GSI Modular Tower Dryers - Dealer Overview of Unloading, Staging and Installing

Installation Manual

PNEG-1708
Date: 05-24-10
This manual is a work-in-progress and may be updated at any time. Check with GSI for most recent version.
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1. Introduction

General Information

The GSI Modular Tower Dryer is designed for quick and easy on-site installation. It offers a number of distinct features and advantages compared to similar products on the market.

As a GSI dealer it is your responsibility to be informed about the product and to assist the customer as necessary for a smooth and successful installation process. This guide provides an overview of the unloading, staging and installation of the Modular Tower Dryer. It provides you with important details about pre-installation considerations, guidelines to prepare for a smooth installation and a list of critical tool characteristics and required tools. It also provides an overview of field-tested suggestions and guidelines for installation of the dryer.

Being informed about this product and being able to serve as an expert resource for your customer increases your credibility through product knowledge and thereby increases your selling power.

Why GSI Modular Tower Dryers?
Modular construction means:

1. FASTER on-site installation
2. EASIER on-site construction
3. SAFER more work performed close to ground
4. MINIMAL connections for gas and power
5. OPTIONS to meet different needs: augers, turners, catwalks and platforms

GSI Modular Tower Dryers:
Finally, Something stacked in YOUR Favor.
Overview

The purpose of this manual is not to instruct dealers in the actual installation of a GSI Modular Tower Dryer. The purpose of this manual is to provide GSI dealers with an overview of some of the features and benefits of this product that set it apart from the competition.

The relative ease with which the installation can be completed, the short installation time and the close-to-ground installation process are all aspects of the GSI Modular Tower Dryer that are important for dealers to highlight to customers.

Helping your customers understand the best way to unload, stage and plan the installation of the dryer streamlines the process. This manual will provide you with important information to share with your customers as they prepare for their new equipment.

The GSI Modular Tower Dryer will arrive at your customer’s location with many connections already made at the factory. For example, much of the electrical wiring is done at the factory and only minimal connections are required to be made in the field. The gas pipe train is also pre-assembled and pre-fitted at the factory.

Being knowledgeable about the product as well having a good overview understanding of the installation process helps build the selling-power and establishes you as an important resource to the customer after the sale.
2. Safety

Safety Guidelines

This manual contains information that is important for you, the owner/operator, to know and understand. This information relates to protecting personal safety and preventing equipment problems. It is the responsibility of the owner/operator to inform anyone operating or working in the area of this equipment of these safety guidelines. To help you recognize this information, we use the symbols that are defined below. Please read the manual and pay attention to these sections. Failure to read this manual and its safety instructions is a misuse of the equipment and may lead to serious injury or death.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

**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 potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

**CAUTION** used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

**NOTE** indicates information about the equipment that you should pay special attention.
Safety Instructions

Our foremost concern is your safety and the safety of others associated with this equipment. We want to keep you as a customer. This manual is to help you understand safe operating procedures and some problems which may be encountered by the operator and other personnel.

As owner and/or operator, it is your responsibility to know what requirements, hazards and precautions exist, and to inform all personnel associated with the equipment or in the area. Safety precautions may be required from the personnel. Avoid any alterations to the equipment. Such alterations may produce a very dangerous situation where SERIOUS INJURY or DEATH may occur.

This equipment shall be installed in accordance with the current installation codes and applicable regulations which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

Follow Safety Instructions

Carefully read all safety messages in this manual and safety signs on your machine. Keep signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from the manufacturer.

Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machinery in proper working condition. Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.

If you do not understand any part of this manual or need assistance, contact your dealer.
2. Safety

<table>
<thead>
<tr>
<th>Wear Protective Clothing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wear close fitting clothing and safety equipment appropriate to the job.</td>
</tr>
<tr>
<td>Remove all jewelry.</td>
</tr>
<tr>
<td>Long hair should be tied up and back.</td>
</tr>
<tr>
<td>Safety glasses should be worn at all times to protect eyes from debris.</td>
</tr>
<tr>
<td>Wear gloves to protect your hands from sharp edges on plastic or steel parts.</td>
</tr>
<tr>
<td>Wear steel toe boots to help protect your feet from falling debris. Tuck in any loose or dangling shoe strings.</td>
</tr>
<tr>
<td>A respirator may be needed to prevent breathing potentially toxic fumes and dust.</td>
</tr>
<tr>
<td>Wear hard hat to help protect your head.</td>
</tr>
<tr>
<td>Wear appropriate fall protection equipment when working at elevations greater than six feet (6’).</td>
</tr>
</tbody>
</table>

- **Eye Protection**
- **Gloves**
- **Steel Toe Boots**
- **Respirator**
- **Hard Hat**
- **Fall Protection**
3. Unloading and Staging for Easy Installation

Unloading and Staging Considerations

A crane of appropriate load capacity is required to unload and stage the modules. The approximate weight of each section is listed below:

1. Unload/Base = 6800 lbs. *
2. Burner/blower section = 4100 lbs. *
3. Heat section (empty/no turners) = 1400 lbs. *
4. Heat section w/ turners = 2550 lbs. *
5. Roof Section = 2300 lbs

*NOTE: Section weights do NOT include the additional weight of the catwalk that will be attached to the appropriate section(s). Catwalk weight is approximately 1150 lbs.

