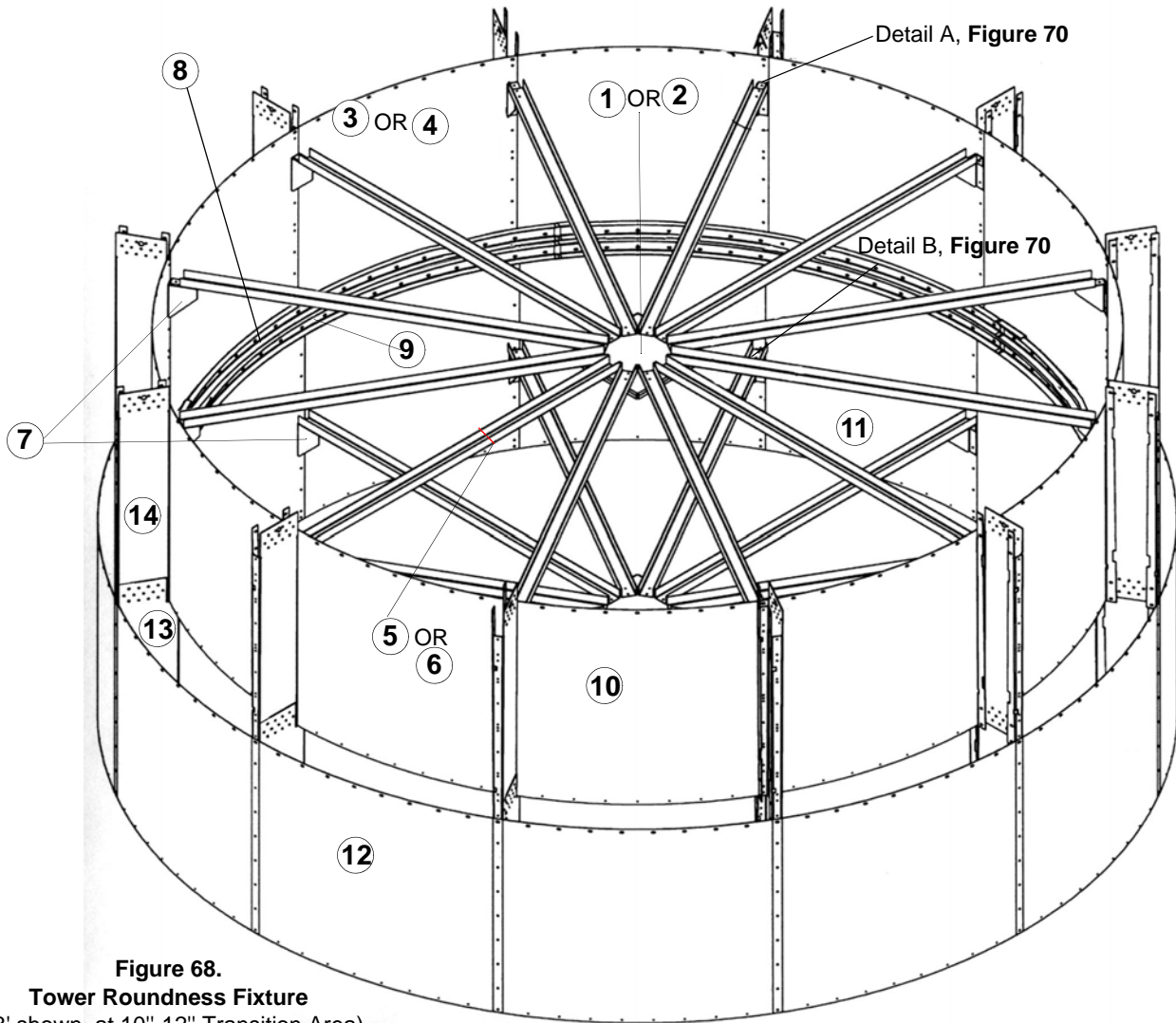


Figure 68.
Tower Roundness Fixture
(18' shown, at 10"-12" Transition Area)

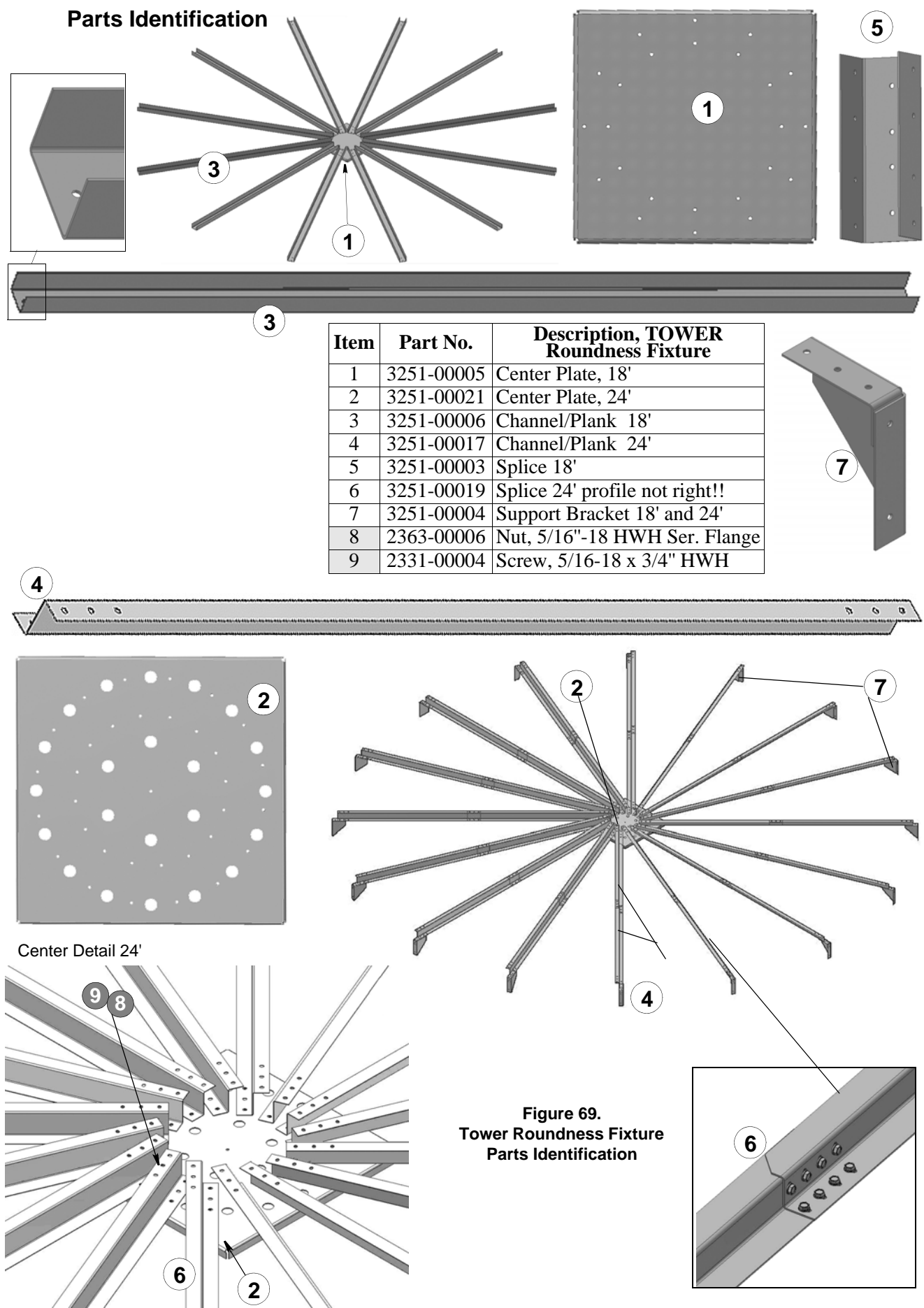
Item	Part No.	Description, Tower Roundness Fixture
1	3251-00005	Center Plate, 18'
2	3251-00021	Center Plate, 24'
3	3251-00006	Channel/Plank 18'
4	3251-00017	Channel/Plank 24'
5	3251-00003	Splice 18'
6	3251-00019	Splice 24'
7	3251-00004	Support Bracket 18' and 24'
8	3201-00001	C-Channel, 10.75" Wall
9	3201-00002	C-Channel, 12.75" Wall
10	3219-00003	Inner Screen, 10.75" Wall
11		Inner Screen, 12.75" Wall
12		Outer Screen, 12.75" Wall, .078 ga
13	3202-00005	Stringer, 12 ga. Trans-Heat
14	3203-00002	Stringer 12 ga. Upper Heat 10.75" Wall

The **Tower Roundness Fixture/Jig** is a spider-like design (also called the “Spider”) that establishes and maintains Tower Roundness as the Tower is raised.

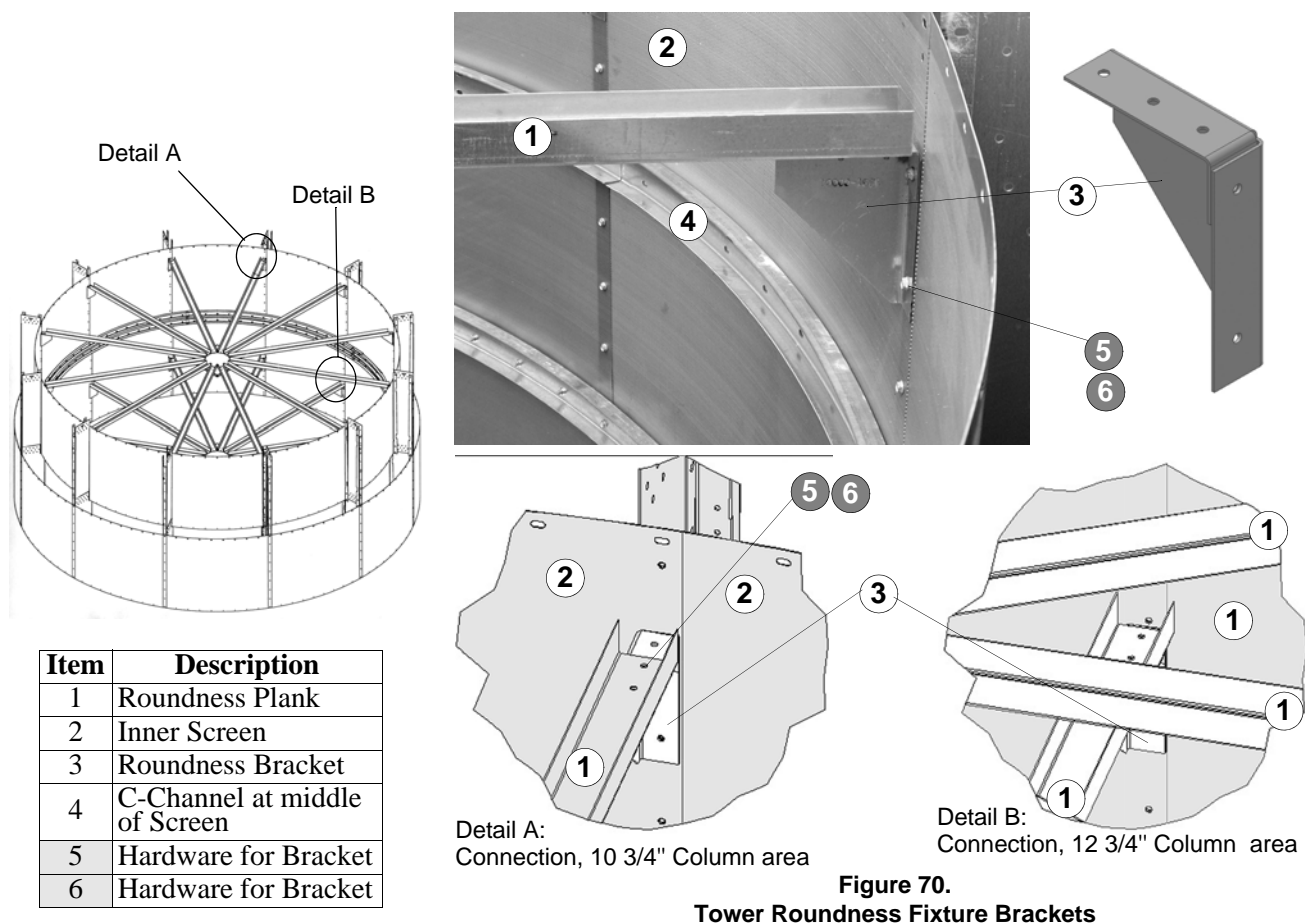
As you add levels of rings, lower and re-attach the Roundness Fixture to insure roundness at any time during Tower construction. The Fixture is also designed so that it may be left in the Roof area as footing for later servicing. Grain will pass through the perforated Center Plate.

The Tower Roundness Fixture mounts with Brackets (3251-00004) under the C-Channel at the top of the Screen. The same Mounting Bracket is used for 10 3/4" and 12 3/4" rings. Flipping the Bracket will change the diameter of the inner ring (by new hole positions). **Figure 70** shows how to turn the Bracket for the change.

(Note that the **BASE/LEG Roundness Fixture** is a separate assembly with a different wall Bracket. See Pages 75-76.)



IMPORTANT! *Roundness Fixtures must be used! The TOWER Fixture must be used before the ring below the Starter Ring is installed.*



Splice Roundness Planks together with 5/15 x 3/4" Bolts and Whiz-Lock Nuts. Use existing hardware to bolt the Brackets to the Inner Screen walls.

The TOWER Roundness Fixture can remain in the Tower for future maintenance.



Figure 71.
Tower Roundness Fixture Remains

Grain Column 10/12 Transition Area

Stringers: At this level (varies per model), Trans-Heat Stringers transition* from a 10.75" width to a 12.75" grain column width. See also **Figure 64** for a larger view of this area.

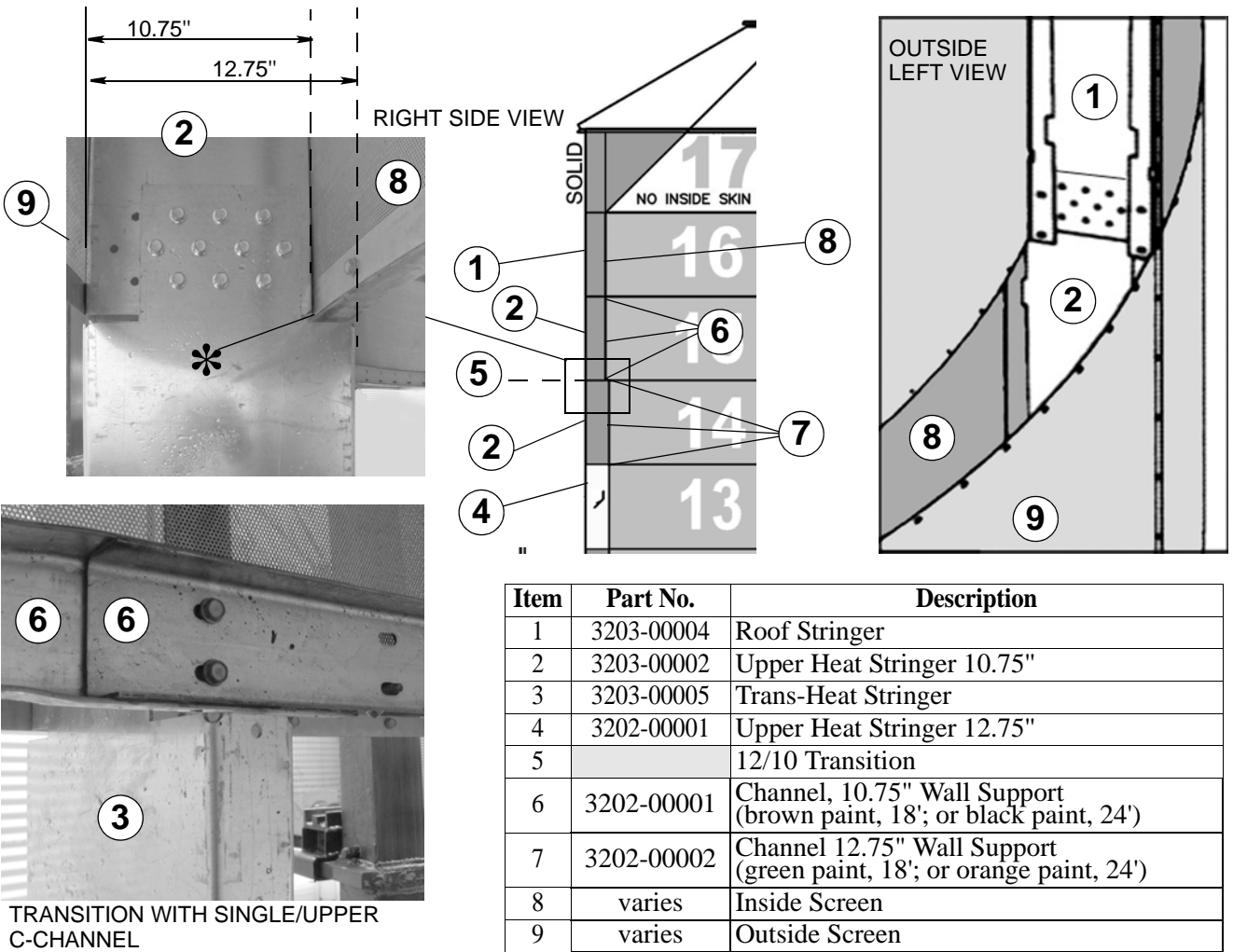
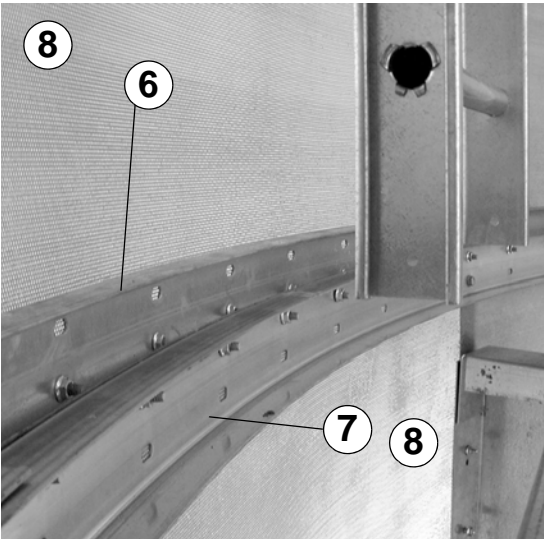


Figure 72.
Column Transition from 10.75" to 12.75" (3500 shown)



C-Channels are doubled-up at this transition. This is the only area in the Tower where two C-Channels are installed together.

Above the transition, C-Channels for 10 3/4" rings are marked with black paint (Item 6) for 24' models, and brown paint for 18' models.

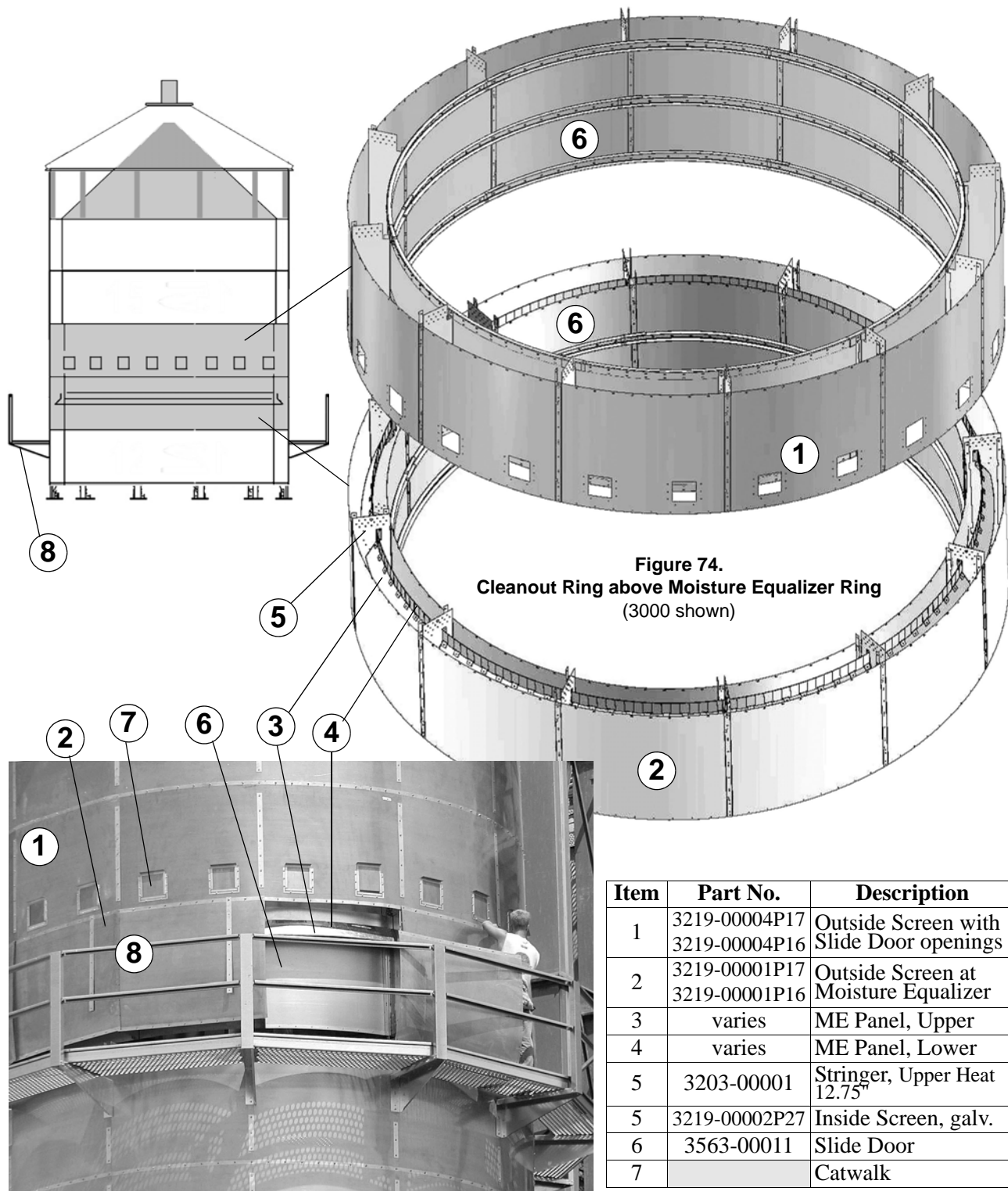
Below the transition, C-Channels for 12 3/4" rings are marked with orange paint (Item 7) for 24' models and green paint for 18' models.

Install C-Channel (Item 6) at the bottom of the Inside Screen here. On the Inside Screen below it, install C-Channel (Item 7) at the top of that Screen.

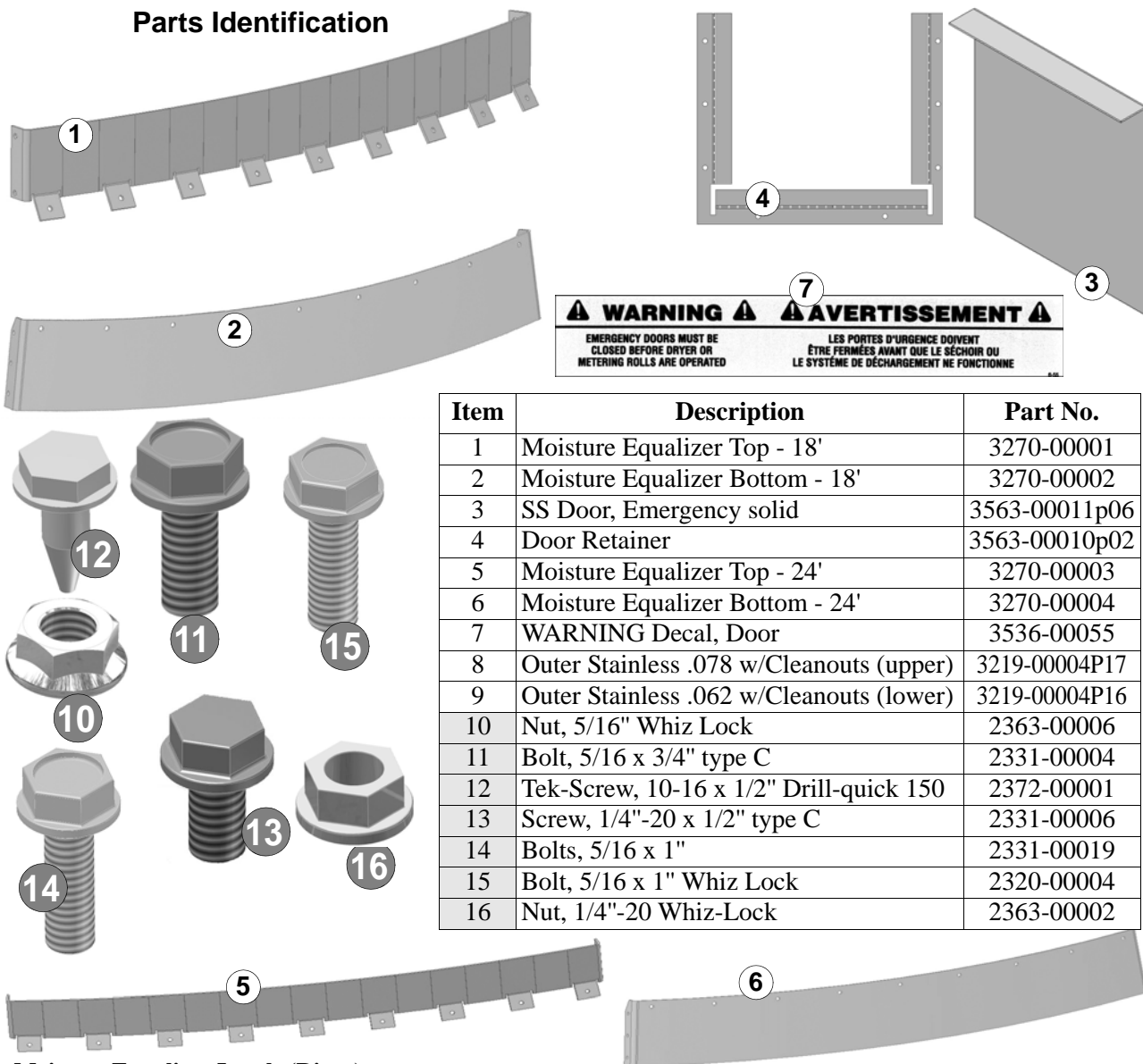
Figure 73.
Double C-Channels at 10.75" to 12.75" Transition

Moisture Equalizer Areas

By the fifth ring down on the BCT3000 (further down on other models), you will install Moisture Equalizer (ME) components. For exact levels where ME rings are located on your model, refer to **Dryer Level Profiles** on Pages 84-87. All BCT models have at least two (upper and lower) ME levels. ME rings will always have an exterior Catwalk, and a ring of Slide Doors above the ME ring. Outer Screen gauges change from .078 on upper ME areas to .062 on lower ME areas.