NOTE: All models of the GSI Modular Tower Dryer are comprised of varying quantities of the sections listed above.

Figure 3A Crane

All sections come labeled by the factory. Separate labels identify the dryer sections by name and by their sequential placement in the overall stacking of the Modular Tower Dryer. (See Figure 3B.)

Figure 3B Section Labels
3. Unloading and Staging for Easy Installation

To determine the weight of multiple sections when lifting them together, simply add the section weights together and if applicable, add the weight of the catwalk as well.

- Crews will need at least four (4) clevis hooks (See Figure 3C) and straps of varying lengths to lift and move the various sections of the dryer.

Before unloading any dryer sections from the delivery truck, be sure to locate and identify the correct locations of the lift points for all sections.

- The roof section is the ONLY section with lift points INSIDE the module. The roof section is lifted using four (4) lift points INSIDE of the module. All other modules are lifted using four (4) lift points around the outside of the modules. (See Figure 3D.)

**Figure 3C Clevis Hooks**

**Figure 3D Lift Point and Clevis Hook INSIDE Roof Section**

**NOTE:** Straps are secured INSIDE the roof section with hooks (See Figure 3D for close-up) and should not extend too much beyond the roof ring. This is to minimize outward pressure on the roof ring. (See Figure 3E.)

**Figure 3E Roof Section Lifted by Crane**

**Note:** Recommended strap lengths for lifting are 6' - 8'

**Figure 3E Roof Section Lifted by Crane**
3. Unloading and Staging for Easy Installation

Do NOT use roof lugs to lift module or damage will occur.

Figure 3F Roof Lugs - NOT for Lifting

All sections (except the roof section) are lifted using four (4) lift points around the outside of the module, clevis hooks and appropriate straps to the crane. Note length of lifting straps compared to length when lifting roof section as shown in Figure 3E on Page 10.

Figure 3G

Lugs are for shipping purposes only. **DO NOT** lift roof section using these lugs.

Always lift roof section using lift points **INSIDE** of the section.
3. Unloading and Staging for Easy Installation

Unloading and Staging the Modules

1. Place modules on ground that is as solid and level as possible.

   **NOTE:** Soft ground/grass will make preparation for installation more difficult. Concrete or gravel ground is preferable for pre-installation work. If no gravel or concrete area is available for staging the modules, consider placing the modules on 2 x 4’s or other blocking material to prevent the modules from sinking into the ground.

2. Place modules next to sequential modules (i.e. place Section 2 near Section 3 and Section 3 near Section 4, etc.) to make the stacking and connection of multiple sections easier.

3. **IMPORTANT:** Leave at least 4’ to 5’ of space between each module.

   Catwalks and/or platforms are attached to appropriate sections before sections are stacked upon each other and lifted into place. *(See Figure 3H.)*

**Figure 3H Unload and Staging Considerations**

**NOTE:** Leave adequate space between modules to attach platforms and catwalks.

**NOTE:** Concrete and gravel make the best staging ground.
3. Unloading and Staging for Easy Installation

Base/Unload Section Placement Considerations

If the concrete foundation is ready and adequately cured, place the base/unload section on it and take careful and complete consideration of the surrounding equipment. Be sure to consider any planned options such as augers and any potential equipment to be added later.

**IMPORTANT:** Also consider the location of the electrical box and control panel as it is important that personnel have adequate and safe access to them. The vision control box can be remote mounted.

**IMPORTANT:** One set of X-braces on the unload section may be removed without compromising structural integrity to allow for auxiliary equipment. No more than one set of X-braces may be removed.

**IMPORTANT:** When drilling holes for the anchor bolts, the drill may encounter rebar in the foundation. If this happens repeatedly (three (3) or more times), call GSI for extension plates to use on the foundation. See Modular Tower Dryer Installation Manual for further information.

**IMPORTANT:** Make sure overhead clearance is adequate for the entire tower dryer height and that clearance between the dryer walls and other equipment is sufficient to allow for catwalks and/or platforms.

**IMPORTANT:** It is critical that the base/unload section be level. Shims are included if leveling is needed. See Modular Tower Dryer Installation for further instructions.

![Figure 3I](image-url)
3. Unloading and Staging for Easy Installation

**Figure 3J** Consider overhead clearance for the entire height of the dryer.

**IMPORTANT:** When considering base/unload section placement be sure to identify and locate the ladder brackets on each section that will be placed upon the base/unload section. Use ladder brackets as a reference point for where ladders, safety cages and platforms/catwalks will be placed higher up on the dryer. Be sure to allow for adequate spacing between the dryer modules AND the attached ladders/safety cages and/or catwalks/platforms.

**Figure 3K** Ladder Brackets - Identify location on each module for alignment considerations and surrounding equipment considerations.
3. Unloading and Staging for Easy Installation

Shipping Crate

Once the modules have been staged, open the crate that shipped with the dryer modules. The crate contains catwalk and/or platform materials, ladders and safety cages, as well as the gas pipe train pipe.

Optional items such as an auger kit will also ship in crates. Installation instructions for optional accessories are in separate installation manuals.

Unload the materials from the crate and place them nearby in like-item groups (i.e. gas train pipes together, catwalk and platform flooring together, etc). (See Figure 3L.)

![Figure 3L Shipping Crate](image)

Once the crate is empty, use a hammer to pound the exposed nails and/or staples back into the frame so that the surface is smooth.

The crate makes an excellent workbench for assembling items throughout the installation process. (See Figure 3L and Figure 3M.)

![Figure 3M Crate as Work Bench](image)
NOTE: If the modules were unloaded on soft or uneven ground, the crate can be broken down to act as blocking material to place under the modules so that they do not sink into the ground.

![Figure 3N](image)

**Critical Tool Characteristics**

Equipping the field crew with the right tools is essential for a smooth installation. The GSI Modular Tower Dryer requires a number of standard tools. Please pay particular attention to the following item descriptions as the characteristics of the following tools are extremely important information for proper installation.

**1-1/8" Hammer Drill Star Bit at least 12" Long is REQUIRED.**

While the anchor bolts are 1" in diameter, the holes for the anchor bolts **MUST** be 1-1/8" in diameter to allow room for the required epoxy. Additionally, anchor bolts must be sunk deep enough so that no more than 2"-3" is above the plate.

**NOTE:** An air compressor hose is needed to blow out the dust from the holes prior to dropping in the anchor bolts and epoxy. *(See Figure 3O.)*

![Figure 3O](image)

*Figure 3O Anchor Bolts Sunk - No More than 3" Remains above Plate*
Laser Transom Level Tool

After placing the unload/base section on the concrete foundation and establishing its proper orientation to other equipment it must be leveled. **GSI strongly recommends using a laser transom leveling tool to level the unit.** *(See Figure 3P.)* If a laser transom is not available, a carpenter’s level may be used.

**NOTE:** It is critical to establish the base/unload section as level. **Even a minor deviation at this level will be a significantly greater deviation at the top section.** Therefore, pay particular attention to confirming the levelness of the base/unload section. Shims are available to assist with leveling the base/unload section.

![Figure 3P Laser Transom Level](image)

Compression Channel

**NOTE:** Regardless of what leveling tool is used, the proper reference point for leveling the unload section of the dryer is the Compression Channel and NOT the base/leg plates on the concrete. See Figure 3Q for reference.

The Compression Channel is the “ledge” around the unload section of the dryer. Use this as the reference point for leveling the unit. Do **NOT** use base plates/feet to determine whether or not unit is level.

![Figure 3Q Unload Section with Compression Channel Marked](image)
3. Unloading and Staging for Easy Installation

Punches

1/4" line up punches - at least 8
5/8" line up punches - at least 8

Ideally, during the installation process, crews will work in two (2) person teams with one team working inside the dryer and one team working outside the dryer. Each crew member should have at least two (2) punches available to them.

**NOTE:** Punches should be long enough to provide significant leverage to the user and should have narrow and pointed tips to facilitate the initial punch placement. (See Figure 3R and Figure 3S.)

**Figure 3R** Line Up Punch and Hammer

**Figure 3S** Line Up Punch Inserted Through Connecting Channels of Dryer
Socket Sets and Impact Wrenches

- 3/8" Drive 1/2" socket set
- 3/8" Drive 9/16" socket set
- 1/2" Drive socket set
- 15/16" Deep well 1/2" drive sockets
- 1/2" Deep well 1/2" drive sockets
- Short 1/2" 1/2" drive sockets
- 9/16" Deep well 1/2" drive sockets
- 1/2" Impact wrenches

Accessing the bolts that connect sections of the dryer together requires passing through the hole in the channel as shown in Figure 3T.

**NOTE:** When installing, in all possible situations, place the impact on the bolt. Do NOT tighten the nut as it will not lock down on the ring. Always tighten the bolt. *(See Figure 3T.)*
3. Unloading and Staging for Easy Installation

**Comprehensive Tool List**

- C6 Epoxy gun
- 1/4” Line up punches
- 1/2” x 9/16” Box end combination wrenches
- 1/2” Open end wrenches
- 9/16” Open end wrenches
- 32 OZ Ball peen hammers
- 5/8” Line up punches
- Small pry bars
- 3/8” Drive 1/2” socket set
- 3/8” Drive 9/16” socket set
- 1/2” Drive socket set
- 4’ Level
- Vice grips
- 25’ Tape measures
- 15/16” Wrenches
- 15/16” Deep well 1/2” drive sockets
- 1/2” Deep well 1/2” drive sockets
- Short 1/2” 1/2” drive sockets
- 9/16” Deep well 1/2” drive sockets
- Caulk gun & 2 tubes of clear silicone
- 36” Pipe wrenches (rigid aluminum)
- 48” Pipe wrench (rigid aluminum)
- 18” Pipe wrenches
- Torque wrench (all 3/8” grade 8 bolts will need 45 ft./lbs.)
- 20’ Ladders
- 6’ Ladders
- 3/8” High speed drill bits
- 5/16” High speed drill bits
- 1/2” Impact wrenches
- 1/2” Drills
- 1-1/2” Sockets
- Cordless sawzall
- 1-1/2” Hammer drill
- 1-1/8” Bits (hammer drill star bits)
- 3/8” & 5/16” Bit for impact driver
- 100’ with a four (4) way box 10 gauge
- 25’ Cord and 100’ cord
Securing the Unload Module

Anchor Bolts

After determining the orientation of the unload section, use a 1-1/8" drill bit at least 12" long to drill holes for the anchor bolts.