Parts Identification



Item	Description	Part No.
1	Moisture Equalizer Top - 18'	3270-00001
2	Moisture Equalizer Bottom - 18'	3270-00002
3	SS Door, Emergency solid	3563-00011p06
4	Door Retainer	3563-00010p02
5	Moisture Equalizer Top - 24'	3270-00003
6	Moisture Equalizer Bottom - 24'	3270-00004
7	WARNING Decal, Door	3536-00055
8	Outer Stainless .078 w/Cleanouts (upper)	3219-00004P17
9	Outer Stainless .062 w/Cleanouts (lower)	3219-00004P16
10	Nut, 5/16" Whiz Lock	2363-00006
11	Bolt, 5/16 x 3/4" type C	2331-00004
12	Tek-Screw, 10-16 x 1/2" Drill-quick 150	2372-00001
13	Screw, 1/4"-20 x 1/2" type C	2331-00006
14	Bolts, 5/16 x 1"	2331-00019
15	Bolt, 5/16 x 1" Whiz Lock	2320-00004
16	Nut, 1/4"-20 Whiz-Lock	2363-00002

Moisture Equalizer Levels (Rings)

Model	Total Rings	Number Rings DOWN as Tower is Raised	OR Ring UP from Bottom
3000	2	5	13th
		9	9th
3500	2	6	14th
		11	9th
4000	2	9	14th
		14	9th
4700	2	8	18th
		13	13th
5000	2	9	15th
		13	11th
6000	2	9	17th
		13	13th
7000	2	9	17th
		14	14th

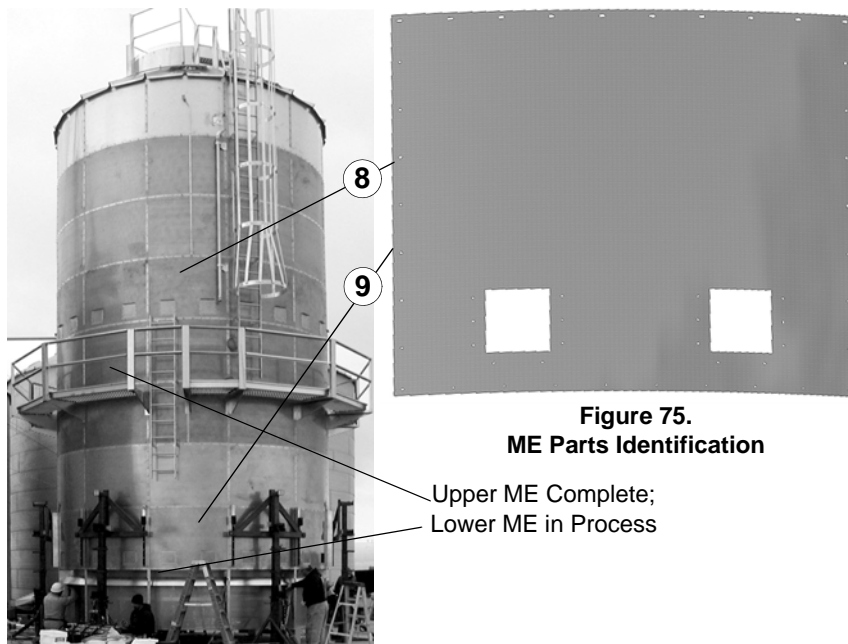


Figure 75.
ME Parts Identification

Upper ME Complete;
Lower ME in Process

Cleanout Ring (Above the Moisture Equalizer Ring)

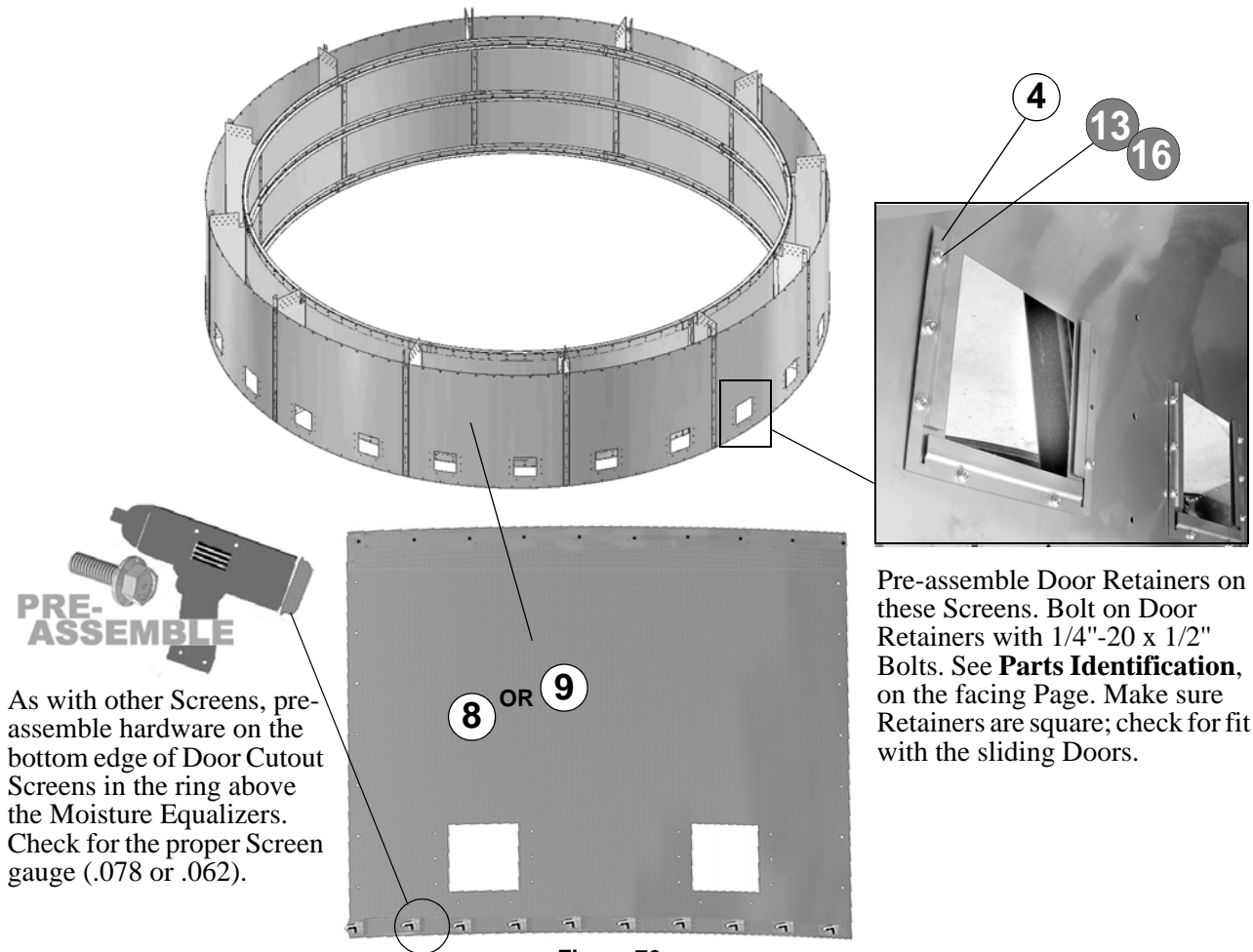


Figure 76.
Outside Cleanout Screens Above ME Ring

Item	Description	Part No.
3	SS Door, Emergency solid	3563-00011p06
4	Door Retainer	3563-00010p02
7	WARNING Decal, Door	3536-00055
8	Outer Stainless .078 w/Cleanouts (upper)	3219-00004P17
9	Outer Stainless .062 w/Cleanouts (lower)	3219-00004P16
13	Screw, 1/4"-20 x 1/2" type C	2331-00006
16	Nut, 1/4"-20 Whiz-Lock	2363-00002

Install the Inside and Outside Screens completely in this Ring.

To avoid damage, do not put WARNING Decals on the Sliding Doors until they are installed in the Retainers.

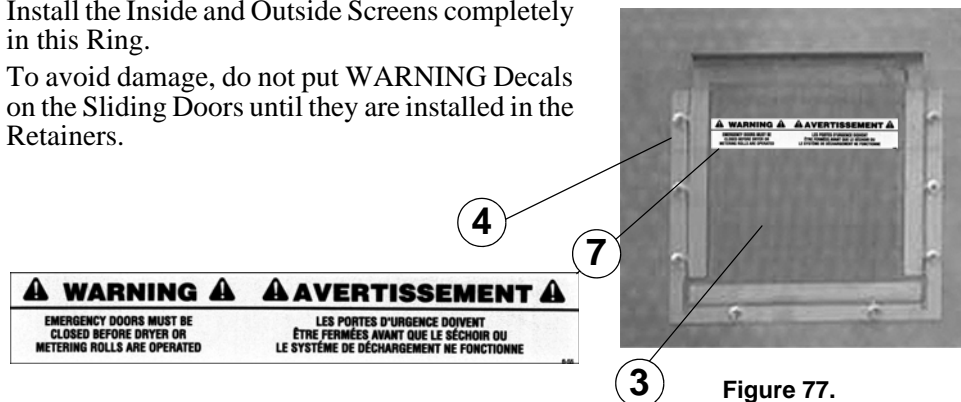


Figure 77.
Finish Slide Doors

Moisture Equalizer Ring

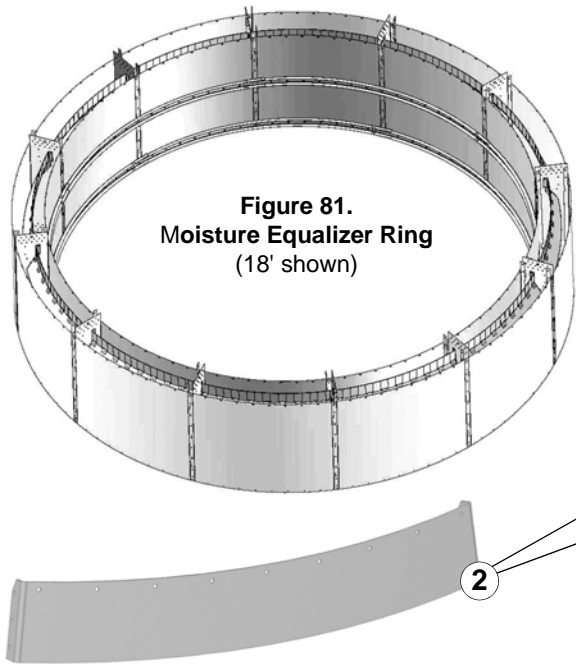


Figure 81.
Moisture Equalizer Ring
(18' shown)

Top and Bottom Moisture Equalizer Panels (can be install in either order) must be completely secured to the Inside Screen (within the grain column area) **before** the Outside Screen is installed. Bolt the Moisture Equalizer TOP Panel (Item 1) between two Stringers. Use 2320-00004 and 2363 00006.

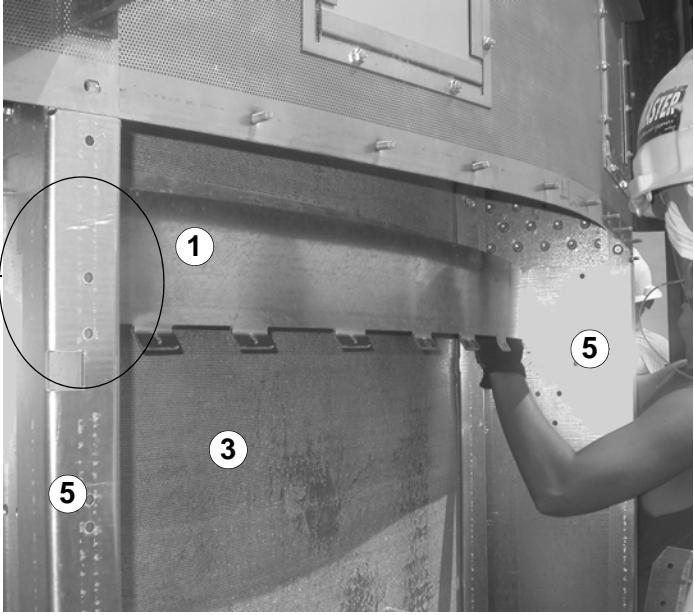
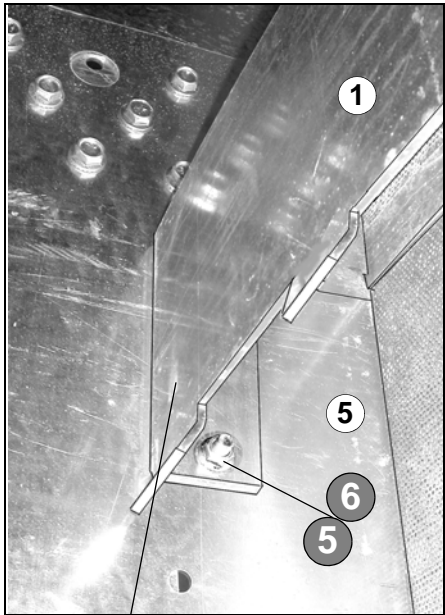
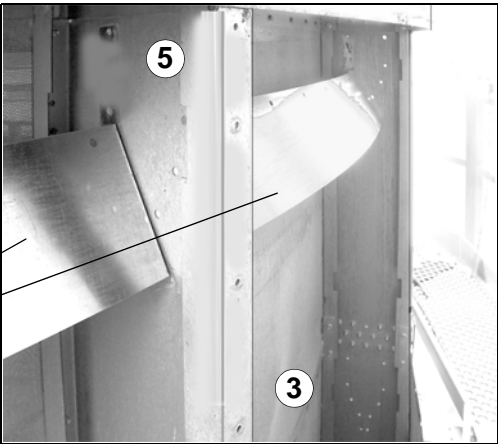
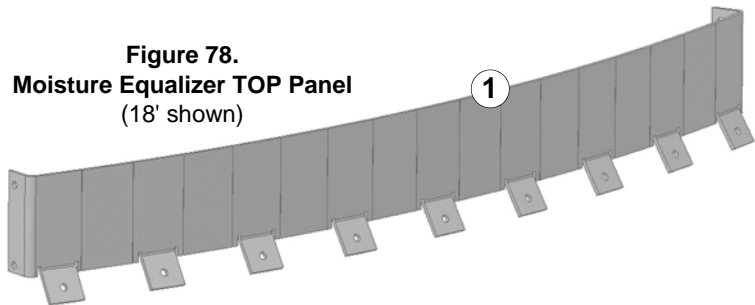


Figure 78.
Moisture Equalizer TOP Panel
(18' shown)



Item	Description
1	Moisture Equalizer Top
2	Moisture Equalizer Bottom
3	Inside Screen
4	Outside Screen
5	Stringer
6	Nut, 5/16" Whiz Lock
7	Bolt, 5/16 x 3.4" type C

Continue around the Tower, with new Moisture Equalizer Panels sharing hardware through the Stringer. Be sure the tabs on te Top Panel lay on top of the Bottom Panel. Attach the remaining Panels (Top or Bottom) to the first Panels installed. Use 2331-00004 and 2363-00006.

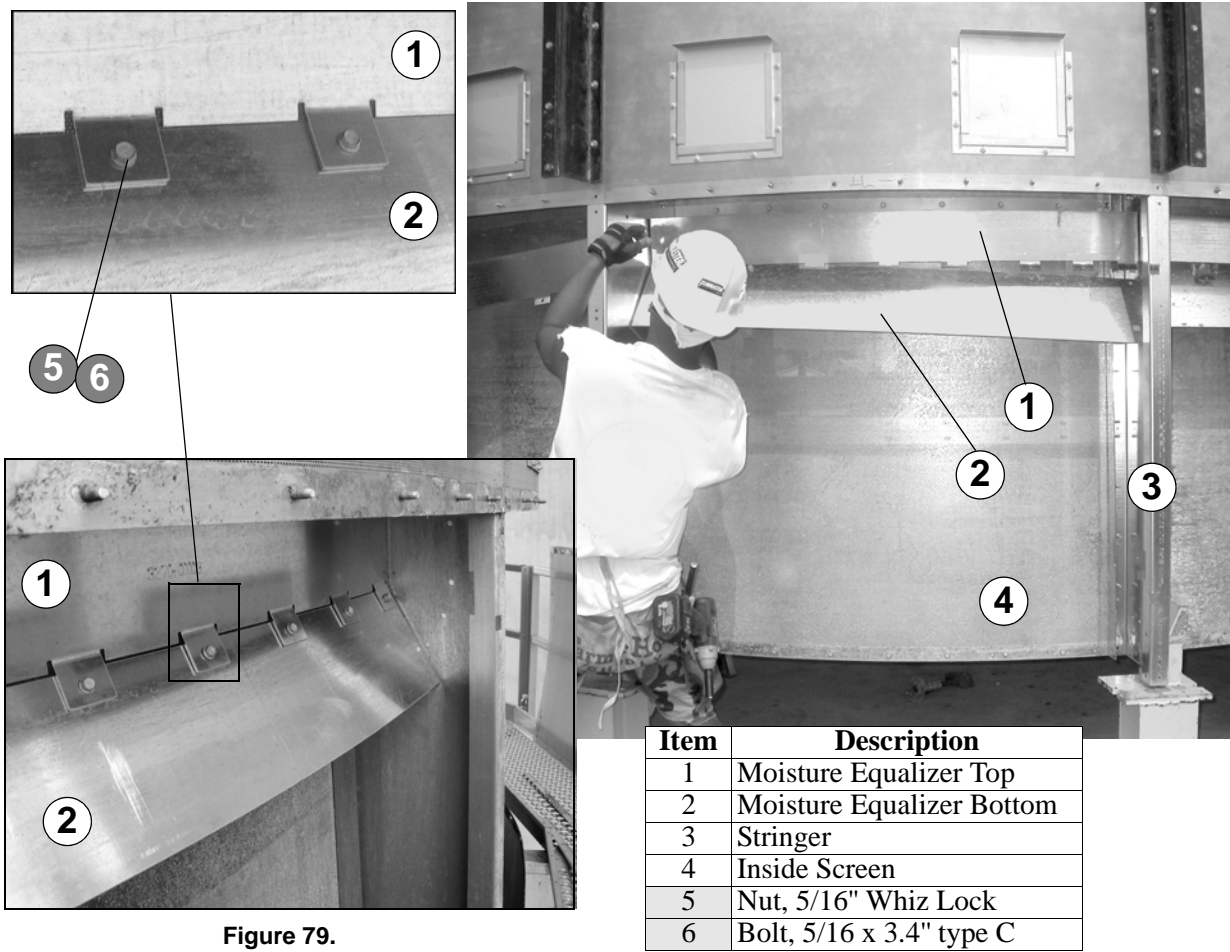


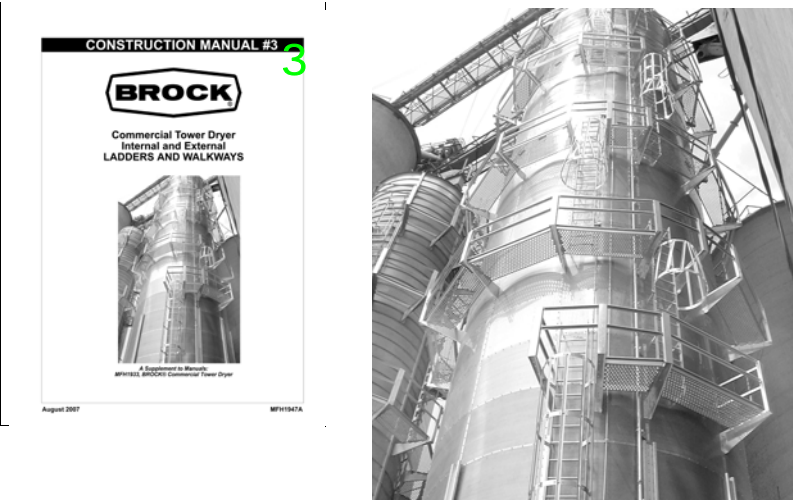
Figure 79.
ME Bottom Panel Installed (18' shown)

Mid Rings: Ladders and Walkways

By the first and second lifts (third and fourth Rings down) you will need to attach the Eave Platform and begin other Outside Ladder-and-Cage sections. Refer to the instructions and diagrams in Ladder Supplement Manual **THREE**. Supplemental Manuals are located inside the QUANTUM® Control Box. Continue building Ladders and Walkways as you build the Tower.

IMPORTANT! *Extra Stringers are installed where Catwalk Arms and Ladders attach to the Tower.*

Figure 80.
Ladder Supplement (THREE)
MFH1947



Mid Rings: Plenum Area, Burner, Duct, Heat Floor

When the Tower is approximately halfway finished, you will need Supplemental Manual **FIVE** to install the Internal Duct, Plenum Floor, and Burner: At the level where there is a solid Outside Screen, the Plenum (Heat) Floor will connect from the Air Duct to the Inside Screen with (3 each) cutouts for FInes Recirculators. This Manual and other Supplemental Manuals are located inside the QUANTUM® Control Box. The **Model Comparison Chart** below shows where this Plenum level is on each BCT model.