**NOTE:** Anchor bolts are 1" in diameter but the hole for them must be 1-1/8" in diameter to allow for the required epoxy.

It may be necessary to loosen or remove the bolts on the X-braces to gain easier access to the holes for the anchor bolts. If X-braces are removed or loosened to drill the anchor bolt holes, be sure to tighten the X-braces again when done.

While it is normal to encounter rebar on occasion when drilling the holes for anchor bolts, should this happen more than 3 or 4 times, it is necessary to contact GSI for splice plates to complete the drilling of the anchor bolt holes. *(See Figure 4A.)*

![Figure 4A](image)

Use a laser transom to level the unload section. **ALWAYS use the compression channel as the point of reference for establishing the levelness of the unit.** Never use the feet/anchor plates to determine levelness. *(See Figure 4B.)*

![Figure 4B](image)
4. Unload Section

Shims are provided to assist with leveling if necessary. (*See Figure 4C.*)

![Figure 4C](image)

After drilling the holes, all debris and fine material must be removed from the holes. Use a compressed air hose to blow the dust and debris out. Then, drop anchor bolt in holes to confirm depth is adequate.

Once the unit is level, fill anchor bolt holes approximately 1/2” full with the provided epoxy. Press anchor bolts in holes. (*See Figure 4D.*)

![Figure 4D](image)

Epoxy should ooze up and out of the hole at the base of the plate. If it does not, add epoxy and repeat. After all anchor bolt holes have been filled with epoxy and all anchor bolts have been inserted into the holes to the proper depth, allow epoxy to set for 4 to 6 hours before installing and tightening nuts or stacking another section of the dryer on top of it.

No more than 2” to 3” of the bolt should remain above the plate. (*See Figure 4E.*)

**NOTE:** 1 Set of X-braces on the unload section may be removed for auxiliary equipment.
Overview Catwalk and Platform Assembly

NOTE: GSI catwalks and platform assembly is covered more fully in separate manuals. This is a basic overview of the process as it relates to the Modular Tower Dryers to assist GSI Dealers in educating customers and assisting with general installation knowledge.

Catwalk and platform parts are shipped in the shipping crate that accompanies the modules. Assemble all floor planks and kick plates ahead of time. Use the shipping crate as a work bench (as illustrated earlier in this manual) and assemble as follows.

IMPORTANT: Always attach catwalks and platforms to the appropriate modules while they are on the ground, before they are stacked on other modules or lifted into place on the unload section.

Match longer kick plates to longer catwalk platforms and match shorter kick plates to shorter catwalk platforms. Attach kick plates to planks with nuts and bolts. For safety purposes, all nuts should be to the inside. Tighten fully with impact.

Fully assembled catwalk planks with kick plates are shown in Figure 5A and Figure 5B.

NOTE: For safety purposes, curved kick plates are provided for the step-over sections immediately off of ladders. The curved kick plate minimizes room between the platform and the dryer wall to help prevent feet/boots from slipping and getting wedged between the platform and the dryer wall. (See Figure 5C.)
5. Catwalk and Platform

Remove four (4) bolts per seam on sections to attach catwalk support braces.

**IMPORTANT:** Be careful not to push bolts back into channel between the screens. If bolts are inadvertently pushed back into the channel, or are stripped and need to be replaced, see field tips for suggestions.

Attach catwalk brackets as shown in *Figure 5D*.

**IMPORTANT:** All brackets must attach facing/angling the same direction. In the example on the right, all brackets will face → to match the bracket being installed.

![Figure 5D](image)

Assemble cut-off angles/support braces.

Connect as shown in *Figure 5E* using one nut and one bolt.

**IMPORTANT:** Finger-tighten only at this time so that the pieces act like a hinge. Again, place nut to the inside.

![Figure 5E](image)  ![Figure 5F](image)
5. Catwalk and Platform

Attach cut-off angles to dryer wall using the previously installed catwalk brackets. Cut-off angles attach to outside of bracket. *(See Figure 5G.)* Tighten fully with impact.

**NOTE:** Lower arm of cut-off angle connects to top hole of bracket and upper cut-off angle arm connects to top hole of bracket.

In *Figure 5G*, the catwalk brackets all face →. The cut-off angles attach to the outside of the bracket and the cut-off angles all face ←.