Model Comparison Chart

Ring	BCT3000	BCT3500	BCT4000	BCT4700	BCT5000	BCT6000	BCT7000
							Upper Roof
27				Upper Roof		Upper Roof	Cone
26				Cone		Cone	∇Top Ring
25				∇Top Ring	Upper Roof	∇Top Ring	
24			Upper Roof		Cone		
23			Cone		∇Top Ring		
22			∇Top Ring				Catwalk
21		Upper Roof		Catwalk			
20		Cone					
19	Upper Roof	∇Top Ring					Moisture Eq.
18	Cone		Catwalk	Moisture Eq.	Catwalk		
17	∇Top Ring			Catwalk		Moisture Eq.	
16						Catwalk	
15					Moisture Eq.		
14		Moisture Eq.	Moisture Eq.		Catwalk		Moisture Eq.
13	Moisture Eq.	Catwalk	Catwalk	Moisture Eq.		Moisture Eq.	Catwalk
12	Catwalk			Catwalk		Catwalk	
11					Moisture Eq.		
10							
9	Moisture Eq.	Moisture Eq.	Moisture Eq.				
8	Catwalk	Catwalk	Catwalk	Catwalk		Catwalk	Catwalk
7				◆ Plenum Floor			◆ Plenum Floor
6			◆ Plenum Floor				
5	Plenum Floor	Plenum Floor			◆ Plenum Floor	◆ Plenum Floor	Catwalk
4	◆ Catwalk	◆ Catwalk			Catwalk	Catwalk	
3	Top Stiffener						
2	(Stiffener Splice between)						
1	Bottom Stiffener						
	Leg Weldments						

∇ Solid Skin/Screen Outside; no Inside Skin Plenum Floor is in the middle of a Solid Skin/Screen

◆ Solid Skins/Screens Inside and Outside

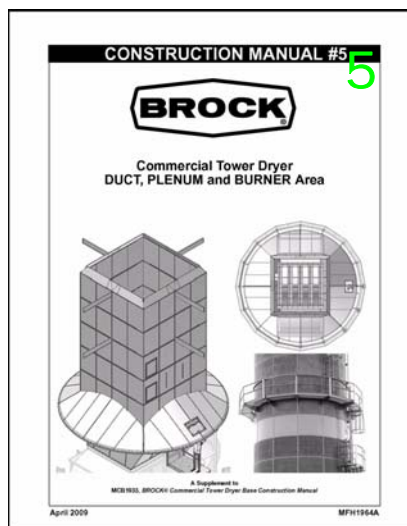
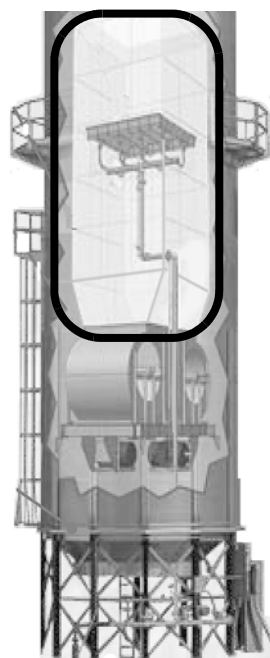
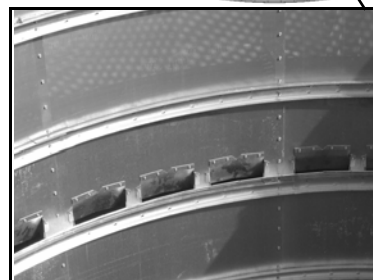
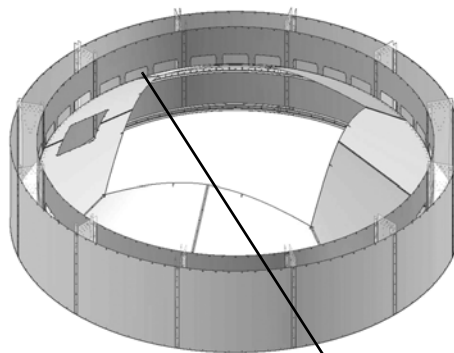


Figure 81.
Plenum Supplement (FIVE)
MFH1964



Bottom Four (4) Stiffened Rings

One- to-two Rings below the solid Plenum Connection are the bottom four (4) rings supported by two (2) Stiffeners (each) two rings high. Install Horizontal Straps (3240-00008) between these “W”-shaped Stiffeners. Vertical Straps are not installed underneath the Stiffeners.

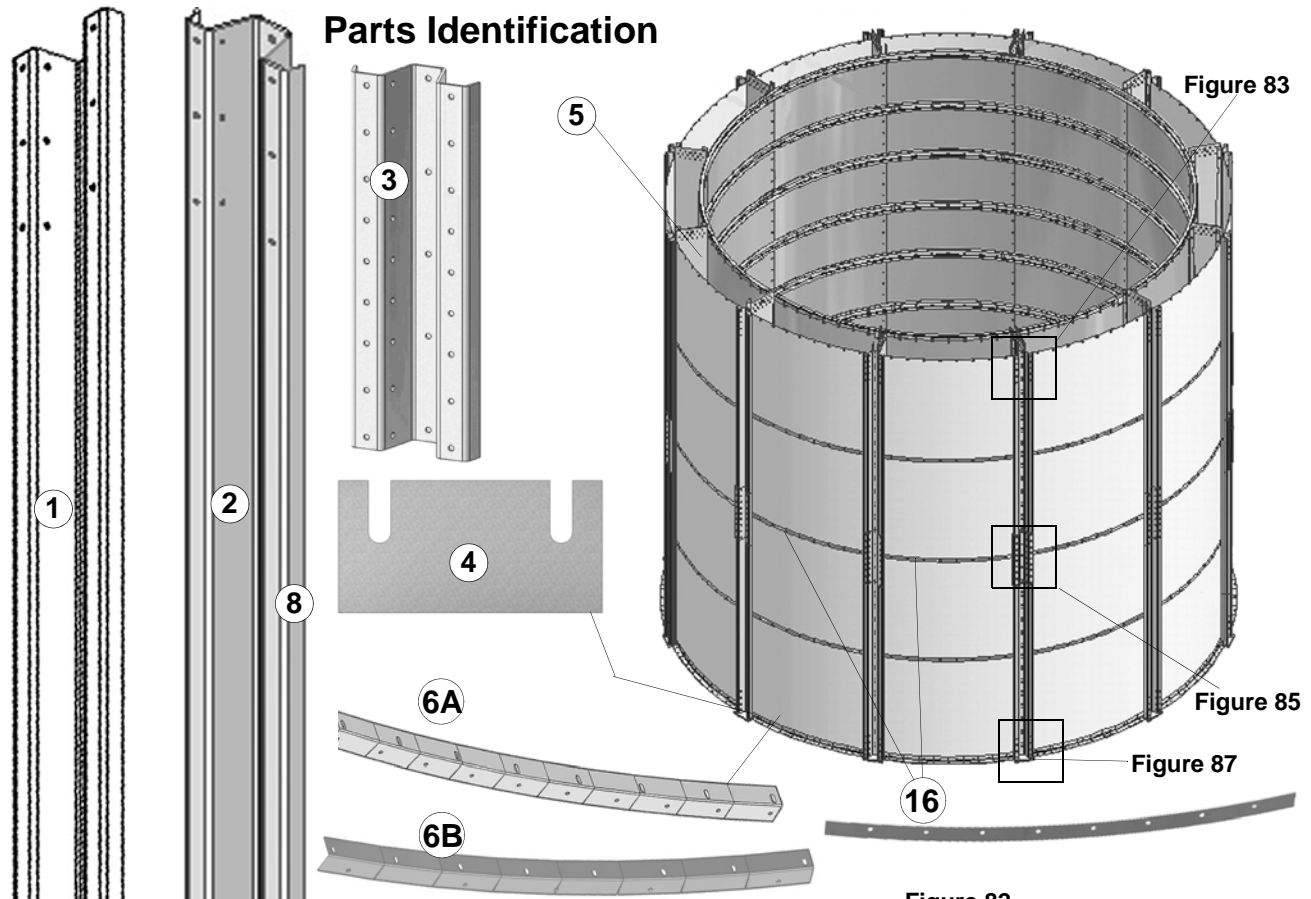


Figure 82.
Bottom Four (4) Tower Rings with Stiffeners (18' shown)

Item	Part No.	Description	18'	24'
1	3240-00001	Stiffener, 8ga. 2-Ring TOP	12	16
2	3240-00003	Stiffener, Weldment 8 ga. 2-Ring BOTTOM 94"	12	16
3	3240-00004	Splice, Stiffener	12	16
4	9-29702	Shim, Stiffener Base	24	32
5	3203-00003	Stringer, Lower Cool Chamber, 12 ga.	12	16
6A	3202-00006	Flashing Attachment, Outer Screen to Legs 18'	6	
6B	3202-00003	Flashing Attachment, Outer Screen to Legs 24'		
7	39-20070	Bolt, Hex Head Gr 8, 5/16-18 x 1" (self-tap Stringers, Stiffener level)		
8	2363-00006	Nut, 5/16-18 Flange, stainless		
9	2364-00041	5/16" Brass Washer		
10	2318-00046	Bolt, Hex Head Gr 8, 5/16-18 x 1 1/4"		
11	2363-00004	Nut, 5/16" Flange SS		
12	2320-00004	Bolt, 5/16-18 x 1 HWH Whiz-Lock		
14		Base Frame		
15		Outside Screen		
16	3240-00008	Short Horizontal Strap (Stiffener area)		

Locate:

- Top and Bottom Stiffeners, shipped banded together on a pallet
- Stiffener Splices
- Jack Lifting Brackets for Stiffener attachment (together on a pallet). Consult your Jack manufacturer's manual to be sure these attachments are installed correctly and safely before proceeding.
- Note that Gr.8 Bolts tapped into Stringers at Stiffeners are 1 1/4" long.

Top Stiffener

Begin the Top Stiffener (no Foot Weldment) at the horizontal seam, at the second bolt hole (down) as shown.

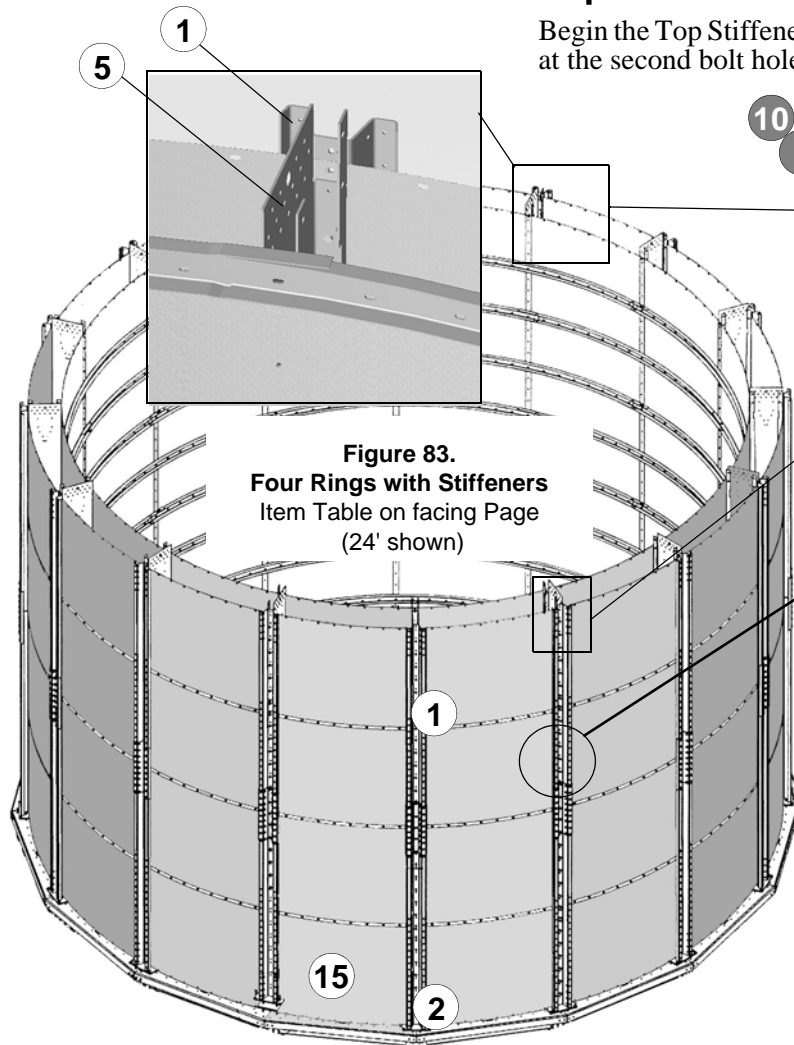
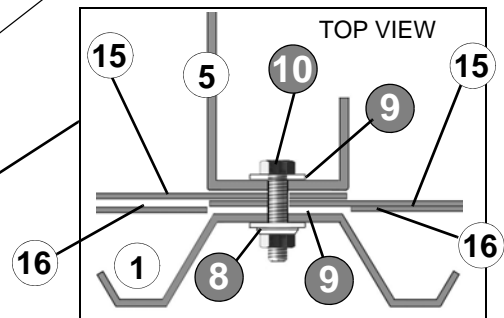
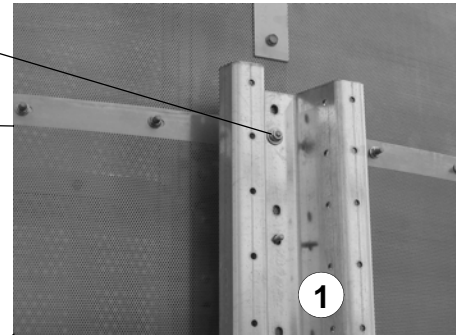


Figure 83.
Four Rings with Stiffeners
Item Table on facing Page
(24' shown)



Use a Gr. 8 Bolt 1 1/4" long in the Stringers at Stiffener-level. Install a Brass Washer (inside, under the Bolt head) and outside with a stainless Whiz Lock Nut to Stiffeners on the vertical seams.

There is **no Vertical Strap** under Stiffeners.

After all Top Stiffeners are installed and tightened, lift the Dryer a distance of two (2) Rings up for clearance to add the Bottom Stiffeners and Splice. See **Figure 84A**.

Stiffener Splice

Use a Stiffener Splice (Item 3) to connect Top and Bottom Stiffeners.

Set the Splice outside the Top Stiffener, with the Splice mid-hole over the horizontal Screen seam. Insert the Bolt with head **outside*** in the mid-hole. See **Figure 85**.

Add hardware in the top four bolt holes to connect the Splice to the lower end of the Top Stiffener. See **Figure 85** on the following page. (continued)

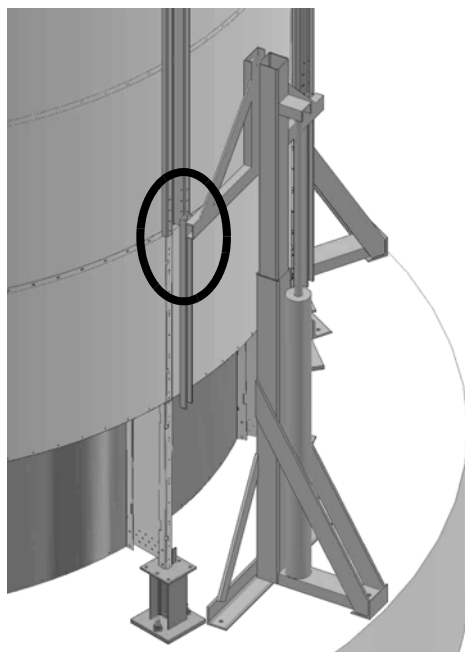


Figure 84A.
Stiffener Lifts Necessary: Two (2) Rings to
Add Bottom Stiffener
Item Table on Facing Page.

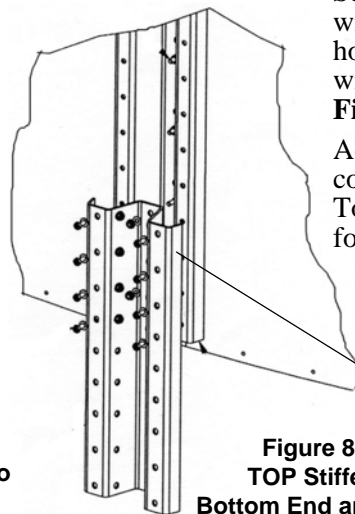
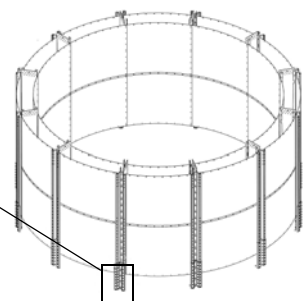
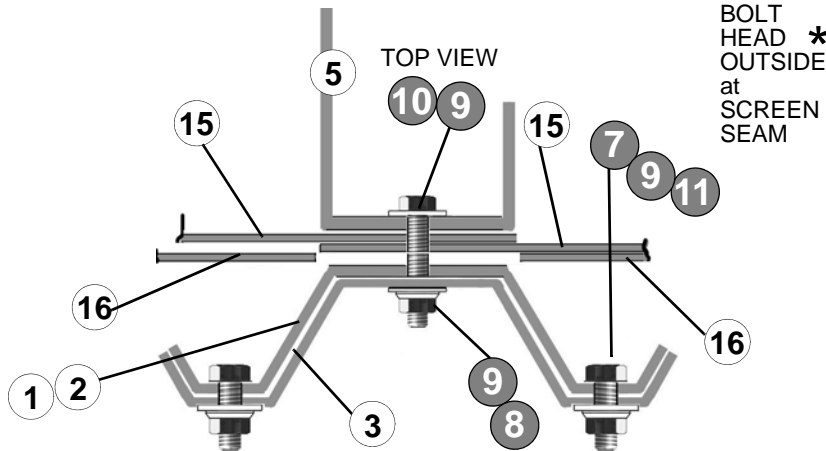


Figure 84A.
TOP Stiffener,
Bottom End and Splice
Item Table on facing Page



Item	Part No.	Description
1	3240-00001	Stiffener, 8ga. 2-Ring TOP
2	3240-00003	Stiffener, Weldment 8 ga. 2-Ring BOTTOM 94"
3	3240-00004	Splice, Stiffener
5	3203-00003	Stringer, Lower Cool Chamber, 12 ga.
7	39-20070	Bolt, Hex Head Gr 8, 5/16-18 x 1" (self-tap Stringers, Stiffener level)
8	2363-00006	Nut, 5/16-18 Flange, stainless
9		5/16" Brass Washer
10	2318-00046	Bolt, Hex Head Gr 8, 5/16-18 x 1 1/4"
11	2363-00004	Nut, 5/16" Flange SS
12	2320-00004	Bolt, 5/16-18 x 1 HWH Whiz-Lock
14		Base Frame
15		Outside Screen
16	3240-00008	Horizontal Strap, SHORT



Stiffener Splice (continued)

Bolt the Splice and Stiffener outer flanges together with 5/16 x 1" Gr. 8 Hex Head Bolts. Use a Brass Washer and Stainless Flange Nut on the outside.

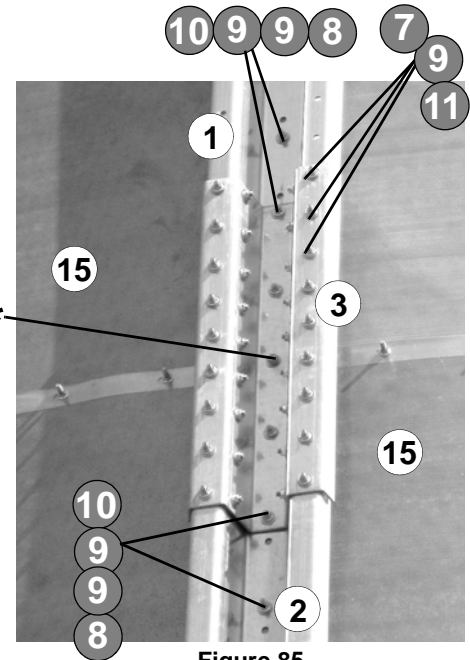


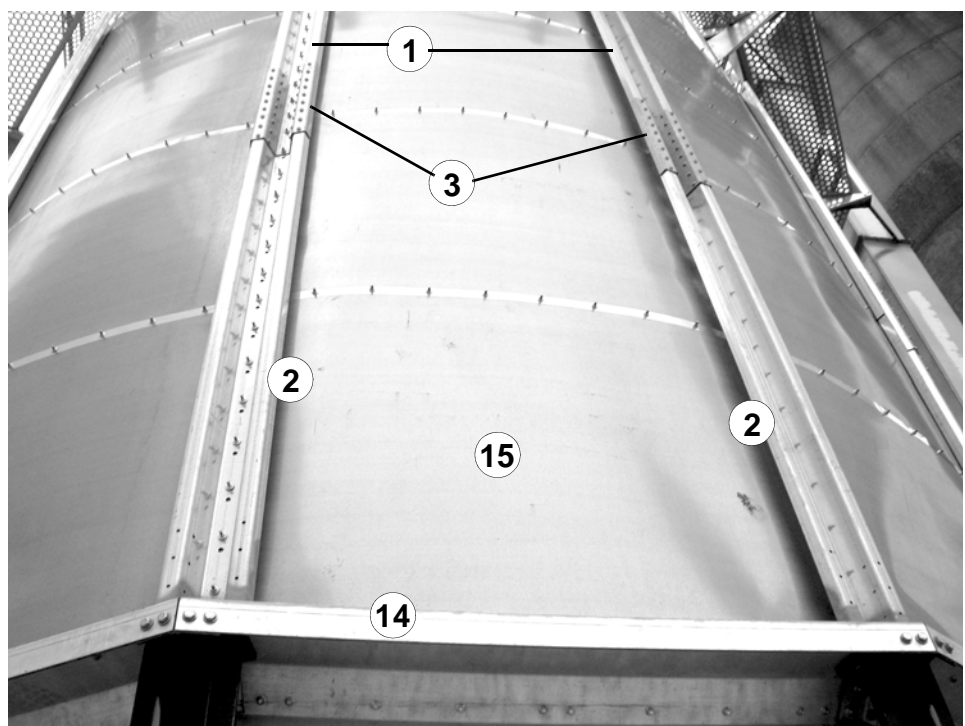
Figure 85.
Stiffener and Splice Hardware
(Short Horizontal Straps not yet installed)

Bottom Stiffeners

After all Splices are installed, the Tower must be completely raised another two (2) Rings before Bottom Stiffeners are added. When the Tower is raised to accommodate the bottom two rings, slide the Bottom Stiffener under the Splice and attach it to the Splice and Screen vertical seams. Repeat for all Stiffeners.

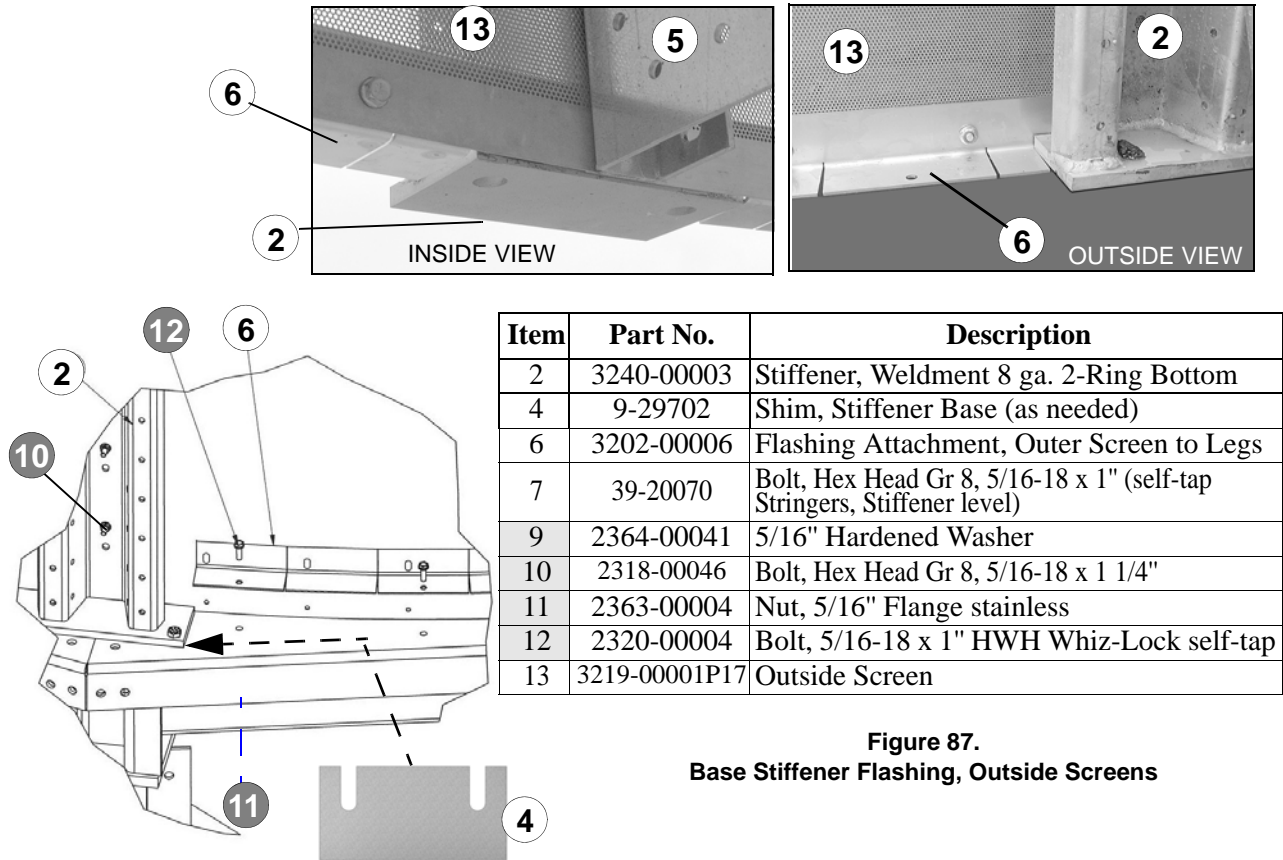


Figure 86.
Bottom Stiffeners



Stiffener Flashing

Install Stiffener/Ring Flashing to the outside bottom edge of the first Ring. Field-cut the Flashing around Stiffener Foot Weldments.



Install the Inner Hopper Attachment Angle and continue with Supplemental Manual SEVEN to complete the Hopper after the Base Ring is installed.

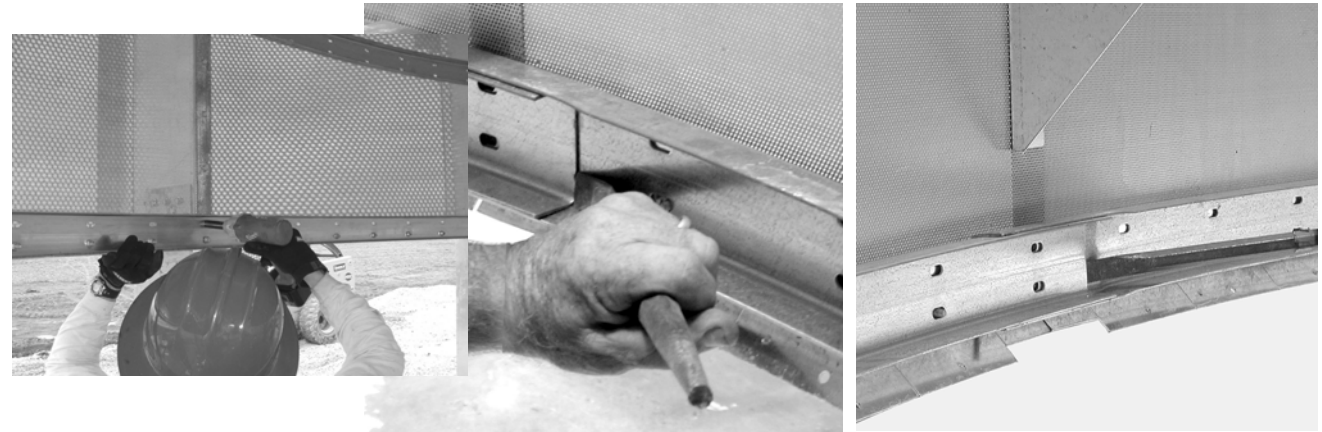


Figure 88.
Inner Hopper Attachment Angle, Inside Screens on Final (Lowermost) C-Channel

Support Structure: Legs, X-Bracing and Base Frame

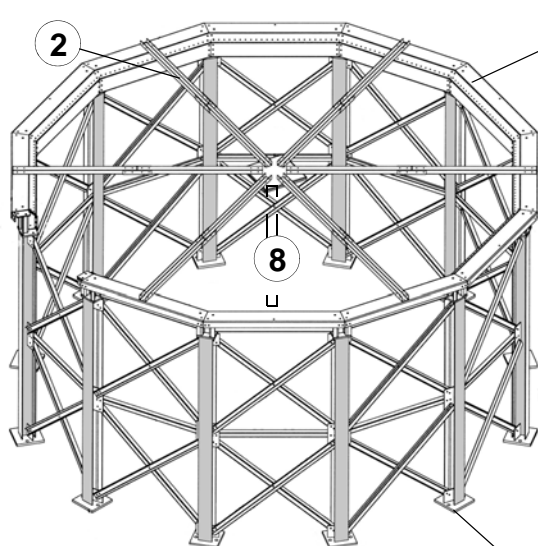


Figure 89.
Support Structure, 18' shown

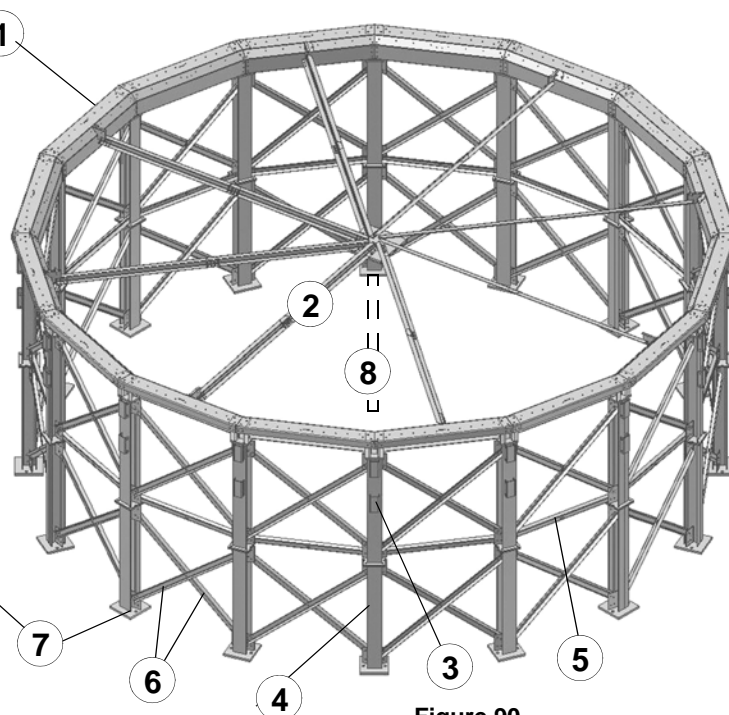


Figure 90.
Support Structure, 24' shown

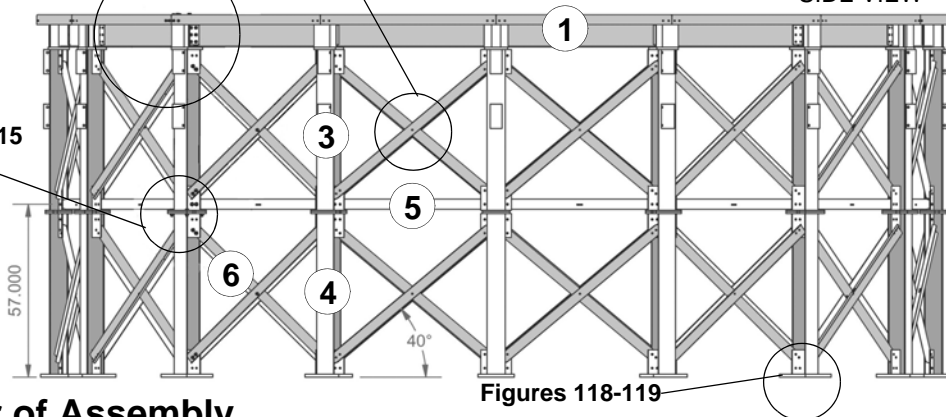
Figures 98-103

Figure 108.

SIDE VIEW

Figures 114-115

Figure 91.
Support Structure, 24' shown



Figures 118-119

Overview and Order of Assembly

1. **Upper Leg Weldments** must be set in place with the entire Tower supported on the jacks. Upper Legs are positioned directly under the Bottom Stiffener Feet.
2. All **Base Frame** sections must be installed between the Upper Leg top plate and Stiffener Attachment Flashing while the Tower is supported on jacks.
3. Once the Base Frame is completed, the **Base Roundness Fixture** is installed (temporarily) to insure the roundness of the Base Frame. Support the Center Plate with a field-cut wooden support or 2 x 4 (not provided). **Tighten** all hardware.
4. Set the Tower down on the Base Frame, shimming as necessary, and connecting the Tower Flashing to the Base Frame.
5. The Tower can now be lifted with the jacks one final time to add the Lower Legs and Bracing.

Item	Description
1	Base Frame
2	Base Roundness Fixture
3	Upper Leg Weldment
4	Lower Leg Weldment
5	Horizontal Tie Brace
6	Diagonal X-Brace
7	Seismic Foot, Bottom Leg
8	Wooden center support

Parts Identification

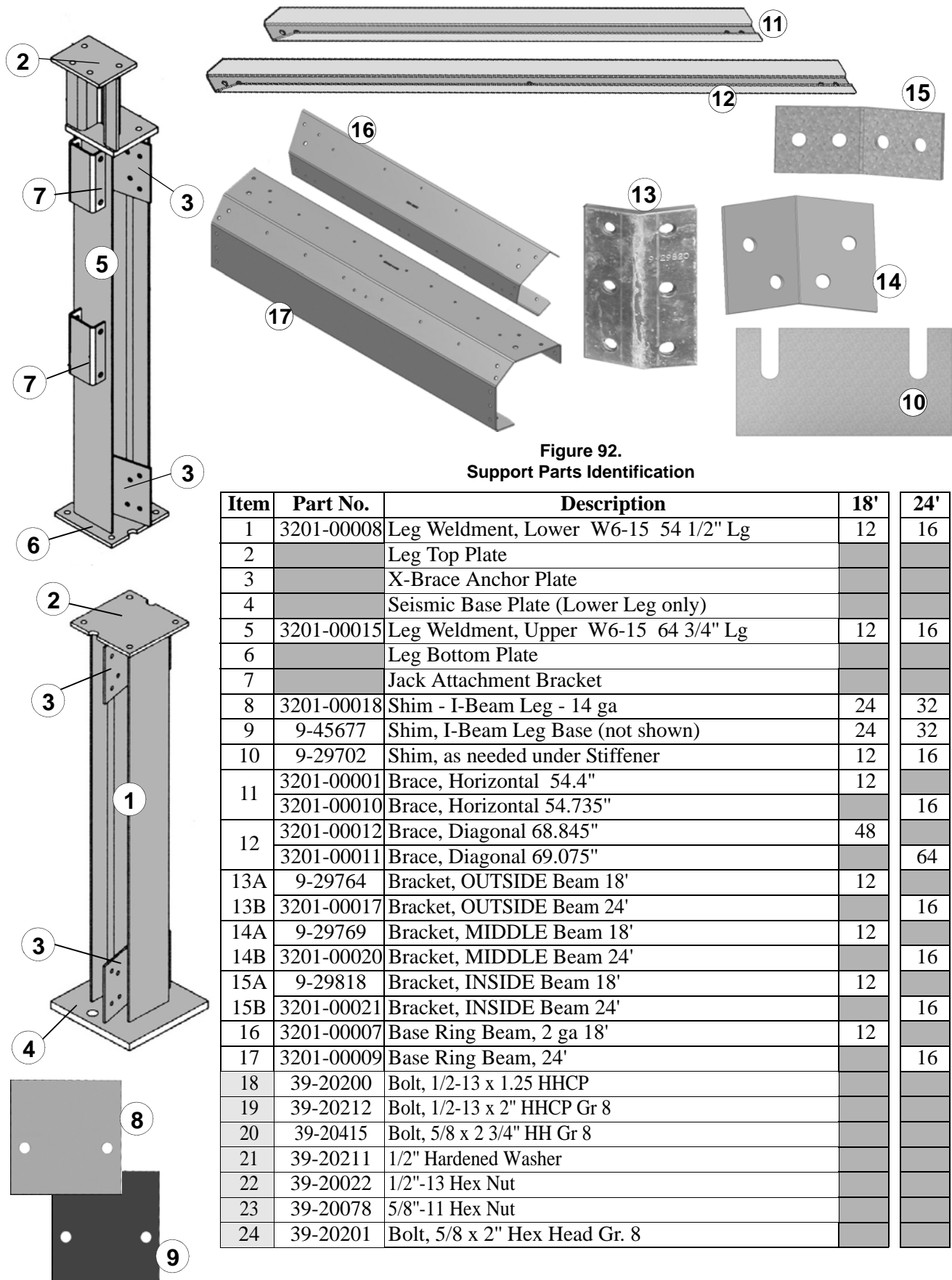


Figure 92.
Support Parts Identification

Item	Part No.	Description	18'	24'
1	3201-00008	Leg Weldment, Lower W6-15 54 1/2" Lg	12	16
2		Leg Top Plate		
3		X-Brace Anchor Plate		
4		Seismic Base Plate (Lower Leg only)		
5	3201-00015	Leg Weldment, Upper W6-15 64 3/4" Lg	12	16
6		Leg Bottom Plate		
7		Jack Attachment Bracket		
8	3201-00018	Shim - I-Beam Leg - 14 ga	24	32
9	9-45677	Shim, I-Beam Leg Base (not shown)	24	32
10	9-29702	Shim, as needed under Stiffener	12	16
11	3201-00001	Brace, Horizontal 54.4"	12	
	3201-00010	Brace, Horizontal 54.735"		16
12	3201-00012	Brace, Diagonal 68.845"	48	
	3201-00011	Brace, Diagonal 69.075"		64
13A	9-29764	Bracket, OUTSIDE Beam 18'	12	
13B	3201-00017	Bracket, OUTSIDE Beam 24'		16
14A	9-29769	Bracket, MIDDLE Beam 18'	12	
14B	3201-00020	Bracket, MIDDLE Beam 24'		16
15A	9-29818	Bracket, INSIDE Beam 18'	12	
15B	3201-00021	Bracket, INSIDE Beam 24'		16
16	3201-00007	Base Ring Beam, 2 ga 18'	12	
17	3201-00009	Base Ring Beam, 24'		16
18	39-20200	Bolt, 1/2-13 x 1.25 HHCP		
19	39-20212	Bolt, 1/2-13 x 2" HHCP Gr 8		
20	39-20415	Bolt, 5/8 x 2 3/4" HH Gr 8		
21	39-20211	1/2" Hardened Washer		
22	39-20022	1/2"-13 Hex Nut		
23	39-20078	5/8"-11 Hex Nut		
24	39-20201	Bolt, 5/8 x 2" Hex Head Gr. 8		

Prepare for Base Frame and Upper Legs

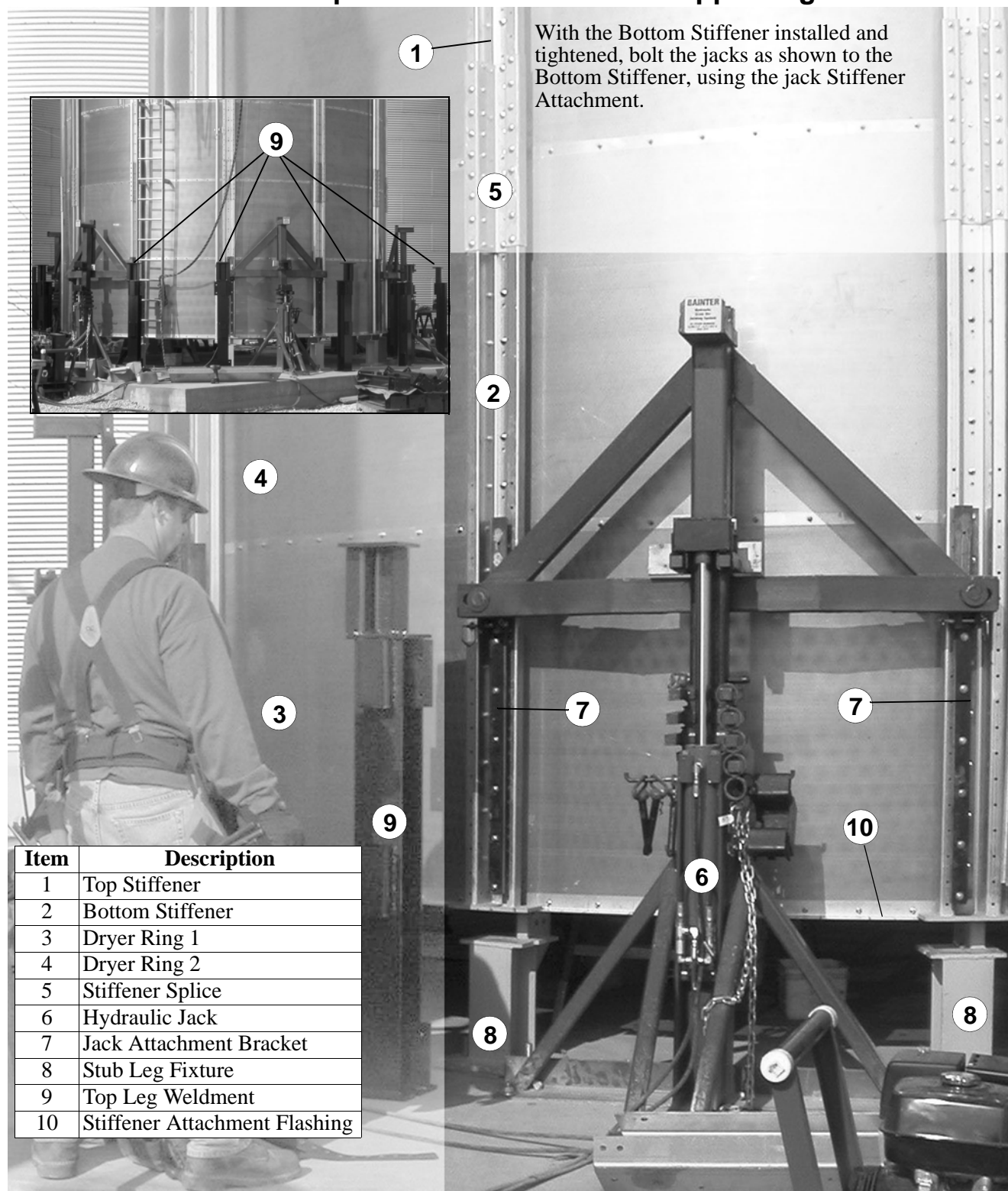


Figure 93.
Preparation to Lift for Upper Legs

IMPORTANT! *Unbolt the Stringers from the Stub Leg Fixtures before starting to lift the structure with the jacks. DO NOT unbolt Stringers until the jacks are securely bolted to the structure vertical seams/Stiffeners with Jack Attachments.*

Remove Stub Leg Fixtures

When the structure is totally secured to the jacks, unbolt the bottom Stringers from the yellow Stub Leg Fixtures.

Raise the structure slowly and evenly so that the bottom of the structure clears the Stub Leg Fixtures.

Unbolt the Fixtures from the concrete pad as you go around. Remove all the Stubs from the concrete pad so they will not be a stumbling hazard and obstruct the work.



Figure 94.
Remove Stub Leg Fixtures

Position **Upper** Leg Weldments closeby at all Stiffener/Stringer locations, where they can be slipped into place with minimal movement. While the **Upper** Leg is 6" [15.2 cm] longer than the Bottom Leg Weldments, and has jack attachment "pockets."

Lift the Tower a minimum 65" [164.1 cm] off the pad up to the Stiffener Flashing Ring. With the Tower raised 65" off the pad, the Upper Leg 64 3/4" [164.5 cm] long, when inserted properly below the Stiffener Flashing, allows for 1/4" [6.4 mm] of clearance.

Check Levelness of the Concrete Pad, Correct with Shims

Use a transit to re-check concrete levelness at each location. Shim as needed. Shims (9-29874) .100" [2.5] thick are provided. Shims should be installed before Legs are set.

IMPORTANT! *It is CRITICAL for safety and the Dryer's structural integrity THAT LEGS ARE LEVEL!*

Shim where necessary to make Legs level all the way around the structure.

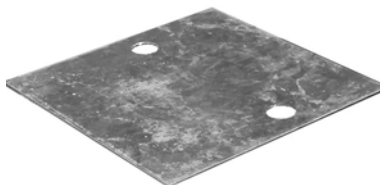
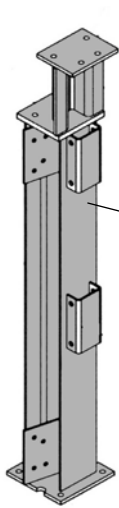


Figure 95.
Leg Weldment Shim

Set UPPER Leg Weldments in Place



With the structure fully supported on the jacks, as the distance from the Base Angle to the pad reaches a height of 65", set in all Upper Leg Weldments directly underneath, but not touching, the Bottom Stiffeners.

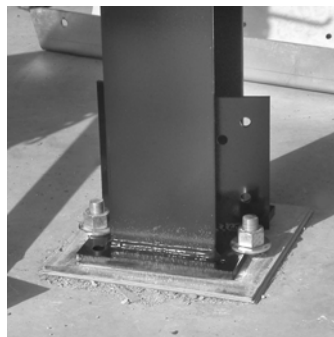
Legs slide over the Anchor Bolts that have been set.

Hand-tighten Anchor Bolts. Add the Washer and Nuts. Use Washers **under** Bolt Heads and Nuts. Tighten all Bolts.

Figure 96.
Install Upper Leg Weldments



HAND-tighten Base Plate hardware at this time. Do not impact-tighten, as this may damage epoxy Anchors.



LIFT #1
UPPER LEG

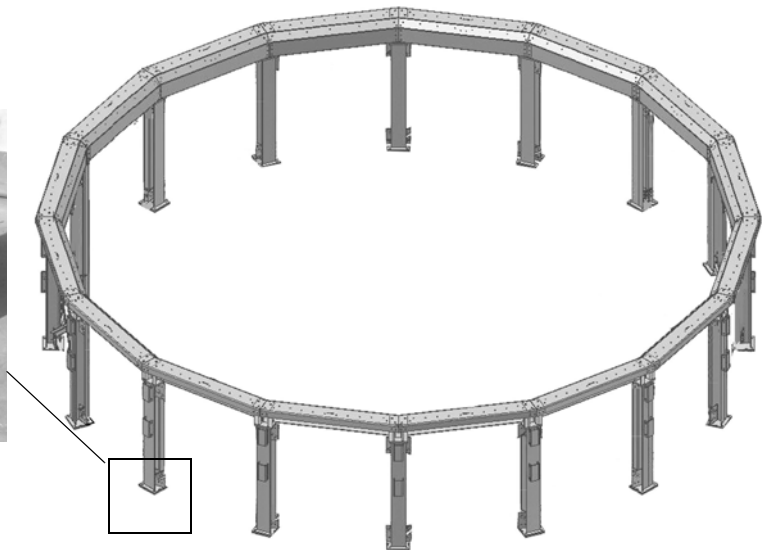


Figure 97.
Bolt UPPER Leg Weldments to Concrete, Shimming as Necessary
(Base Frame and Leg Roundness Assembly also shown)

In between the Stiffener/Flashing and Upper Leg Weldment, slide in Base Frame sections and bolt the Frame sections together.

Attach the **Leg/Base Roundness Assembly** at the base of the tank before bolting on the Legs to the Base Frame Sections.

X-Braces can be added between the Upper Legs as well. Do not tighten. See Pages 77-78.

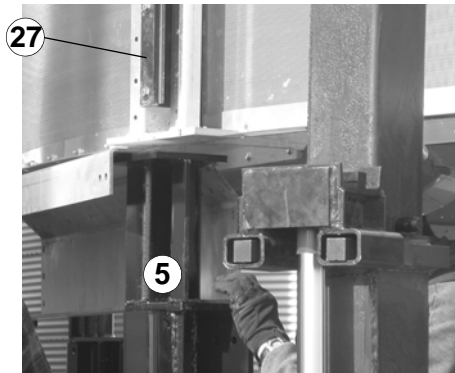
Base Frame

With the **Upper Leg Weldments** secured at the concrete pad and the structure still supported on jacks, Base Frame sections can be installed between the Bottom Stiffeners and Upper Legs. When lifting the Tower at this point, note that Stiffener bases hang a bit lower than the Screens before the Support Structure is built.

IMPORTANT!

Upper Leg Weldments must be securely fastened to the concrete pad BEFORE jack attachment brackets may be removed from the Bottom Stiffeners.

Between the lifted Dryer structure and Top Leg Weldment, slide in a Base Frame Section. Make sure the holes where Stiffeners will attach through the Beam to the Leg are aligned. Secure with an HHCP 1/2 x 2" Gr. 8 Bolt above and a 1/2" Hex Nut below. Hand-tighten only. Install Shims between Stiffener bases and Base Frame sections.



Item	Part No.	Description
5	3201-00015	Upper Leg Weldment
16	3201-00007	Base Ring Beam, 2 ga 18'
17	3201-00009	Base Ring Beam, 24'
19	39-20212	Bolt, HHCP 1/2-13 x 2" Gr. 8
25	3240-00004	Bottom Stiffener Weldment
26	varies	Stiffener Attachment Flashing
27		Jack Attachment

Figure 98.

Base Ring Section above Upper Leg Weldment

Secure the other end of the Base Frame Section. Slide in an adjacent Base Frame Section and bolt it into place between the upper Dryer structure and the Leg.