**NOTE:** As with the catwalk brackets, all cut-off angles should face the same direction.

**NOTE:** Do NOT attach brackets and/or cut-off angles where ladder sections will be installed.

---

**Catwalk Transitions**

After attaching the cut-off angles to the catwalk brackets on the dryer wall, attach a catwalk transition to each cut-off angle.

Catwalk transition is shown in *Figure 5H below and Figure 5I on Page 26.*

**IMPORTANT:** Note the hole alignment on the catwalk transition. The “five (5) hole” pattern near the center of the transition MUST be oriented so that the center hole is AWAY from the dryer wall. *(See Figure 5H below and Figure 5I on Page 26.)*

**NOTE:** The hole indicated on the catwalk transition must be oriented AWAY from the dryer wall.

---

**Figure 5G**

**Figure 5H**
5. Catwalk and Platform

Attach catwalk planks (with kick plates attached) to catwalk transitions.

**NOTE:** Kick plates help prevent shoes and feet from slipping off the platform. There are two (2) planks between cut-off angles. The longer plank with the kick plate goes further away from the dryer wall with the kick plate on the outside and the shorter plank goes closest to the dryer wall with the kick plate to the inside (to prevent stepping or slipping between the plank and the dryer). *(See Figure 5J.)*

Nuts and bolts connecting catwalk plank to catwalk transition.

**NOTE:** Left nut is the middle hole mentioned in previous steps that had to be oriented away from dryer wall. This is required so that the catwalk floor planks fit correctly.

**Catwalk Transition:** Note in *Figure 5J* only the inside plank has been placed. The longer plank further from the dryer wall has not yet been placed and connected.

**Catwalk Plank:** Note this the shorter plank on the inside closer to the dryer wall.

**Kick Plate:** On inside of plank to prevent stepping between catwalk and dryer wall.
As mentioned earlier, be sure to use the catwalk plank with the curved kick plate at the step over point immediate beside ladders. This is an added safety feature to help prevent feet from being wedged between the catwalk and the dryer wall when stepping over or off a ladder. *(See Figure 5K.)* This is the step over section immediately beside a ladder. Use ladder brackets for placement guidance.

![Figure 5K](image1.png)

Figure 5K

Step-over kick plates are installed at step over locations. These kick plates are lower to step in and higher where the handrail supports attach. *(See Figure 5L.)*

![Figure 5L](image2.png)

Figure 5L
Attach handrail supports to cut off angles as shown in *Figure 5M and Figure 5N*.

Attach handrails to handrail supports as shown in *Figure 5M and Figure 5N*. Make sure curved side of handrails is to the inside for use. The sharper flat sides should be to the outside.
Connect handrails to the inside of supports as shown in Figure 5O.
Nuts should be to the outside and the curved side of the handrail should be to the inside of the platform or catwalk for use. *(See Figure 5O and Figure 5P.)*
Note handrail orientation. Flat side goes to the outside away from the dryer. *(See Figure 5O.)*
Note handrail orientation. Rounded side goes to the inside for hand safety. Outside away from the dryer. *(See Figure 5O.)*
Note placement of connecting handrails to handrail support. *(See Figure 5P.)*
NOTE: When assembling catwalks and platforms be sure to leave open the area between seams where ladder brackets are located. Ladders will be installed at these points to connect the platforms and catwalks.
Burner/Blower Section Floor Planks

The burner/blower section contains flooring to support the user when entering the dryer to perform cleaning or maintenance duties.

The flooring planks for the burner/blower section are similar to catwalk planks but have “TABS” on the ends to drop into slots in the burner/blower section.

Before lifting the burner/blower section into place, be sure that the interior floor planks have been placed. (See Figure 6A.)

In *Figure 6A*, one plank has been placed. Note the longer planks will be placed to the outside (closer to the dryer wall) and the shorter planks to the inside (closer to the burner/blower).

In *Figure 6B*, multiple flooring planks have been installed along the outer portion (closer to the dryer wall). The inner planks have yet to be placed.
6. Burner/Blower Section

**NOTE:** The plank nearest the thermistor housing will need to be cut to allow it to drop into place.

In *Figure 6C*, the installer is marking the plank so that it can be field cut for proper fit.

*Figure 6D* shows the marks where the plank needs to be cut for proper fit.

Note the tabs and slots on burner/blower floor planks. This helps differentiate them from catwalk planks. *(See Figure 6C.)*
Figure 6E shows the field-cut plank installed in the burner/blower section. Note how the cut out now fits around the thermistor.

Figure 6E

Figure 6F shows burner/blower planks installed.

Figure 6F
7. Stacking and Connecting Modules

Overview for Safety

The GSI Modular Tower Dryer is designed for quick and safe on-site installation.

In order to maximize safety, always perform as much work as possible as close to the ground as possible.

Use the illustration guides included later in this section for reference.

**IMPORTANT:** Before lifting any modules make sure the lifting capacity of the crane is adequate for the total combined weight of the module or modules, as well as any attached accessories such as catwalks, platforms and ladders.

- Unload/base = 6800 lbs. *
- Burner/blower section = 4100 lbs. *
- Heat section (empty/no turners) = 1400 lbs. *
- Heat section w/ turners = 2550 lbs. *
- Roof Section = 2300 lbs.

*NOTE: Section weights do NOT include the additional weight of the catwalk that will be attached to the appropriate section(s). Catwalk weight is approximately 1150 lbs.

All sections come labeled by the factory. Separate labels identify the dryer sections by name and by their sequential placement in the overall stacking of the Modular Tower Dryer.

To determine the weight of multiple sections when lifting them together, simply add the section weights together and if applicable, add the weight of the catwalk as well.

**NOTE:** Always attach ladder to roof section BEFORE lifting roof off of ground. Attach ladder to section below roof section AFTER roof section is placed upon it.
To maximize safety and convenience, perform as much work as close to the ground as possible.

IMPORTANT: Make sure crane is of adequate lifting capacity.

NOTE: Catwalks, ladders and other accessories not shown for clarity. Be sure to include weight of accessories when combining sections.

NOTE: If the crane is not sufficient to lift the combined weight of Sections Roof/4/3/2 as shown in this example, replace Step 3 with connecting Sections 3 and 2 and then stacking those combined modules on the base.

Step 1:
Stack and connect Roof section to Section 4

Step 2:
Stack and connect Roof/4 to Section 3

Step 3:
Stack and connect Section 2 to Base section

Step 4:
Stack and connect Roof/4/3/2 to Base
To maximize safety and convenience, perform as much work as close to the ground as possible.

IMPORTANT: Make sure crane is of adequate lifting capacity.

NOTE: Catwalks, ladders and other accessories not shown for clarity. Be sure to include weight of accessories when combining sections.

Step 1: Stack and connect Roof to Section 5

Step 2: Stack and connect Roof/5 to Section 4

Step 3: Stack and connect Roof/5/4 to Section 3

Step 4: Stack and connect Roof/5/4/3 to Section 2

Step 5: Stack and connect Roof/5/4/3/2 to Base

Figure 7B
To maximize safety and convenience, perform as much work as close to the ground as possible.  

**IMPORTANT:** Make sure crane is of adequate lifting capacity.  
**NOTE:** Catwalks, ladders and other accessories not shown for clarity. Be sure to include weight of accessories when combining sections.

**NOTE:** If the crane is not sufficient to lift the combined weight of Sections Roof/6/5/4/3 as shown in this example, replace Step 4 with connecting Sections 3 and 2 and then stacking those combined modules on the base and then lifting and connecting Roof/6/5/4/3 to Base/2/3.

**Step 1:**
Stack and connect Roof to Section 6

**Step 2:**
Stack and connect Roof/6/5 to Section 4

**Step 3:**
Stack and connect Roof/6/5/4 to Section 3

**Step 4:**
Stack and connect Roof/6/5/4/3 to Base/2

**Step 5:**
Stack and connect Section 2 to Base

**Step 6:**
Stack and connect Roof/6/5/4/3 to Base/2
To maximize safety and convenience, perform as much work as close to the ground as possible. IMPORTANT: Make sure crane is of adequate lifting capacity. NOTE: Catwalks, ladders and other accessories not shown for clarity. Be sure to include weight of accessories when combining sections.

NOTE: If the crane is not sufficient to lift the combined weight of Sections Roof/7/6/5/4 as shown in this example, replace Step 5 with connecting Sections 3 and 2 and then stacking those combined modules on the base.

Example:

Step 1:
Stack and connect Roof to Section 7

Step 2:
Stack and connect Roof/Section 7 to Section 6

Step 3:
Stack and connect Roof/7/6/5 to Section 4

Step 4:
Stack and connect Roof/7/6/5/4 to Section 3

Step 5:
Stack and connect Roof/7/6/5/4 to Section 3

Step 6:
Stack and connect Section 2 to Base

Step 7:
Stack and connect Roof/7/6/5/4/3 to Base/2
Lifting and Placing a Module on Top of Another

Use four (4) clevis hooks to connect the crane’s lifting straps to the module. Remember, all modules except the roof, lift from four (4) lift points around the outside of the unit.

Figure 7E

NOTE: Platform already attached to upper module.

Figure 7F
7. Stacking and Connecting Modules

When maneuvering lifted modules across open ground, have personnel beside it to guide it and minimize sway. When lifting the module on top of another module, be sure personnel have hard hats.

Carefully lower the module down so that the connecting channels of each module are touching can be connected with nuts and bolts.

**KEEP SOME DEGREE OF TENSION ON THE MODULE FROM THE CRANE. DO NOT FULLY REST THE MODULE(S) ON THE OTHER(S) AT THIS TIME.**

**NOTE:** Ideally, crews will work in two (2) person teams with one team working inside the dryer and one team working outside the dryer. Each person should have at least two (2) punches with narrow pointed tips and long enough to provide significant leverage. Place step ladders and tools INSIDE modules before stacking for ease of access.

**Connecting Modules**

Use the punches to line up connecting holes so that nuts and bolts can be loosely inserted at this time.