Repeat this procedure around the structure until all Base Frame Sections are in place. Do not tighten hardware until the **final** Base Frame section is in place; there may need to be some critical adjustment in order to install the final Base Frame section.
(continued)

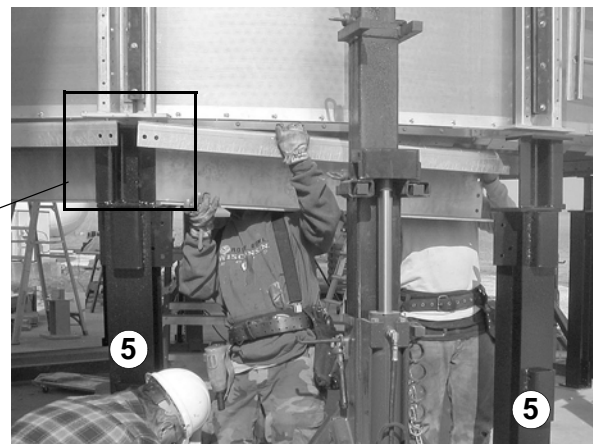
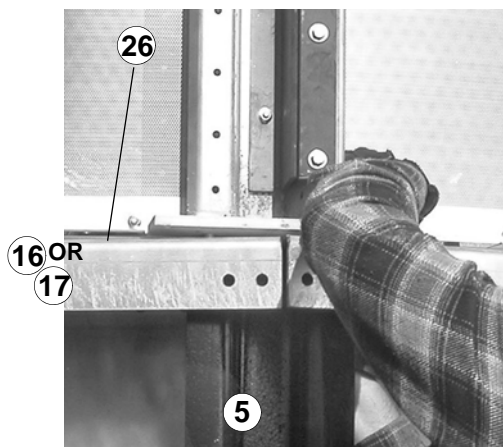


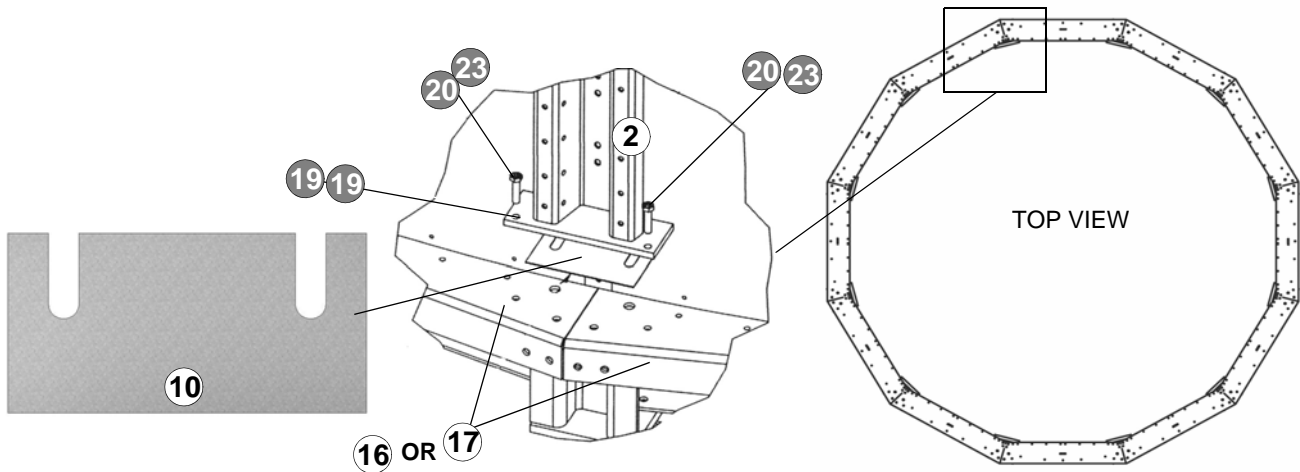
Figure 99.

Add All Base Frame Sections

Base Frame (continued)

Use Spacers (9-29702) under the Stiffeners to level Base Frame Sections.

IMPORTANT! *Stiffener alignment with the Base Angle sections is CRITICAL!*



Item	Part No.	Description
5	3201-00015	Upper Leg Weldment
16	3201-00007	Base Ring Beam, 2 ga 18'
17	3201-00009	Base Ring Beam, 24'
19	39-20212	Bolt, HHCP 1/2-13 x 2" Gr. 8
20	39-20415	Bolt, 5/8 x 2 3/4" HH Gr 8
23	39-20078	5/8"-11 Hex Nut
25	3240-00004	Bottom Stiffener Weldment
26	varies	Stiffener Attachment Flashing

Figure 100.
Add Shims

IMPORTANT!

Make the first connection: Drop two (2) 5/8 x 2 3/4" Bolts in first, from the Stiffener base through the Base Frame section to the underside of the Leg Top Plate. Secure with Hex Nuts as shown on Page 74.

Next, bolt down the Stiffener Attachment Flashing to the top of all Base Frame sections. Use punches for the outer holes, which are for alignment.

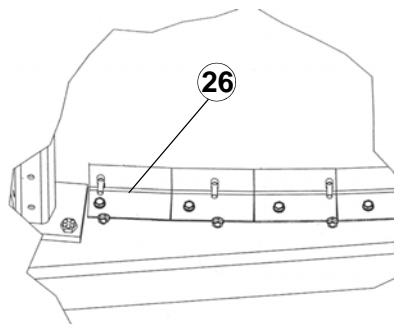
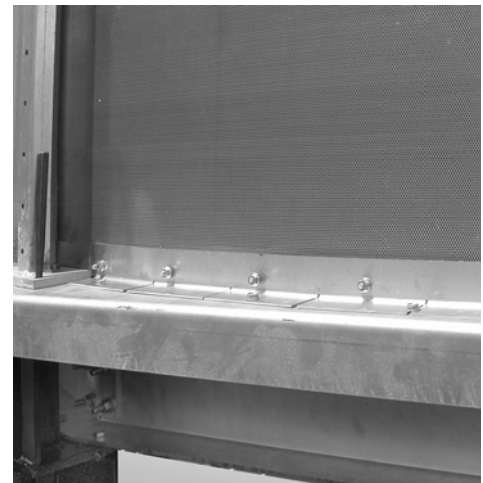


Figure 101.
Flashing to Base Frame

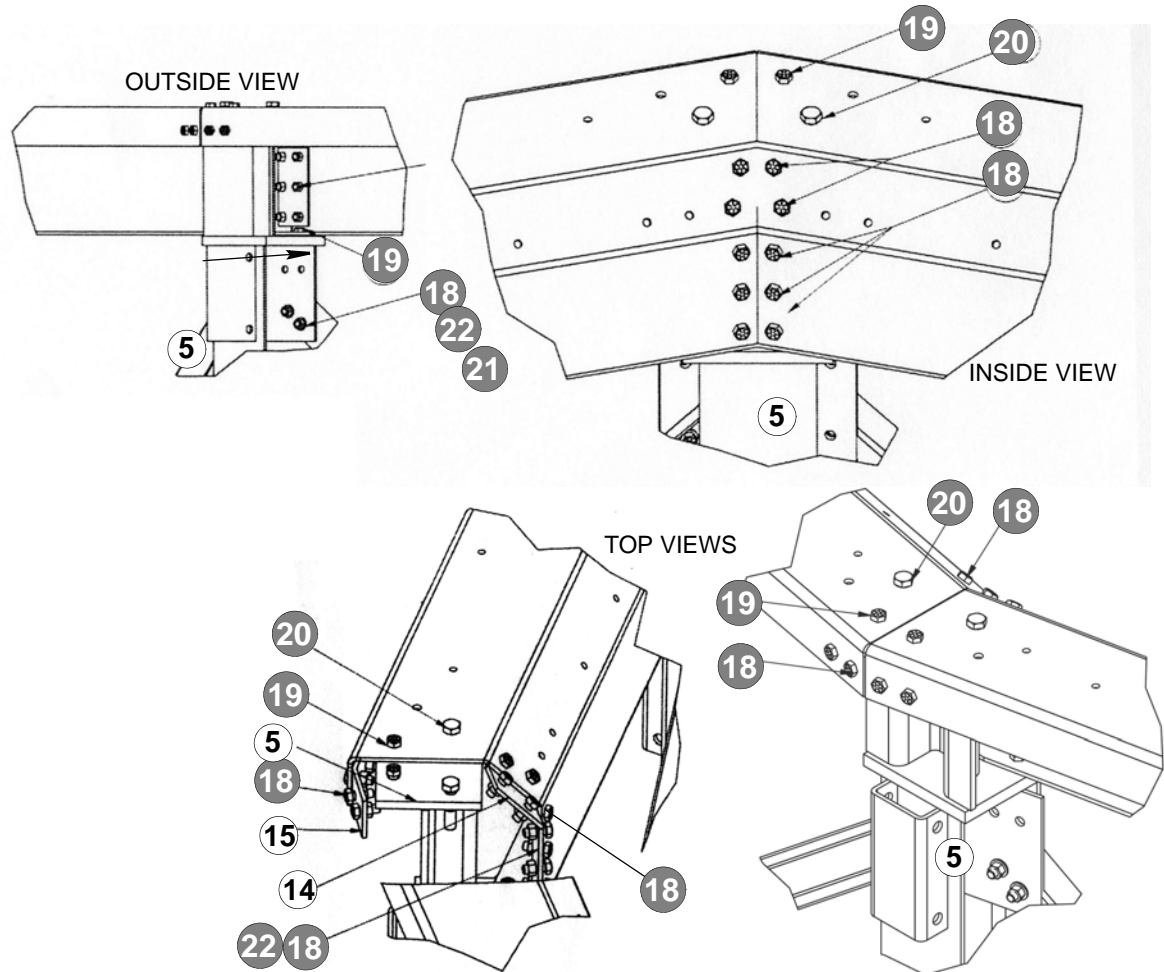


Use Front INSIDE Brackets to attach adjacent Beams together. Add front bolts where Base Frame Sections join, secure with Hex Nuts inside. Hand-tighten.

Bolt the Base Frame sections both inside and outside to each other and to the Leg Weldments. Use Washers on both sides of the connection.

IMPORTANT! *Keep all Base Frame connections LOOSE UNTIL AFTER the Rounding Fixture has been installed and adjusted. See the following Pages (75-76).*

(continued)



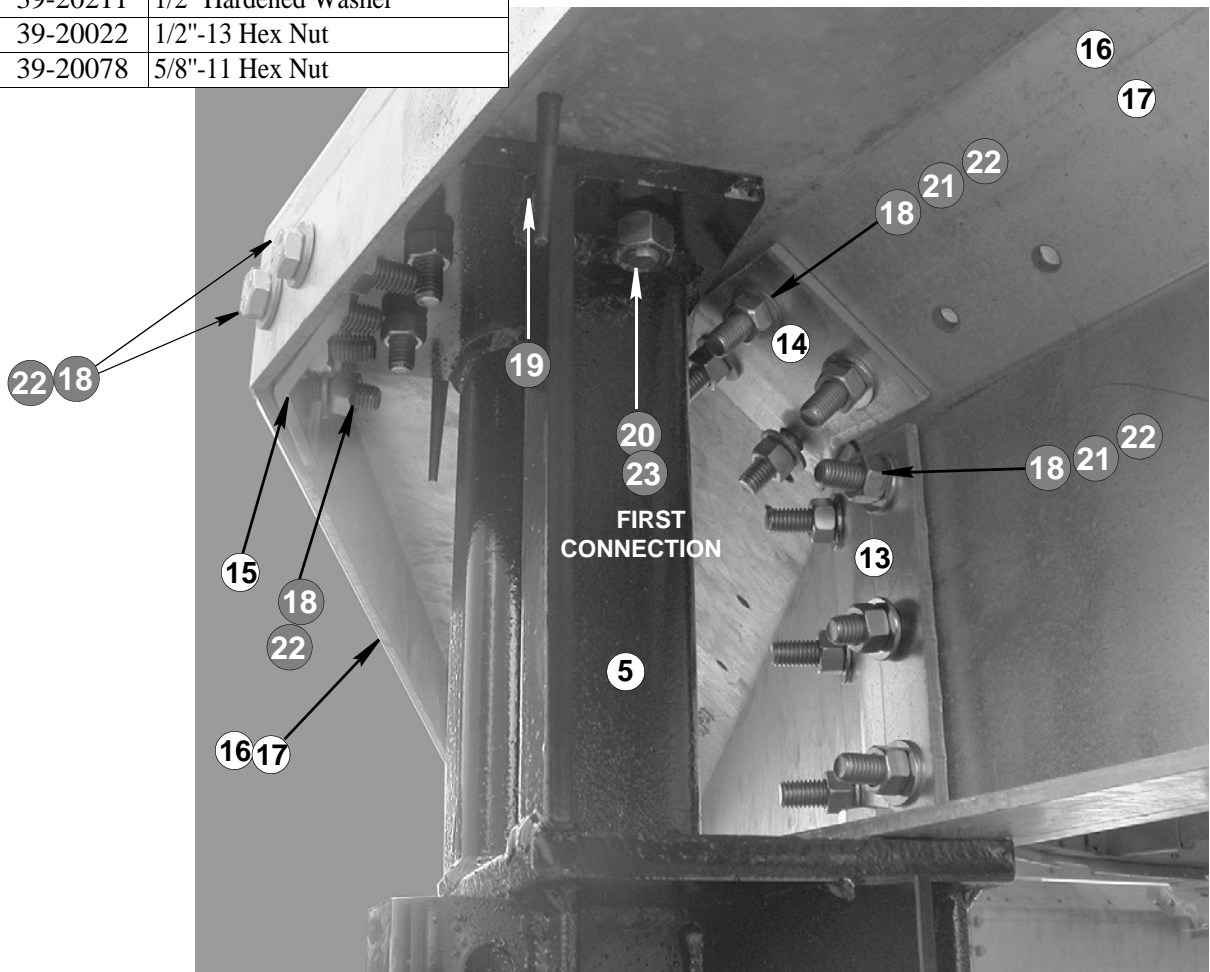
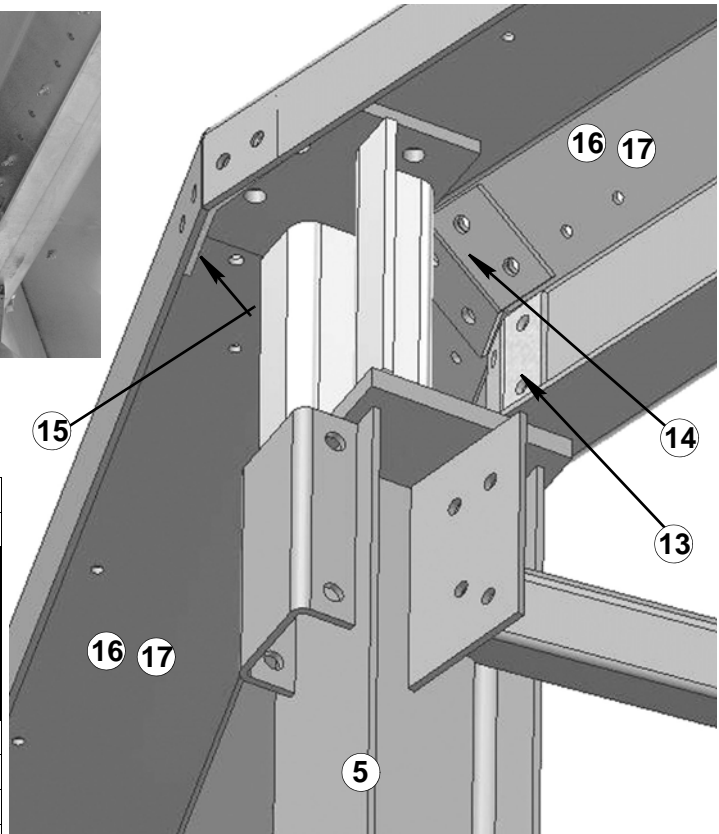
Item	Part No.	Description
5	3201-00015	Upper Leg Weldment
13	3201-00017	Bracket, OUTSIDE Beam
14	3201-00020	Bracket, MIDDLE Beam
15	3201-00021	Bracket, INSIDE Beam
16	3201-00007	Base Ring Beam, 2 ga 18'
17	3201-00009	Base Ring Beam, 24'
18	39-20200	Bolt, 1/2-13 x 1.25 HHCP
19	39-20212	Bolt, HHCP 1/2-13 x 2" Gr. 8
20	39-20415	Bolt, 5/8 x 2 3/4" HH Gr 8
21	39-20211	1/2" Hardened Washer
22	39-20022	1/2"-13 Hex Nut
23	39-20078	5/8"-11 Hex Nut

Figure 102.
Connections at Base Frame



Figure 103.
Beam Bracket Placement
(Item Table on facing page.)

Item	Part No.	Description
5	3201-00015	Upper Leg Weldment
13	3201-00017	Bracket, OUTSIDE Beam
14	3201-00020	Bracket, MIDDLE Beam
15	3201-00021	Bracket, INSIDE Beam
16	3201-00007	Base Ring Beam, 2 ga 18'
17	3201-00009	Base Ring Beam, 24'
18	39-20200	Bolt, 1/2-13 x 1.25 HHCP
19	39-20212	Bolt, HHCP 1/2-13 x 2" Gr. 8
20	39-20415	Bolt, 5/8 x 2 3/4" HH Gr 8
21	39-20211	1/2" Hardened Washer
22	39-20022	1/2"-13 Hex Nut
23	39-20078	5/8"-11 Hex Nut



Base/Leg Roundness Fixture

The **Base Roundness Assembly** attaches with special Brackets (3251-00015) to the sloped inside of the Base Frame. Use a tape measure to determine roundness and a come-a-long to adjust the Assembly evenly. Until all Channels are bolted onto the Center Plate, support the Center Plate.

IMPORTANT! *The Base Frame Rounding Fixture must be used! Hopper Panels will not fit if the Base Frame is not ROUND. (continued)*



Figure 104.
Base Roundness Fixture
Item Table on facing Page.
(24' shown)

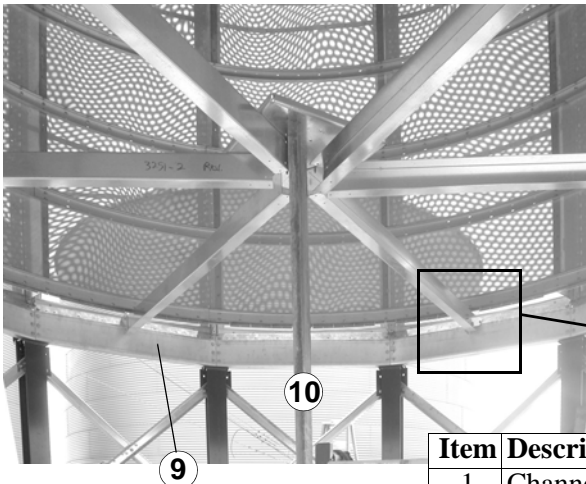
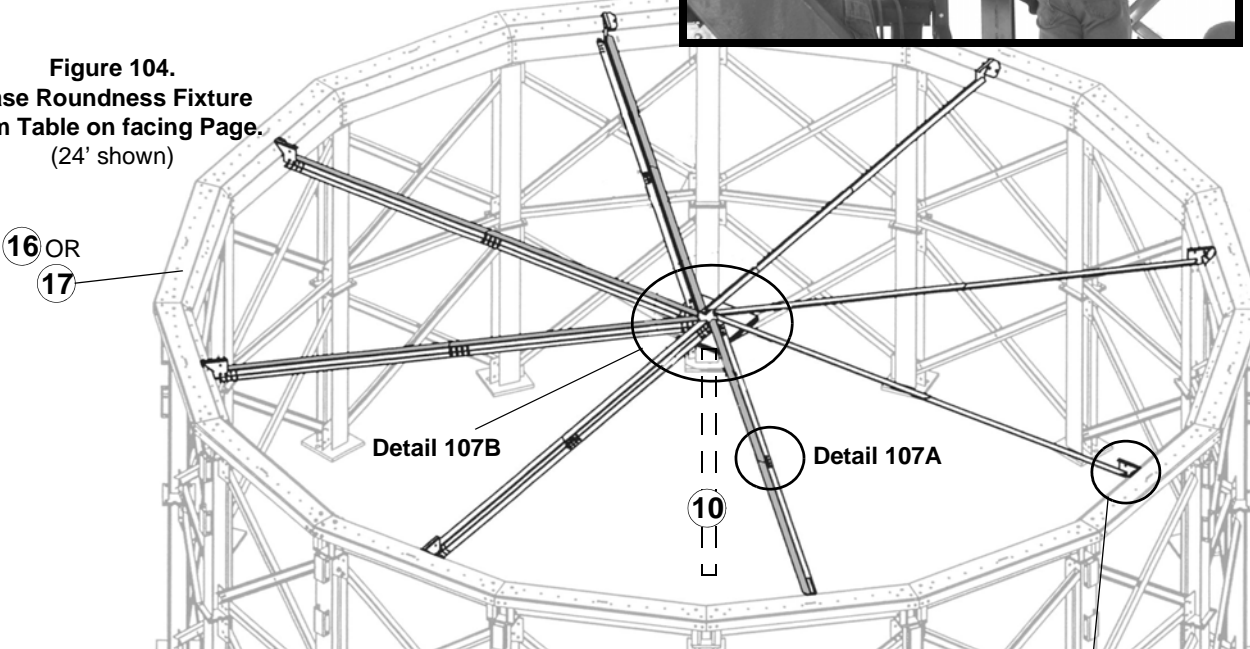
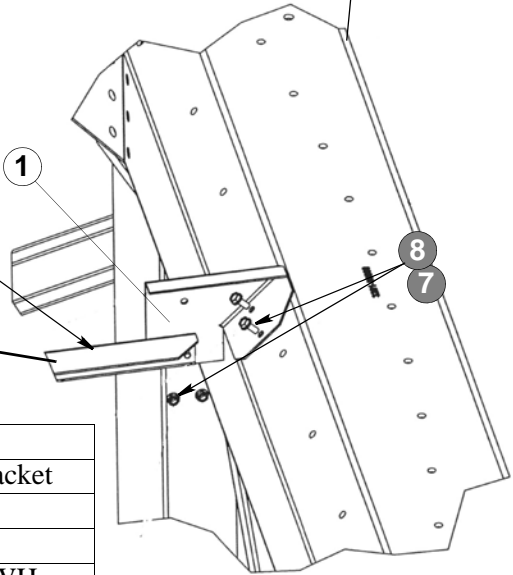
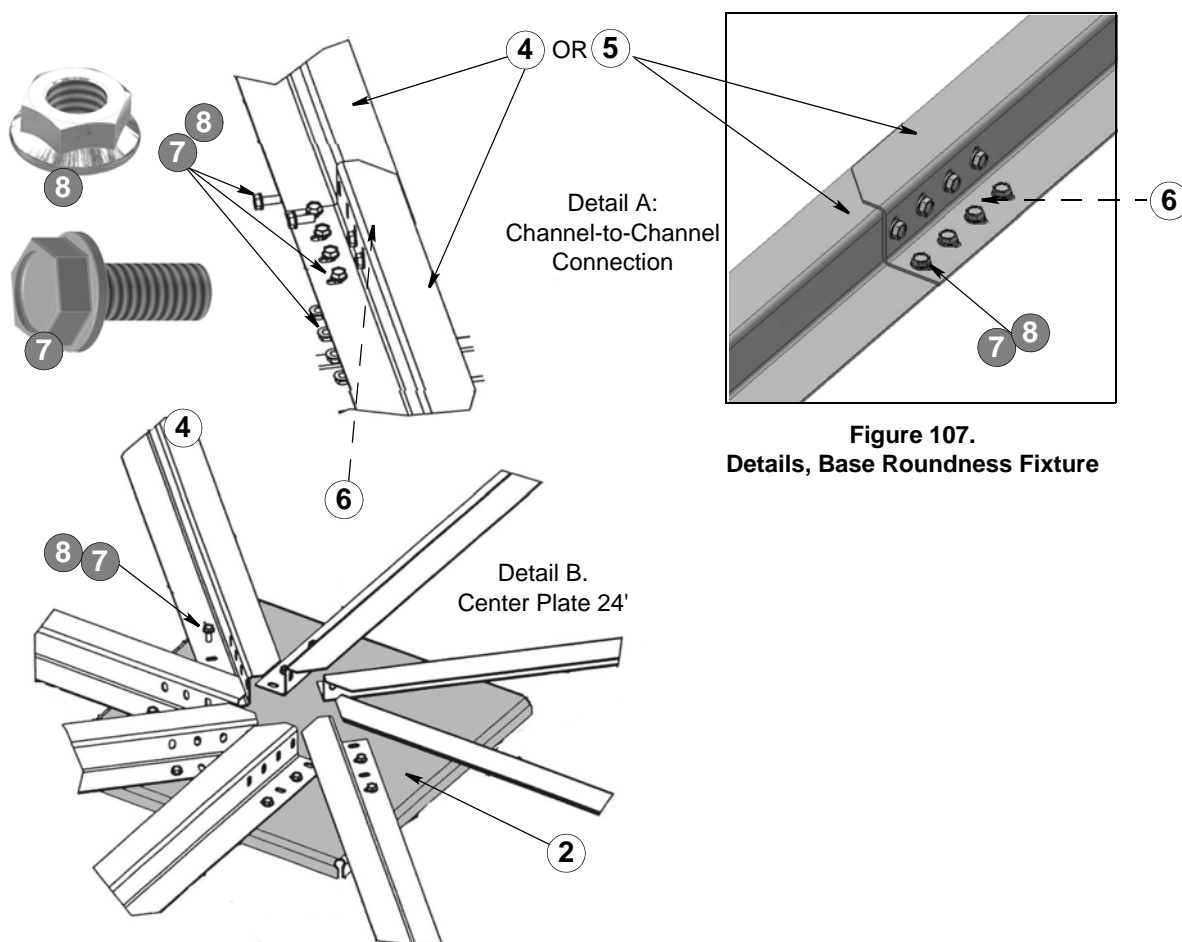
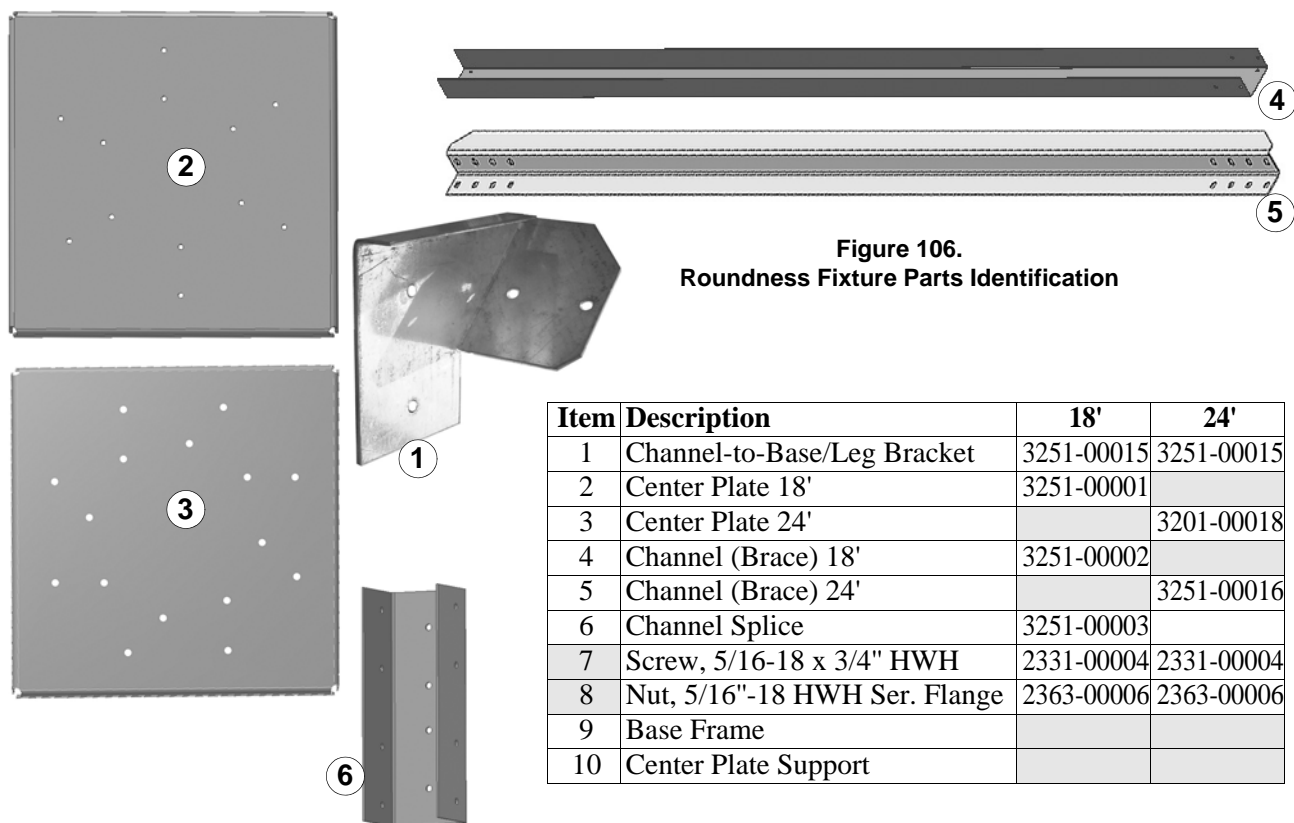


Figure 105.
Center Support (left) and
Bracket to Base Frame (right)

Item	Description
1	Channel-to-Base/Leg Bracket
2	Center Plate 18'
4	Channel (Brace) 18'
7	Screw, 5/16-18 x 3/4" HWH
8	Nut, 5/16"-18 HWH Ser. Flange
9	Base Frame
10	Wooden Center Plate support (field-cut, not provided)



Base/Leg Roundness Fixture (continued)



X-Bracing Between (Upper) Leg Weldments

Once Upper Leg Weldments are installed, begin installing **Diagonal X-Braces** between them.

At the top of the Leg, use the **bottom** holes on the Leg's X-Brace Anchor Plate.
At the bottom end of the Leg, use the **top** holes on the X-Brace Anchor Plate.

X-Braces are connected to Leg Weldments with 1/2" x 1 1/4" Hex Head Gr. 8 Bolts, Hex Nuts, and Hardened Washers (both the head and Nut sides). In the center holes where X-Braces cross: align and secure with two (2) Washers between the Braces and on each side of the connection. Leg-Brace hardware code has a triangle. (continued)

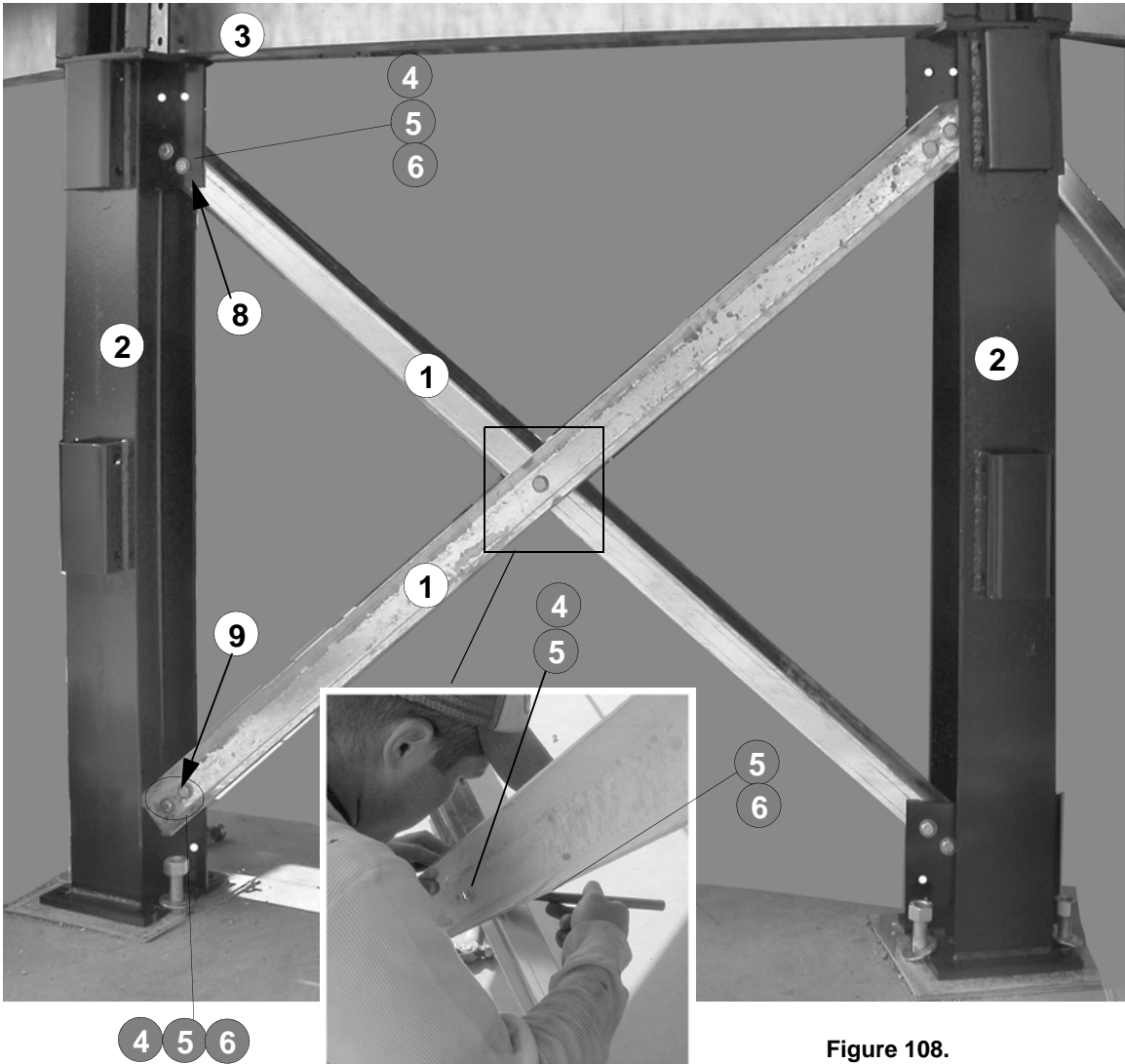
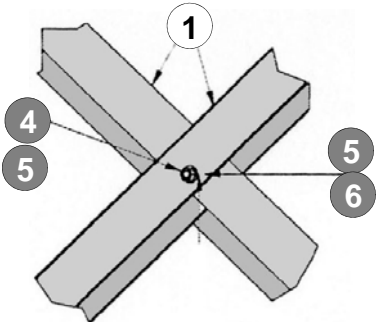


Figure 108.
Diagonal X-Brace Connections



Item	Description	Part No.
1	X-Brace 68.845" for 18' X-Brace 69.075" for 24'	3201-00012 3201-00011
2	Upper Leg Weldment	3201-00015
3	Base Frame	
4	Bolt, 1/2- x 1 1/4" HH Gr 8	39-20200
5	1/2" Hardened Washers	39-20211
6	1/2" Hex Nut	39-20022
8	Use the bottom holes.	
9	Use the top holes.	

Take this time to tighten **all** Hardware and check distances. There should be 65" [165.1 cm] from the top of the Base Frame to the concrete pad (see **Figure 110**).

As soon as Roundness has been adjusted and verified, the Roundness Assembly can be removed so that it will not be a head-injury hazard.

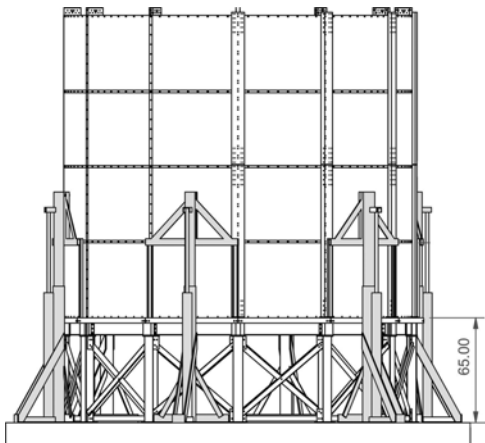


Figure 109.
Distance, Jacks Fully Extended, UPPER
Legs Installed to Concrete and Base
Frame, 65" [165.1 cm]

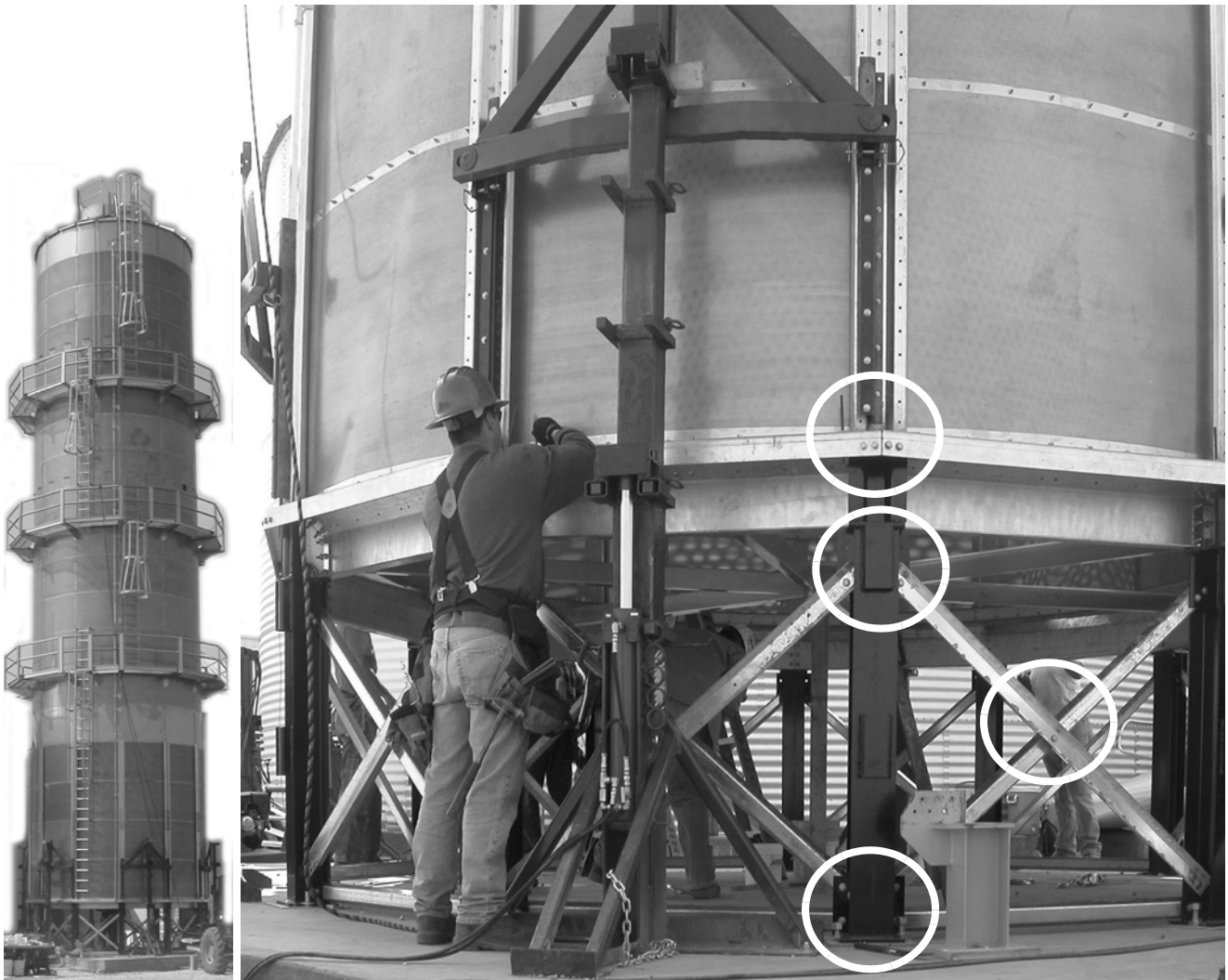
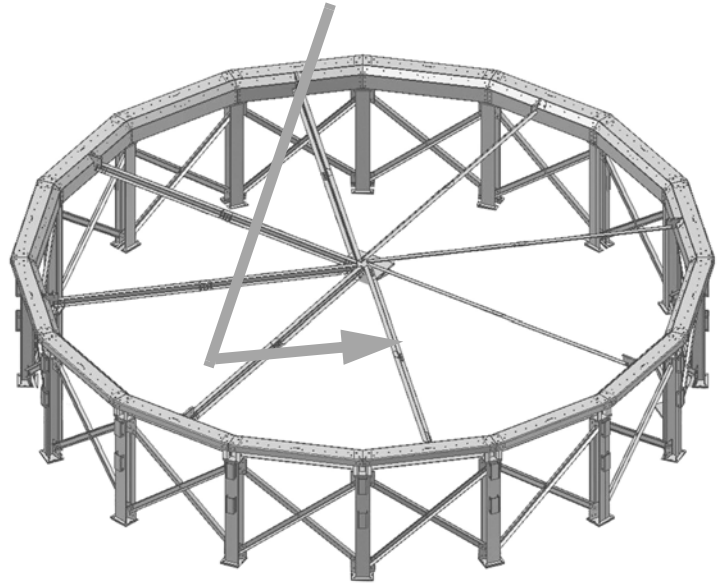


Figure 110.
Tighten ALL Hardware and Check Distances

Install Lower Leg Weldments (Final Lift)

Remove Jack Attachments from the Stiffeners. Replace Stiffener hardware in Bottom Stiffeners. Remove the Base Roundness Fixture.

IMPORTANT!

Upper Leg Weldments must be securely fastened to the concrete pad BEFORE jack attachment brackets may be removed from the Bottom Stiffeners.

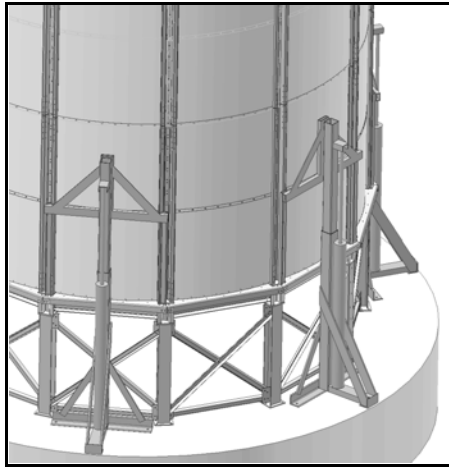


Figure 111.
Jack Attachments on Stiffener



Figure 112.
Replace Stiffener Hardware

Reposition the jacks for a new lift. Reconnect the jacks to the Upper Leg Weldment using the pocket-brackets on the Upper Leg Weldments. Before proceeding, consult the Jack manufacturer manual to be sure the jack-to-Leg attachments are installed correctly and safely.

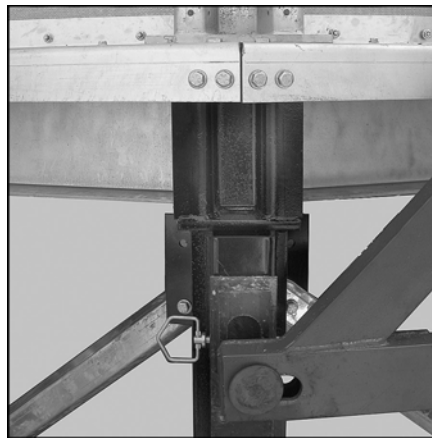


Figure 113.
Jack Brackets on Upper Legs



Position all Lower Leg Weldments closeby around the structure, where they can be slipped into place with minimal movement.

Unbolt the Upper Leg Weldments from the concrete pad.

IMPORTANT!

DO NOT unbolt Upper Legs until the jacks are securely bolted to the Jack Pockets on the Upper Legs.

Raise the Structure.

With the structure fully supported on the jacks, position the Lower Leg over the Anchor Bolts and under the Upper Leg and Bolt the Legs together. Use 5/8 x 2" Gr. 8 Hex Head Bolts and Hex Nuts. (continued)

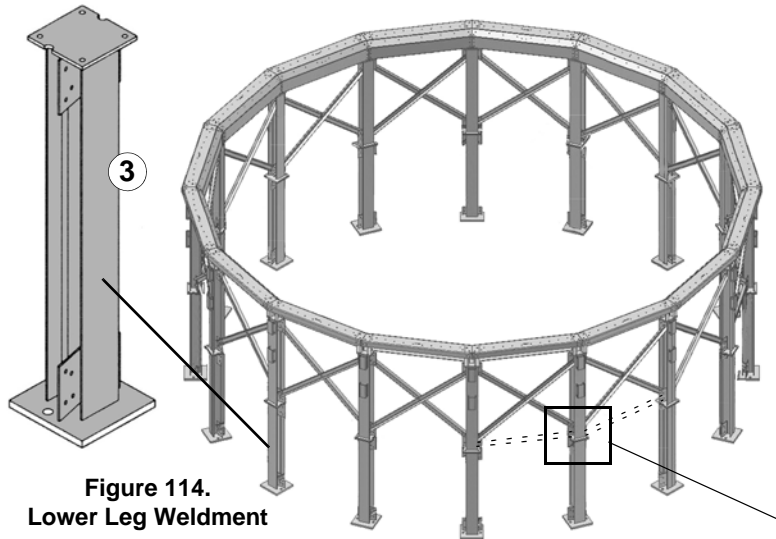
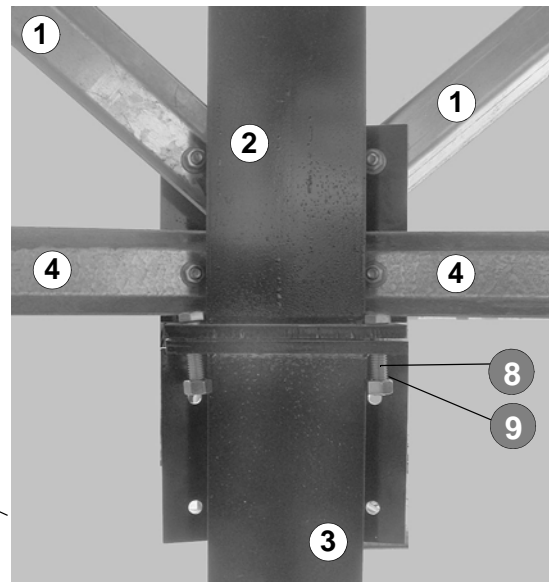


Figure 114.
Lower Leg Weldment



OUTSIDE VIEW

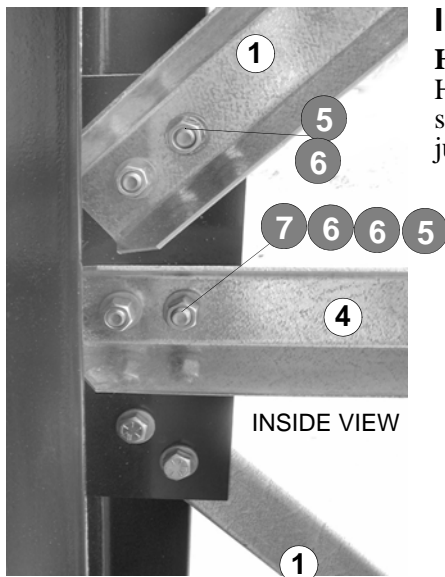


Figure 115.
Horizontal Tie Brace
Connections

Install Horizontal Tie Braces and LOWER X-Braces

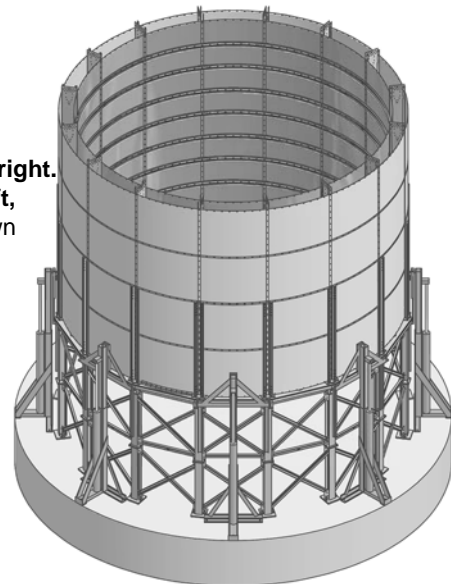
Horizontal Tie Braces are connected to Leg Weldments with 1/2" x 1 1/4" Hex Head Gr. 8 Bolts, Hex Nuts, and Hardened Washers (both the head and Nut sides). (NOTE: To give a flat mounting surface for the Plumbing electrical junction box, Mount the Horizontal Brace **backwards** on that section.)