**NOTE:** Significant hammering and prying to accomplish hole alignment is to be expected.

![Figure 7G](image)

![Figure 7H](image)
IMPORTANT: *When stacking one module on top of another, be sure to line up ladder brackets.*

In *Figure 7I* ladder brackets are circled.

![Figure 7I](image)

Ideally, installation should proceed with a team of two (2) working to connect the modules from inside of the dryer and two (2) working to connect the modules on the outside of the module.

For ease of assembly, place all tools, hardware and step ladders inside the module before other upon it. *Figure 7J* shows a team of two (2) working to connect the modules on the inside.

![Figure 7J](image)
7. Stacking and Connecting Modules

NOTE: On all models of the GSI Modular Tower Dryer, the first two (2) connecting seams - between the base/unload section and Section 2, and between Section 2 and Section 3 - requires a nut and bolt in EVERY hole of the connecting channel, both INSIDE and OUTSIDE of the dryer.

NOTE: For every other connecting seam after/above the first two (2), every other hole may be bolted.

OUTSIDE of dryer: Two (2) connecting channels between two (2) modules. (See Figure 7K.)
NOTE: Every connecting hole has a nut/bolt in place.

INSIDE of dryer: Two (2) connecting channels between two (2) modules. (See Figure 7L.) NOTE: Every connecting hole should have a nut/bolt in place. In this illustration this has not been accomplished yet as the punch is still being used to align holes and one hole is missing a bolt as well. Both of these are marked with HEAVY weighted circles.

HEAVIER weighted circles highlight missing nuts and bolts that need to be added.
Once all holes have a nut and bolt installed and finger tightened, tighten with power impact.

**NOTE:** When installing, in all possible situations, place the impact on the bolt. Do NOT tighten the nut as it will not lock down on the ring. Always tighten the bolt.

**NOTE:** Accessing the bolts that connect sections of the dryer together requires passing through the hole in the channel as shown. Narrow sockets and/or extensions may be required.

**NOTE:** Torque all bolts in connecting seams to 35ft/lbs.

![Image 1](image1.png)

Figure 7M

![Image 2](image2.png)

Figure 7N
7. Stacking and Connecting Modules

To stack additional sections, repeat the process as described above - always remembering to line up the ladder brackets on the modules -- and follow the suggested sequence illustrated earlier in this chapter.

- Consider the orientation of each module as it pertains to ladders and catwalks before placing it on the module for connection.
- Secure the module with clevis hooks and lifting straps. Lift with crane and place on top of next module.
- Place section together but do not fully rest upper section on lower section.
- Use hammers and punches to line up connecting holes in channels both inside and outside of dryer.
- Insert nut and bolt and finger tighten in every hole or every other hole as appropriate.
- Tighten with power impact.
- Caulk gaps.

**NOTE:** It is normal for “dents” or “wrinkles” to appear in the screen during this process of stacking and connecting. Most “dents” and/or “wrinkles” will be eliminated or greatly reduced in the final step of the installation process.

**NOTE:** ALWAYS stack and connect so that as much work as possible is done as close to the ground as possible. Use the illustrations at the beginning of this chapter as a guide to accomplish this.

Figure 7O
Electrical Overview Minimal Connections

One of the more beneficial features of GSI Module Tower Dryers is the fact that much of the electrical wiring is done at the plant prior to shipping.

This is an advantage for the customer as fewer electrical connections need to be made in field, thereby making is a quicker and safer installation.

The connections to be made in the field by the customer are:

- Air flow
- Bindicator
- Flame sensor
- Ignitor/spark plug
- Plenum temperature sensor
- Grain temperature sensor
- Outside overhead

Several of these connections are reviewed in the upcoming pages.
Another advantage of the GSI Modular Tower Dryer is the ability of the vision control box to be remote mounted. The control box can remain on the unload section as shown and shipped, or if the customer prefers, it can be remote mounted in a more convenient location for user access or to allow auxiliary equipment access to the tower dryer.

If the vision control panel remains mounted on the unload section of the GSI Modular Tower Dryer, the protective rain shield should be installed as shown in Figure 8B to help protect it from the elements.

Air Switch

The air flow sensor connects to the grill guard on the fan with a rubber grommet and feeds through to a connecting point on the outside of the electrical control box, which connects to the sensor on the inside of the control box. (See Figure 8C below, Figure 8D and Figure 8E on Page 47.)
8. Electrical Connections

Figure 8D

Figure 8E
8. Electrical Connections

Flame Sensor and Ignitor Wires (Spark Plug)

From inside the burner/blower section, the flame rod wire and the spark plug wire will be passed through these holes as shown in Figure 8G.

The flame sensor and ignitor wires connect to the electrical control box.
8. Electrical Connections

Bindicator, Outside Overheat and Moisture Sensor

The bindicator is mounted on the roof with its wiring running the height of the dryer in conduit and is connected by the customer in the field. (See Figure 8I.)

![Figure 8I](image)

The outside overheat (copper tubing) runs the circumference of the dryer on the roof section. It connects to a junction box with conduit running the height of the dryer and is connected to the control panel by the customer in the field. (See Figure 8J.)