Item	Part No.	Description
1	3201-00012 3201-00011	Diagonal X-Brace 68.845" for 18' Diagonal X-Brace 69.075"
2	3201-00015	Upper Leg Weldment
3	3201-00008	Lower Leg Weldment
4	3201-00001 3201-00010	Horiz. Tie Brace 54.4" for 18' Horizontal Tie Brace 54.735" for 24'
5	39-20200	Bolt, HHCP 1/2-13 x 1 1/4" .00015zy
6	39-20211	Washer, Hardened 1/2"
7	39-20022	Nut, Hex 1/2"-13
8	39-20076	Nut, Hex 5/8"-11
9	39-20201	Bolt, Hex Head 5/8-11 x 2" Gr. 8



Figure 116.
Lower X-Braces

Figure 117, right.
Final Lift,
24' shown



Bolt LOWER Leg Weldments to the Concrete Pad

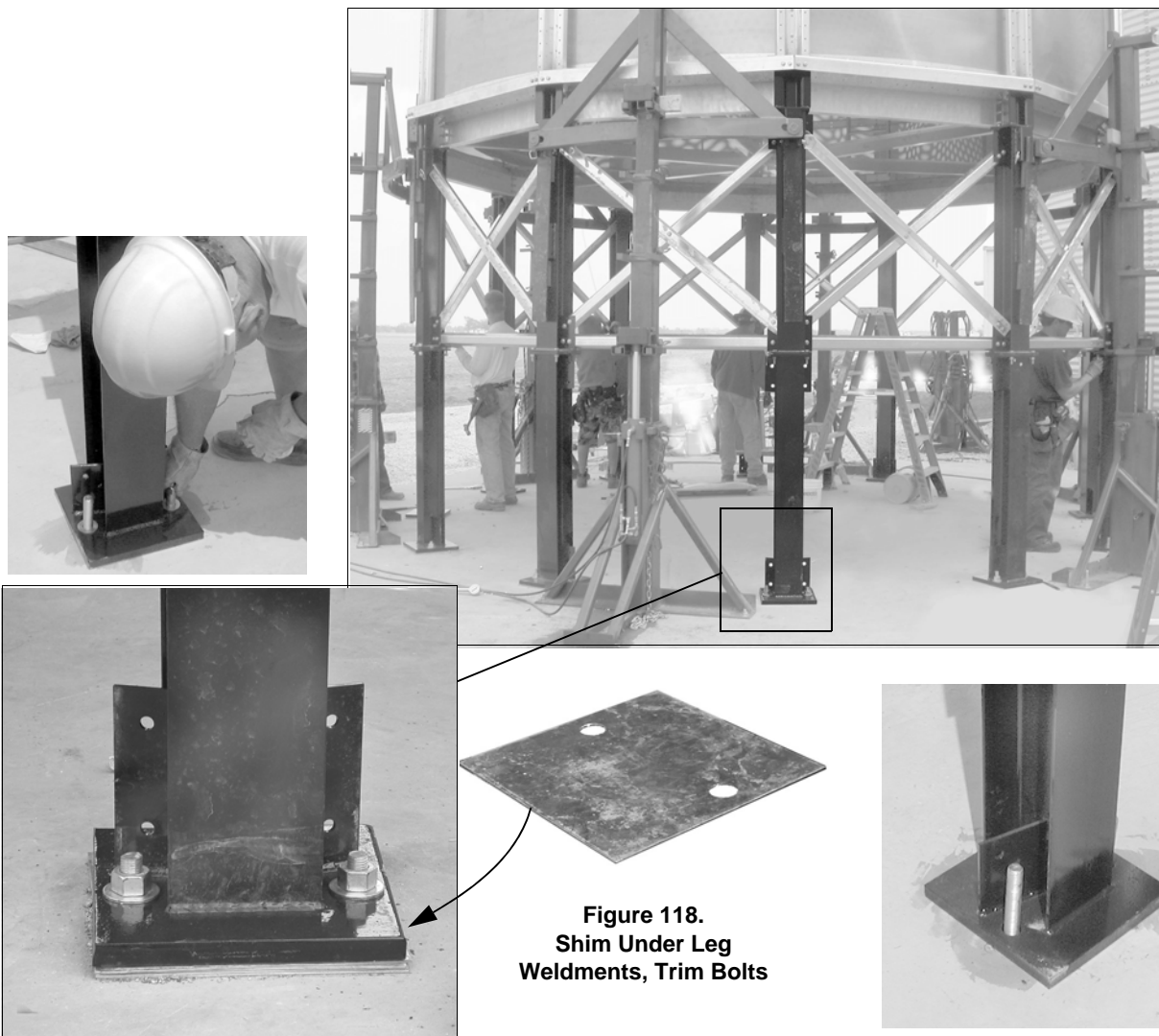


Figure 118.
Shim Under Leg
Weldments, Trim Bolts

Legs slide over the Anchor Bolts. Anchor-Bolt the Lower Legs to the concrete pad. Trim off the excess bolt with a disc cutter. Hand-tighten Bolts. Re-install Washers and Nuts.

IMPORTANT!



HAND-tighten the Base Plate hardware at this time. Do not impact-tighten, as this may damage epoxy Anchors.

After Jacks are removed for clearance (see the following section), hand-tighten Leg Base Plate hardware **again**.

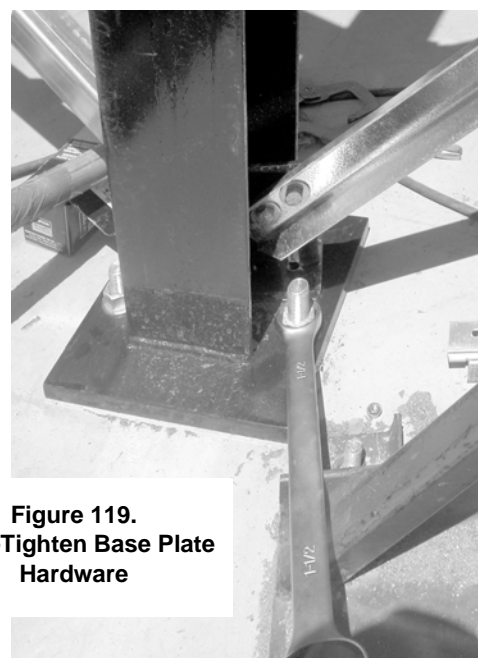


Figure 119.
Hand-Tighten Base Plate
Hardware

Additional Procedures Needed

Remove Hydraulic Jacks from Around the Dryer; Reposition

When all connections are tightened and double-checked, unbolt all the jacks from the Legs and lower the Jacks.

Remove all hardware connecting the jack bases to the concrete pad.

Pull two Jacks out of the way.

Move four (4) jacks inside the structure for lifting the Blower Platform (discussed in Supplemental Manual SIX).



Figure 120.

Remove Jacks from Outside

Repair the Concrete Pad Surface

Cut off and sink the Anchor Bolts that were holding the Jacks in place.

Fill with epoxy if desired. Do not leave bubbles. Sweep and clean the concrete ad.

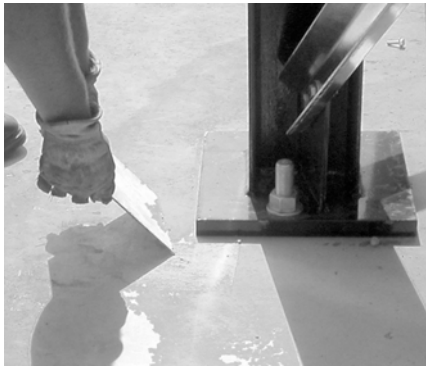
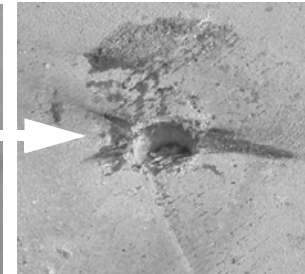
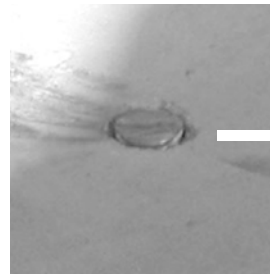


Figure 121.
Patch Bolt Holes



Build and Raise the Blower Assembly

Build and install the Blower Platform in the Dryer Tower according to the instructions in Manual Supplement **SIX**. Supplemental Manuals are located inside the QUANTUM® Control Box.

Keep four (4) jacks inside the Tower for lifting the complete Blower Platform.

IMPORTANT! *When the Blower Platform is complete and lifted into the Tower, you will need Manual Supplement FOUR to complete the Hopper and Unload areas.*

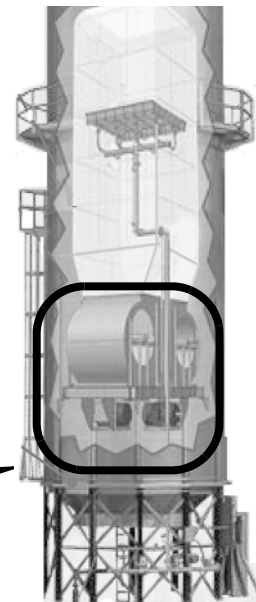
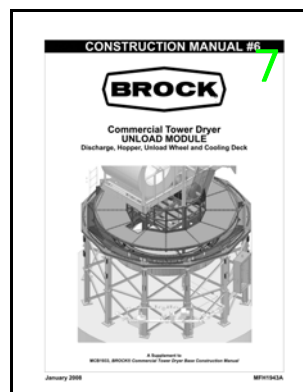


Figure 122.
Blower Supplement (SIX)
MFH1952

Hopper and Unload, Controls and Lower Plumbing

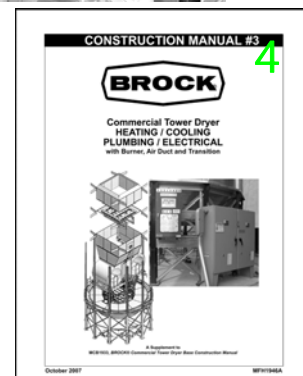
Build and install the Hopper and Unload area Dryer Tower according to the instructions in Manual Supplement **SEVEN**. Supplemental Manuals are located inside the QUANTUM® Control Box.

Figure 123.
Unload Module Supplement
(SEVEN) MFH1943



When the Hopper and Unload are complete, you will need to return to Manual Supplement FOUR to complete the LOWER PLUMBING and ELECTRICAL systems. These installations can only be completed after the Hopper area is installed and the Lower Plumbing and Control Box are mounted.

Figure 124.
Plumbing and Electrical
Supplement (FOUR)
MFH1946



Dryer Level Profiles

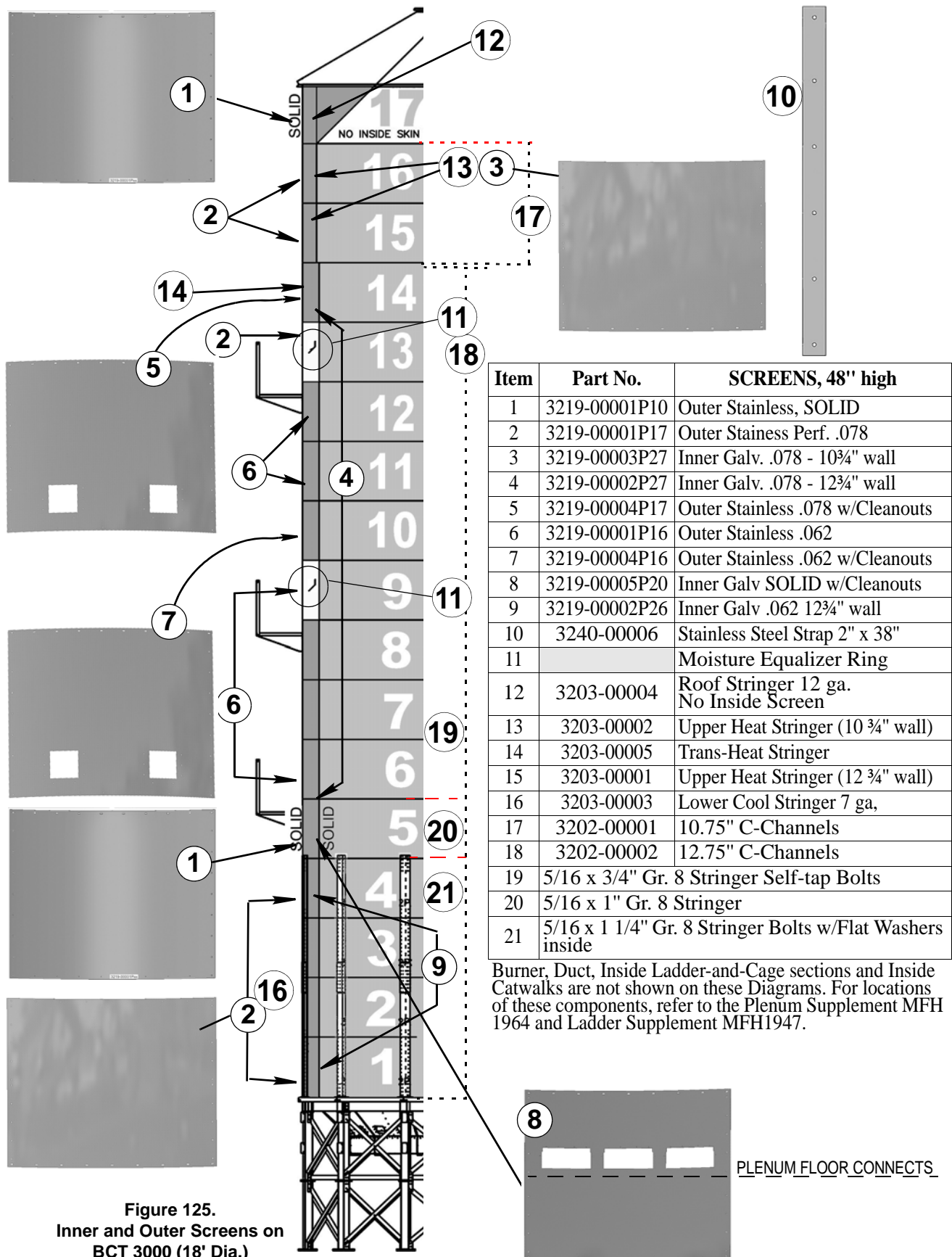
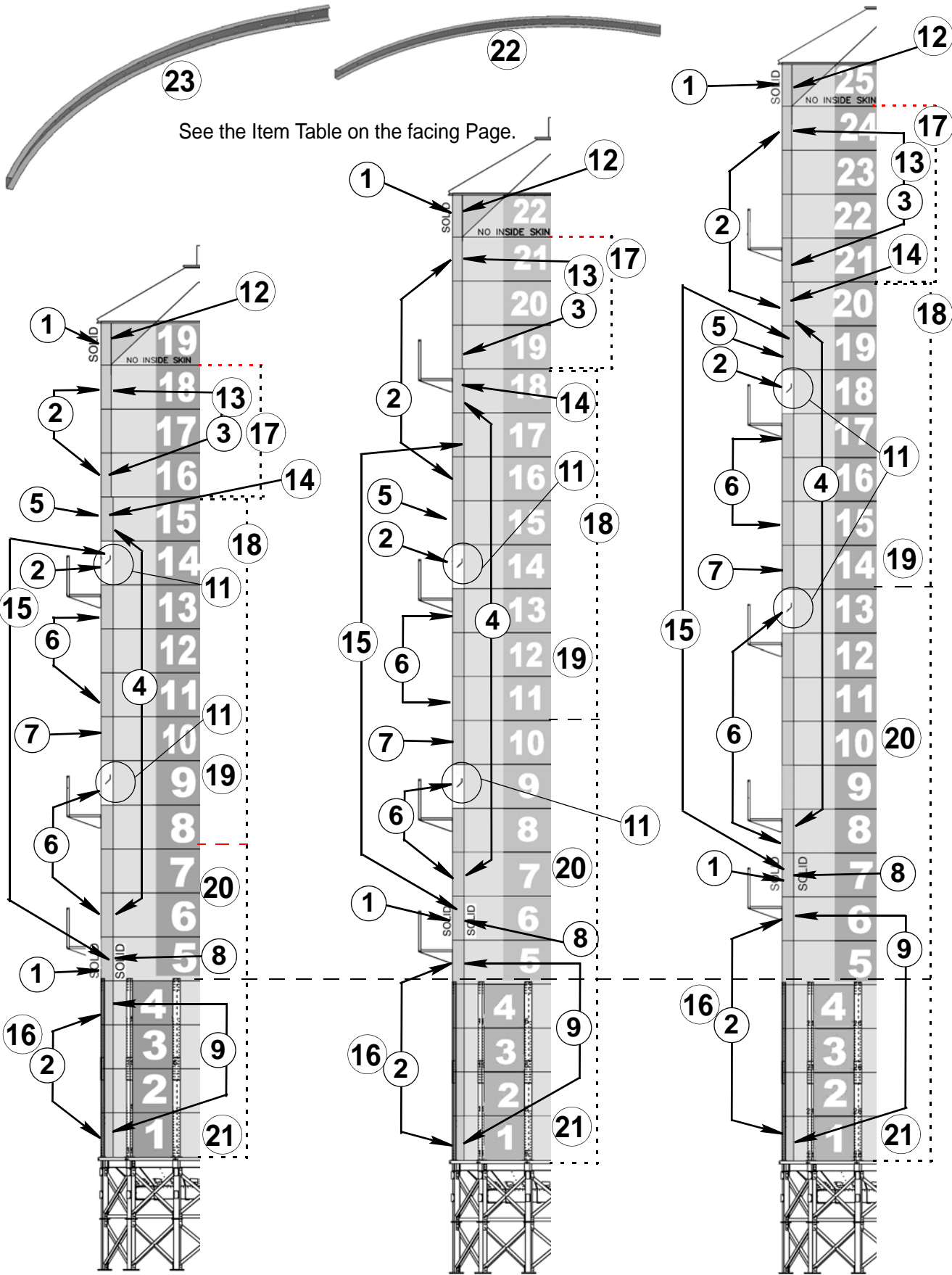


Figure 125.
Inner and Outer Screens on
BCT 3000 (18' Dia.)



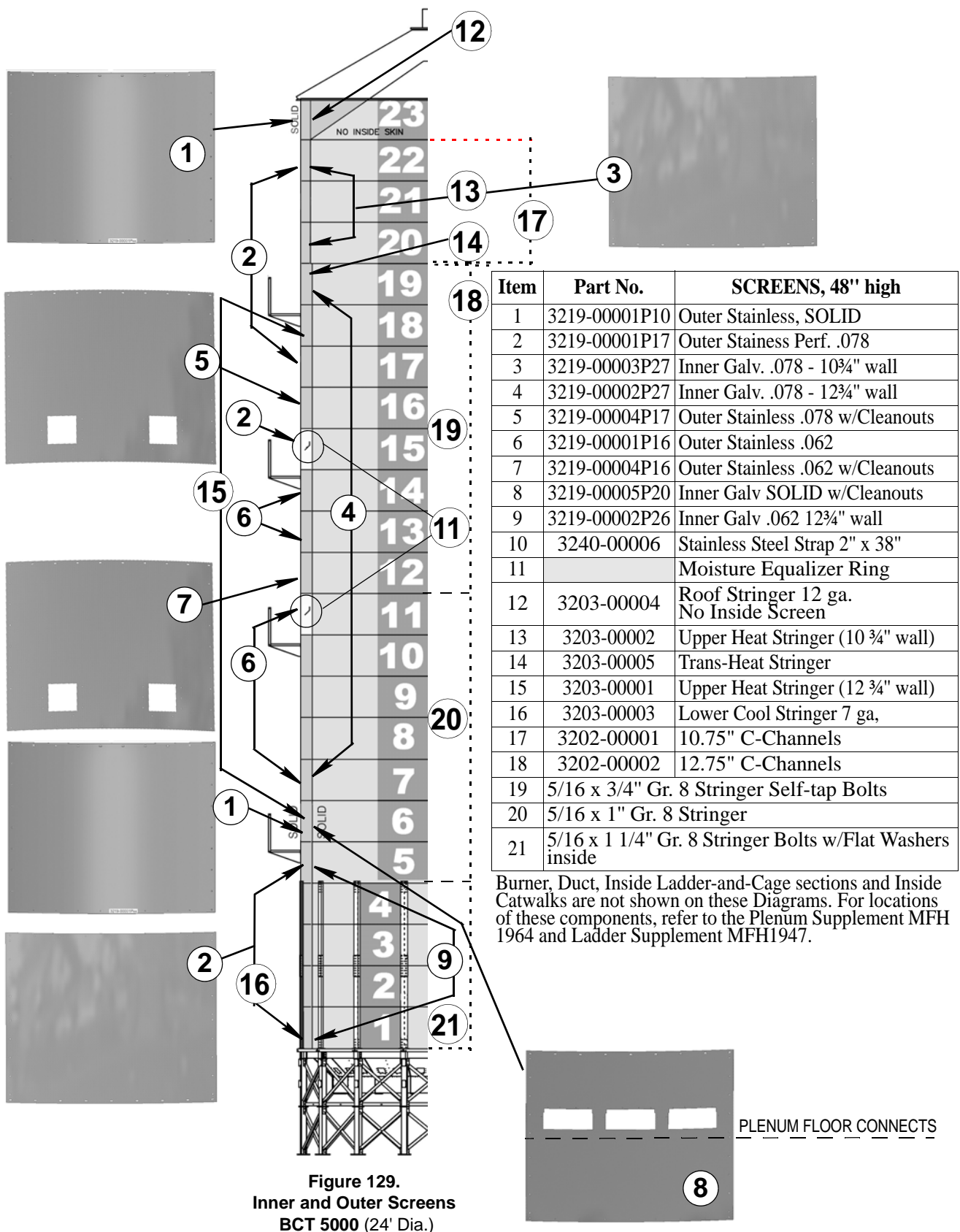


Figure 129.
Inner and Outer Screens
BCT 5000 (24' Dia.)

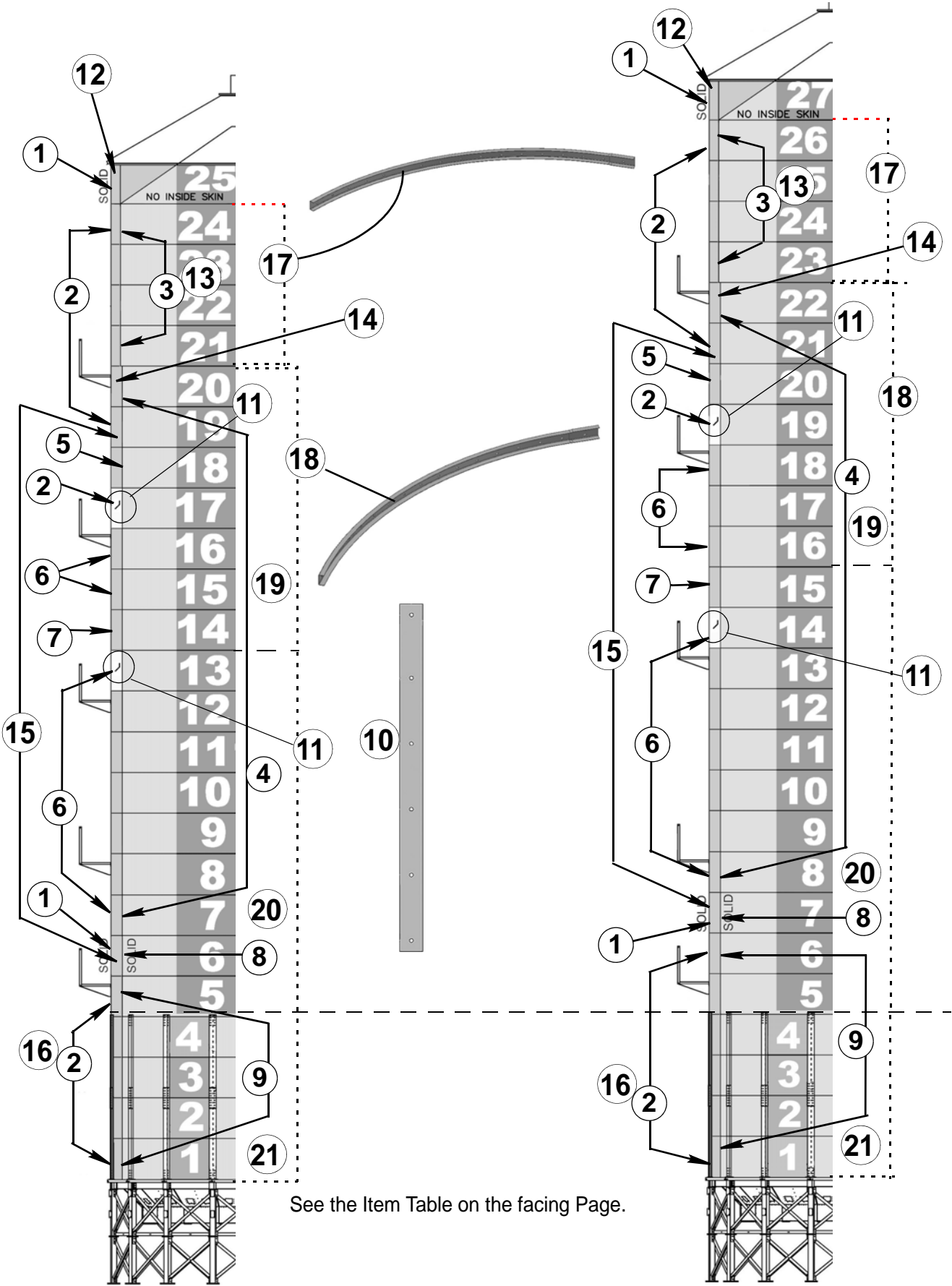


Figure 130.
Inner and Outer Screens
BCT 6000 (24' Dia.)

Figure 131.
Inner and Outer Screens
BCT 7000 (24' Dia.)

Parts Listing

Tower Components

Part No.	Description	18' Models				24' Models		
		3000	3500	4000	4700	5000	6000	7000
Base Support Structure and Legs: Note that 18' and 24' use same Upper/Lower Leg Weldments/Shims								
3201-00008	Leg Weldment, Lower W6-15 54 1/2" Lg	12	12	12	12	16	16	16
3201-00015	Leg Weldment, Upper W6-15 64 3/4" Lg	12	12	12	12	16	16	16
3201-00018	Shim - I-Beam Leg - 14 ga	24	24	24	24	32	32	32
9-45677	Shim, I-Beam Leg Base	24	24	24	24	32	32	32
3201-00001	Brace, Horizontal 54.4"	12	12	12	12			
3201-00010	Brace, Horizontal 54.735"					16	16	16
3201-00007	Beam, 2 ga 18" 45° CHB	12	12	12	12			
3201-00009	Beam, Top 24' Leg Structure					16	16	16
3201-00012	Brace, Diagonal 68.845"	48	48	48	48			
3201-00011	Brace, Diagonal 69.075"					64	64	64
*9-28089	Kit, Beam Bracket 18' CHB	1	1	1	1			
9-29764	Bracket, OUTSIDE Beam-24'	12	12	12	12			
9-29769	Bracket, MIDDLE Beam-24'	12	12	12	12			
9-29818	Bracket, INSIDE Beam-24"	12	12	12	12			
*3201-00017	Bracket, OUTSIDE Beam-24'					16	16	16
*3201-00020	Bracket, MIDDLE Beam-24'					16	16	16
*3201-00021	Bracket, INSIDE Beam-24"					16	16	16
Inner C-Channel and Stiffener-to-Base Ring Flashing								
3202-00001	Channel 10.75" Wall Support	30	42	42	54			
3202-00002	Channel 12.75" Wall Support	174	186	222	246			
3202-00006	Attachment, Outer Screen-to-Legs (Flashing)	12	12	12	12			
3202-00007	Channel 10.75" Wall Support					56	72	72
3202-00008	Channel 12.75" Wall Support					312	328	360
3202-00003	Attachment, Outer Screen-to-Legs (Flashing)					16	16	16
Screens ("Skins")								
3219-00001P10	Outer Stainless, SOLID	24	24	24	24	32	32	32
3219-00001P17	Outer Stainless Perf. .078"	84	96	144	144	192	192	208
3219-00003P27	Inner Galv. .078" 10¾" wall	24	36	36	48			
3219-00002P27	Inner Galv. .078" 12¾" wall	108	120	144	156			
3219-00004P17	Outer Stainless .078" w/Cleanouts	12	12	12	12	16	16	16
3219-00001P16	Outer Stainless .062"	72	84	72	108	112	144	160
3219-00004P16	Outer Stainless .062" w/Cleanouts	12	12	12	12	16	16	16
3219-00005P20	Inner Galv SOLID w/Cleanouts 12¾" wall	12	12	12	12			
3219-00002P26	Inner Galv .062" 12¾" wall	48	48	60	72			
3219-0008P20	Inner Screen w/Cleanouts 12¾" wall					16	16	16
3219-0007P26	Inner Galv. .062" w/Cleanouts 12¾" wall					80	80	96
3219-0006P27	Inner Galv. .078"					48	64	64
3219-0007P27	Inner Galv. .078" 12¾" wall					208	224	240
3240-00006	Stainless Steel Strap 2" x 38" (Vertical seam)							
3240-00007	Horizontal Strap							
3240-00008	Horizontal Strap, SHORT (Stiffener area)							
Stringers								
3203-00001	Stringer, Upper Heat 12¾" wall	111	123	147	160	211	227	243
3203-00002	Stringer, Upper Heat 10 ¾" Wall	24	36	36	49	48	64	64
3203-00003	Stringer, Lower Cool Chamber	48	48	60	72	81	81	97
3203-00004	Stringer, Roof	14	14	14	14	16	16	16
3203-00005	Stringer, Trans Heat 10 ¾"- 12¾" wall	12	12	13	12	16	17	17
Moisture Equalizer								
3270-00001	Moisture Equalizer, Top for 18'	24	24	24	24			
3270-00002	Moisture Equalizer, Bottom for 18'	24	24	24	24			
3270-00003	Moisture Equalizer, Top for 24'					32	32	32
3270-00004	Moisture Equalizer, Bottom for 24'					32	32	32
Outer Sliding Doors above Moisture Equalizer Ring								
3563-00010P02	Retainer	72	72	72	72	96	96	96
3563-00011P04	Door, Solid SS	72	72	72	72	32	32	32
3248-00002	WARNING Decal on Door	72	72	72	72	96	96	96
Foundation Anchors: all common for 18' and 24'								
3248-00001	Adhesive, Anchor Hy150 16.9 oz	8	8	8	8	12	12	12
3248-00002	Anchor, Treaded Rod (2) 1 x 16" Has-e	12	12	12	12	16	16	16
9-24087	Stub Leg Fixture	12	12	12	12	16	16	16
7071-00001	18' Leg Anchor Bolt-to-Jack Template for LEG holes	1	1	1	1			
7071-00002	Radius Channel 18 and 24	2	2	2	2	2	2	2
7071-00006	24' Leg Anchor Bolt-to-Jack Template for LEG holes					1	1	1
7071-00008	Radius Channel Extender 24'					2	2	2

Part No.	Description	18' Models				24' Models		
		3000	3500	4000	4700	5000	6000	7000
Stiffeners: bottom 4 rings								
3240-00001	Stiffener, 8ga. 2-Ring	12	12	12	12	16	16	16
3240-00003	Stiffener, Weldment 8 ga. 2-Ring Bottom	12	12	12	12	16	16	16
3240-00004	Splice, Stiffener	12	12	12	12	16	16	16
9-29702	Shim, Stiffener Base CHB	24	24	24	24	32	32	32
LEG Roundness Fixture								
3251-00001	Plate, Center Fixture - Leg Structure 18'	1	1	1	1			
3251-00018	Plate, Center Fixture - Leg Structure 24'					1	1	1
3251-00002	Channel, Leg Structure - Roundness	6	6	6	6			
3251-00004	Support, Roundness Fixture	24	24	24	24	24	24	24
3251-00015	Channel Attachment - Leg Roundness	6	6	6	6	8	8	8
*3251-00016	Brace, Center Fixture Leg Structure 24'					16	16	16
Tower Roundness Fixture								
3251-00005	Center Plate 18'	1	1	1	1			
3251-00021	Center Plate 24'					1	1	1
3251-00006	Channel/Plank 18'	24	24	24	24			
3251-00017	Channel/Plank 24'					64	64	64
3251-00003	Splice 18'							
3251-00019	Splice 24'					16	16	16
SAFETY Decals and Information Decals								
1315-00236	Decal, WARNING High Operation Temp	2	2	2	2	2	2	2
1315-00238	Decal, WARNING Keep Guards On	5	5	5	5	1	1	1
1315-00247	Decal, WARNING Keep Door Closed	24	24	24	24	32	32	32
1315-00251	Decal, WARNING Rotation Motion	2	2	2	2	2	2	2
3136-00039	Decal, Open Drain Weekly	2	2	2	2	2	2	2
3136-00038	Decal, CAUTION Ladders Slippery	2	2	2	2	2	2	2
5537-00038	Decal, Pilot Pressure	1	1	1	1	1	1	1
5537-00037	Decal, LP/NG Vapor Pressure	1	1	1	1	1	1	1
5537-00040	Decal, Burner Pressure	1	1	1	1	1	1	1
5537-00049	Decal, Connect to NG or PV	1	1	1	1	1	1	1
3536-00055	Decal, WARNING Emergency Doors	24	24	24	24	32	32	32
3236-00018	Decal, BROCK® Black (Garner) LEFT Half	4	4	4	4	3	3	3
3236-00019	Decal, BROCK® Black (Garner) RIGHT Half	4	4	4	4	3	3	3
5563-00003	Valve, Shut-off Upper (not in BOM)	1	1	1	1	1	1	1
5563-00004	Gasket, Shut-off Valve (not in BOM)	1	1	1	1	1	1	1
3334-00001	WARNING-Do Not Stand on Handrail (not in BOM)	1	1	1	1	1	1	1
3734-00029	Sampling Procedure (not in BOM)	1	1	1	1	1	1	1
Bolt Packages								
3254-00002	Bolt Pkg - Bct 3000	1						
3254-00003	Bolt Pkg - Bct 3500		1					
3254-00004	Bolt Pkg - Bct 4000			1				
3254-00001	Bolt Pkg - Bct 4700				1			
3254-00005	Bolt Pkg - Bct 5000					1		
3254-00006	Bolt Pkg - Bct 6000						1	
3254-00007	Bolt Pkg - Bct 7000							1

Tower Hardware Index

(Hardware used in THIS Manual only; for a complete listing of Hardware / usages, see Manual Supplement MFH1953)

Part No.	Description	Used Where:
2364-00041	5/16" Hardened Washer	Stringer, Base Stiffener, Splice
39-20070	Bolt, HH 5/16 x 1" Gr 8	Stringers/Splice
2318-00046	Bolt, 5/16" x 1 1/4" HH Gr 8	Base Stiffener
39-20201	5/8 x 2" HH Gr 8 Bolt	Split Legs
39-20415	5/8 X 2 3/4" HH Gr 8 Bolt	Stiffener and Beam
39-20076	5/8"-11 Hex Nut	Split legs
39-20022	1/2"-13 Hex Nut	Horizontal Tie Brace, X-Brace, Beam
39-20211	1/2" Hardened Washer	X-Brace Tie Brace
2363-00004	Nut, 5/16"-18 Whiz Lock SS	Stringers
2330-00001	Bolt, 3/8 x 3/4" Whiz Lock	Stringers-to-Stringers/Stubs
2363-00001	Nut, 3/8" Whiz Lock	Stringers-to-Stringers/Stubs
2331-00004	Bolt	Skins to Stringer
2363-00006	Nut, 5/16" Whiz Lock	Inner Skins and Stringer
2372-00001	Tek-Screw, 10-16x 1/2" Drill-quick 150	misc. needs
2372-00008	Tek-Screw, 1/4"-14 x 3/4" Drill-quick	misc. needs
2331-00019	Bolts, 5/16 x 1"	C-Channel to Stringers
2320-00004	Bolt, 5/16 x 1" Whiz Lock	Moisture Equalizers
2363-00006	Nut, 5/16" Whiz Lock	Moisture Equalizers
2331-00004	Bolt, 5/16 x 3/4"	Moisture Equalizers

References

Electrical connection/disconnection procedures for Dryer testing

IMPORTANT!

WARNING!



IMPORTANT!

These procedures are to remind Qualified Electrical Personnel ONLY of the minimum steps that MUST be followed.

Their inclusion in this Manual does NOT in any way imply that these procedures can be used BY unqualified personnel or in substitution FOR Qualified Electrical Personnel.

Review and always follow the “Electrical Connection/Disconnection Procedures for Dryer Testing” outlined here.

These procedures MUST be followed by Installers of BROCK® Dryers and related equipment. Failure to follow these procedures could result in death or serious injury.

Connecting Procedures:

1. **BEFORE ANY TESTING, make certain all supply Disconnects are in the OFF position and LOCKOUTS are in place!!!!**
2. Verify that the Disconnect to the Dryer being tested is in the OFF position.
3. Verify proper voltage to be used, 240V single-phase, 240V 3-phase or 480V 3-phase.
4. Verify that your voltage tester is operating properly: Test it on a **known** voltage source.
5. Checks for voltage at the end of the female supply plug or plugs, from the appropriate supply disconnect. **Make sure to check the correct cable!!! NO VOLTAGE should be present!!!!**
6. Perform a visible check on the supply cable and plug or plugs for any defects/damage.
7. Confirm again that the male plug “Pigtail” is disconnected from the female supply plug or plugs. Perform a visible inspection on the Pigtail Supply Cable and plug or plugs. After it is confirmed that the Pigtail Supply Cable is in good condition, it can be connected to the Dryer Disconnect. Secure this cable to remove stress on the terminal connections.
8. After good, secure connections are made to the Dryer Disconnect, you may proceed to plug the Dryer connection cable plug or plugs into the supply plug or plugs. The individual phase plugs for the 240V cable should be connected according to color. Make sure all plugs are firmly seated and latched. **Always make sure the individual green ground plugs are hooked up.**
9. Before powering up, a 10' [3 048] area around the open panel to be “energized” will need to be blocked off with a non-conductive perimeter guard. **Only properly protected and trained personnel can enter this area when the open panel is energized.**
10. Once all the connections and inspections are conducted and the area is secured and you are wearing the proper PPE equipment, you are free to start the POWER UP sequence.
11. You may now TURN ON the Supply Disconnect, and then turn on the Dryer Disconnect.
12. At this point you are free perform the appropriate tests as outlined in your **Test Procedures....would this be the next section, “Checkout and Adjustments?”**

Disconnecting Procedures:

1. Turn OFF the Dryer Motor or Motors, and then turn off the Dryer Disconnect.
2. Turn OFF and LOCKOUT the Supply Disconnect.
3. Verify that your voltage meter is working properly: Test it on a **known** voltage source.
4. Check for voltage at the point of temporary cable connection to the Dryer - **NO VOLTAGE SHOULD BE PRESENT!!!!**
5. At this point the PPE equipment does not need to be worn.
6. Unplug the male plug or plugs from the female supply plug or plugs.
7. You may now remove the temporary test cable from the Dryer.
8. Store cables properly with the provided safety caps inserted in the female plugs.
9. **Supply Disconnects MUST ALWAYS REMAIN IN THE "OFF" POSITION AND LOCKED OUT when not in use!!!! —8/17/2006**

Manufacturer's Recommended Minimum Lockout/Tagout Energy Control Procedures

These procedures amount to minimum instructions for Lockout/Tagout. Any more stringent, current, or up-to-date requirements pursuant to OSHA or other regulations must be followed to the extent applicable.

Purpose

The procedures listed herein are intended to provide minimum instructions to operators and/or end users of products supplied by the Manufacturer. To the extent that applicable laws, regulations, and/or codes, (such as, without limitation, OSHA regulations and requirements), provide more stringent requirements, all erectors, installers, operators and/or end users of the products referenced in this manufacturer's product manual, such applicable laws, regulations and/or codes MUST be followed. Whenever maintenance or servicing is completed to machines or equipment, all such maintenance and servicing shall be completed in accordance with the requirements of OSHA's 1910.147, et seq., including any amendments thereto. Such requirements are designed to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees or operators perform any maintenance or servicing where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Authorized and Affected Individuals

Authorized operators and individuals who must be trained on these procedures include, without limitation, individuals who must lock out or tag out machines or equipment in order to perform servicing or maintenance on that machine or equipment. Affected individuals who must follow these procedures and be trained on the minimum requirements stated herein include individuals whose job responsibilities or operational responsibilities require him/her to operate or use a machine or equipment on which servicing or maintenance may be performed, or whose job responsibilities or operational responsibilities require him/her to work in an area in which such servicing or maintenance is being performed. An individual should not be authorized to perform such job responsibilities and/or operational responsibilities until he/she is properly trained on these procedures and is properly trained to complete such servicing or maintenance tasks.

Service and/or Maintenance

Work place activities such as construction, installing, setting up, adjusting, inspecting, modifying and maintaining and/or servicing machines or equipment must be subject to the minimum procedures stated herein and any additional procedures required by applicable law, regulation or code. Additional activities, such as lubrication, cleaning or unjamming of machines or equipment, and making adjustments or tool changes, where the individual performing the activity may be exposed to the unexpected energization or start up of the equipment or release of hazardous energy must also be subject to the minimum procedures stated herein and any additional procedures required by applicable law, regulation or code.

These minimum procedures must be followed by maintenance and setup personnel. Maintenance personnel must follow such minimum procedures in the event that any type of required repair, cleaning, maintenance, inspections, adjusting, or servicing (e.g., electrical, mechanical, or other such servicing that requires entrance into or close contact with the machinery).

Setup personnel must follow these minimum procedures in the event that any type of setup is required (e.g., replacing dies, adjusting guards, adjusting die components / tooling, removal of jammed parts, or other such activities that require entrance into or close contact with the machinery).

Machinery and Equipment

Unlike small appliances or hand tools, industrial machinery requires more than turning off a switch and unplugging. The power for such equipment comes from multiple, interactive energy sources. If all energy sources are not isolated before service (setup and/or maintenance) is performed, an accidental release of energy could occur which could result in serious injury or even death. These forms of energy include: electrical, pneumatic, chemical, thermal, hydraulic, mechanical, or gravity. When machines or equipment need to be serviced, this energy must be isolated so authorized personnel can safely perform the work.

Each individual fitting the above descriptions must be issued locks, with identifying tags, which must be used only by that person. Locks must not be transferable from person to person, and each individual must be held responsible for his/her own locks and keys. Each lock must be numbered and a master list showing the number, and the individual using it, must be under the supervision of the facilities or project site manager.

Lockout/Tagout Procedures

Lockout/Tagout is the preferred method of isolating machines, or equipment, from energy sources. Tagout is to be performed, instead of lockout, only when there is no way to lockout a machine. The authorized maintenance supervisor must be notified if there is no way to lockout a machine. The authorized maintenance supervisor must then evaluate equipment for future lockout capabilities.

Affected individuals must be notified when their machine is to be locked out according to the following method. All types of machinery and equipment mentioned above must be subject to these minimum shutdown, isolation, blocking and securing procedures for Lockout/Tagout.

Step One: Preparation for shutdown

Before an authorized or affected individual turns off a machine or equipment, the authorized individual shall have a working knowledge of the specific equipment, the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.

Step Two: Machine or equipment shutdown

The machine or equipment shall be turned off or shut down using the procedures established for that specific machine or piece of equipment. An orderly shutdown must be utilized to avoid any additional, or increased, hazard(s) to individuals as a result of equipment stoppage.

Step Three: Machine or equipment isolation

All energy isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated, in such a manner, as to isolate the machine or equipment from the energy source(s).

Step Four: Lockout/Tagout device application

All types of machinery and equipment listed above fall under these lockout placement, removal, transfer, and responsibility minimum procedures.

Lockout/Tagout devices shall be affixed to each energy isolating device by authorized individuals. Lockout devices, where used, shall be affixed in a manner that will hold the energy isolating devices in a "safe" or "off" position. Tagout devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the "safe" or "off" position is prohibited. Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.

Step Five: Stored energy

Following the application of Lockout/Tagout devices to energy isolating devices, all potentially hazardous stored or residual energy must be relieved, disconnected, restrained, and otherwise rendered safe. If there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

Step Six: Verification of isolation

Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized individual shall verify that isolation and deenergization of the machine or equipment have been accomplished, even though isolation is performed prior to shutdown and is checked at that point. Verify the isolation of the equipment by operating the push button or other normal operating or startup control(s) to make certain the equipment will not operate. Return the operating control(s) to neutral or ioff position after verifying that the equipment is isolated. The machine or equipment is now locked out and servicing or maintenance may safely begin. (continued)

(continued) Step Seven: Release from Lockout/Tagout.

Before Lockout/Tagout devices are removed and energy is restored to the machine or equipment, procedures shall be followed and actions taken by the authorized individual(s) to ensure the following:

The machine or equipment: The work area shall be inspected to ensure that nonessential items have been removed and to ensure that machine or equipment components are operationally intact.

Individuals Present: The work area shall be checked to ensure that all individuals have been safely positioned or removed. After Lockout/Tagout devices have been removed and before a machine or equipment is started, affected individuals shall be notified that the Lockout/Tagout device(s) have been removed.

Step Eight: Lockout/tagout devices removal

Each Lockout/Tagout device shall be removed from each energy isolating device by the individual who applied the device. Exception: When the authorized individual who applied the Lockout/Tagout device is not available to remove it, that device may be removed under the direction of the authorized supervisor, provided that specific procedures and training for such removal have been developed, documented and incorporated into the owner's control program. The owner shall demonstrate that the specific procedure provides equivalent safety to the removal of the device by the authorized individual who applied it. The specific procedure shall include at least the following elements:

- a. Verification by the owner (supervisor / manager) that the authorized individual who applied the device is not at the facility / project site.
- b. Making all the reasonable efforts to contact the authorized individual to inform him/her that his/her Lockout/Tagout device has been removed.
- c. Ensuring that the authorized individual has the knowledge before he/she resumes work at that facility / project site.

Shift or Personnel Changes

When a shift or personnel change occurs, a designated individual shall ensure the continuity of Lockout/Tagout protection.

The designated individual shall provide for the orderly transfer of Lockout/Tagout devices between off-going and on-coming individuals to minimize risk from stored energy.

In general, if a piece of equipment is locked out at shift change, the person on the next shift must apply their lock before the individual who is leaving can remove their lock. In the event that no authorized individual or supervisor is available to transfer the Lockout/Tagout device, a designated department lock can be used to lockout the equipment during this time frame. As soon as the next shift authorized individual is available, he/she must ensure the equipment is properly de-energized and then place their own Lockout/Tagout device on the equipment.

At this point in time the department lock should be removed and returned to its designated storage location. The department lock is never to be used as an individual lockout protection device while servicing or repairing equipment.

Group Lockout/Tagout

If more than one individual is servicing or setting up the machinery, each individual will use their own lock on the lockout. This prevents undue exposure to a potential hazard. The last individual working on the machinery will remove his/her lock and the tag indicating the work has been completed. The locks should remain on the switch until all work has been completed unless it is necessary for the machinery to be operable between servicing and/or maintenance and does not expose the worker or operator to any unnecessary danger.

Operator Training

The owner must provide effective initial training and retraining as necessary and must certify that such training has been given to all workers and operators covered by these minimum procedures. The certification must contain each worker and/or operator's name and dates of training.

For the purposes of these minimum procedures, there are three types of individuals — authorized, affected, and other. The amount and kind of training that each individual should receive is based upon (1) the relationship of that individual's responsibilities in relation to the machine or equipment being locked and tagged out, and (2) the degree of knowledge relevant to hazardous energy that he or she must possess.

For example, the owner's training program for authorized individuals (those who are charged with the responsibility for implementing the energy control procedures and performing the service and maintenance) must cover, at minimum, the following areas: (1) details about the type and magnitude of the hazardous energy sources present in the workplace; and (2) the methods and means necessary to isolate and control those energy sources (i.e., the elements of the energy control procedures). By contrast, affected individuals (usually the machine operators or users) and all other individuals who have access to such machines and/or equipment must be able to: (1) recognize when the control procedure is being implemented; and (2) understand the purpose of the procedure and the importance of not attempting to start up or use the machinery and/or equipment that has been locked or tagged out.

Because an affected individual is not one who is performing the service or maintenance, that individual's responsibilities under these minimum procedures are more simple (i.e., whenever there is a Lockout/Tagout device in place on an energy-isolating device, the affected individual must leave it alone and never attempt to operate the machinery and/or equipment).

Every training program must ensure that all authorized and affected individuals understand the purpose, function and restrictions of these minimum energy control procedures and that authorized individuals possess the knowledge and skills necessary for the safe application, use, and removal of energy controls.

Training programs used for compliance with these minimum procedures and/or other more stringent applicable procedures, which are performance-oriented, should deal with the equipment, type(s) of energy, and hazard(s) specific to the environment being covered.

Retraining must be provided, as required, whenever there is a change in work and/or operational assignments, a change in machines, equipment or processes that present a new hazard, or a change in minimum energy control procedures. Additional retraining must be conducted whenever a periodic inspection reveals, or whenever the relevant authorized supervisor has reason to believe, that there are deviations from or inadequacies in the authorized individual's knowledge or use of the minimum required energy control procedure.

Periodic Inspection

A periodic inspection is done, looking at the minimum energy control procedures performed to ensure that such minimum procedures and requirements are being followed. The inspection should be performed monthly by the authorized supervisor with the intent of evaluating the authorized individuals at least once per year. This information should be recorded on a Lockout/Tagout Inspection Sheet / Log. All original copies should be maintained by the owner of the equipment and/or machinery.

Outside personnel (contractors, etc.)

The owner and any third party contractor engaged to perform installation, maintenance or operation of the equipment and/or machinery must advise each other of their respective minimum Lockout/Tagout procedures. Each party must ensure that his or her personnel must understand and comply with all restrictions and / or prohibitions of the other party's minimum energy control procedures.

Administrative Duties

The authorized supervisors are responsible for the daily follow-through of the required minimum procedures for each applicable piece of equipment and/or machinery. Violation of the required minimum procedures set by the owner must be addressed appropriately by the owner and/or authorized supervisor. The owner of the applicable equipment and/or machinery must review and update the required minimum procedures as necessary.

Rev. 09/18/07

Specifications

Model	BCT3000	BCT3500	BCT4000	BCT4700	BCT5000	BCT6000	BCT7000
Diameter	18'	18'	18'	18'	24'	24'	24'
Height	80' - 9"	88' - 7"	100' - 3"	111' - 10"	105' - 10"	113' - 7"	121' - 4"
Base Height ft	9.96	9.96	9.96	9.96	9.96	9.96	9.96
Body Height ft	73.75	73.75	97.00	97.00	104.75	104.75	104.75
Roof Height ft	4.86	4.86	4.86	4.86	6.58	6.58	6.58
Total Height ft	88.57	88.57	111.82	111.82	121.29	121.29	121.29
Empty Weight	53,000	53,000	63,000	63,000	98,400	98,400	98,400
Grain Column Width	12¾, 10¾"	12¾, 10¾"	12¾, 10¾"	12¾, 10¾"	12¾, 10¾"	12¾, 10¾"	12¾, 10¾"
Internal Platform (std.)	1	1	1	1	1	1	1
External Platforms	2	2	3	4	3	4	4
Blower HP	(2) 60	(2) 75	(2) 100	(2) 125	(2) 100	(2) 125	(2) 150
DWDI Blower	(2) 490	(2) 490	(2) 490	(2) 490	(2) 660	(2) 660	(2) 660
Unload Motor HP	7.5	7.5	7.5	7.5	10	10	10



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