![Figure 8J](image)
Plenum Temperature

Plenum temperature is monitored through the wiring in the conduit that runs up through the burner/blower floor. This was referenced in burner/blower section on Page 31, when installing the floor planks in the burner/blower section as it was necessary to cut a floor plank to fit around the conduit.

Connecting this is also done in the field by the customer. (See Figure 8K.)

Figure 8K

Conduit clamps are pre-installed at the factory, making it easy for customers to simply route the conduit through and close the clamp.

Figure 8L
Gas Pipe Train (Natural or LP) Overview Minimal Connections

Another beneficial feature of the GSI Modular Tower Dryer is the fact that the gas pipe train comes pre-fitted and pre-assembled from the factory. This minimizes the connections that need to be made in the field by the customer. The result, is a quicker and simpler installation process.

Only three (3) connections need to be made in the field to complete the gas train. *(See Figure 9A.)*

![Figure 9A](image)

The three (3) connecting hoses for the gas train are for:

- Liquid in
- Vapor out
- Return to burner

All three (3) are shown in the *Figure 9B* and ship in the crate along with catwalks, platforms and other hardware.

Each hose has unique fittings and can only be installed in the proper location.

![Figure 9B](image)
The largest connecting hose connects inside the dryer for the return to blower. (See Figure 9C, Figure 9D and Figure 9E.)
10. Removing Wrinkles and Dents from Screens

During the installation process it is common for screen to “dent” or “wrinkle” from the pressures and stresses of assembling.

Examples of “denting” and “wrinkling” in the screens are circled in the Figure 10A. They are often most visible in bright, reflective sunlight.

Removing (or greatly minimizing) these dents and wrinkles is one of the final steps in the installation process.

Using all proper safety equipment and precautions, crew members should loosen the nuts on the nearest columns one at a time until the “dent/wrinkle” literally “pops” out. Then, the nut(s) can be re-tightened.

In Figure 10A, the columns in which the nuts should be loosened are between the arrow marks.

On occasion, it may be necessary to loosen the nuts connecting modules together. If this is the case, ALWAYS retighten with impact when “wrinkle/dent” has “popped” out.

When removing wrinkles, work from the top down.
Field Tip for Retrieving/Securing Bolts Pushed into Channels

If bolts are accidentally pushed back into the channel when installed the catwalk support brackets, the easiest way to remove them is by creating an extra-long handled wrench. An example of this is shown in Figure 11A. Attach a regular wrench to a long pole, in this case one of the long safety cage bars was used.

A crew member can then access the bolt from the channel by reaching in with the extra-long wrench. Carpenter’s putty can be placed on the end to help pick up the bolt if needed. The wrench can then be used to hold the bolt in place back in the proper hole as it is re-tightened.

Figure 11A

Figure 11B
GSI Group, LLC Limited Warranty

The GSI Group, LLC (“GSI”) warrants products which it manufactures to be free of defects in materials and workmanship under normal usage and conditions for a period of 12 months after sale to the original end-user or if a foreign sale, 14 months from arrival at port of discharge, whichever is earlier. The end-user’s sole remedy (and GSI’s only obligation) is to repair or replace, at GSI’s option and expense, products that in GSI’s judgment, contain a material defect in materials or workmanship. Expenses incurred by or on behalf of the end-user without prior written authorization from the GSI Warranty Group shall be the sole responsibility of the end-user.

Warranty Extensions:
The Limited Warranty period is extended for the following products:

<table>
<thead>
<tr>
<th>Product</th>
<th>Warranty Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP Fans and Flooring</td>
<td></td>
</tr>
<tr>
<td>Performer Series Direct Drive Fan Motor</td>
<td>3 Years</td>
</tr>
<tr>
<td>All Fiberglass Housings</td>
<td>Lifetime</td>
</tr>
<tr>
<td>All Fiberglass Propellers</td>
<td>Lifetime</td>
</tr>
<tr>
<td>Cumberland Feeding/Watering Systems</td>
<td></td>
</tr>
<tr>
<td>Feeder System Pan Assemblies</td>
<td>5 Years **</td>
</tr>
<tr>
<td>Feed Tubes (1-3/4&quot; and 2.00&quot;)</td>
<td>10 Years *</td>
</tr>
<tr>
<td>Centerless Augers</td>
<td>10 Years *</td>
</tr>
<tr>
<td>Watering Nipples</td>
<td>10 Years *</td>
</tr>
<tr>
<td>Grain Systems</td>
<td></td>
</tr>
<tr>
<td>Grain Bin Structural Design</td>
<td>5 Years</td>
</tr>
<tr>
<td>Grain Systems Feeding/Watering</td>
<td></td>
</tr>
<tr>
<td>Farm Fans Zimmerman</td>
<td></td>
</tr>
<tr>
<td>Portable and Tower Dryers</td>
<td>2 Years</td>
</tr>
<tr>
<td>Portable and Tower Dryer Frames and Infrastructure †</td>
<td>5 Years</td>
</tr>
</tbody>
</table>

GSI further warrants that the portable and tower dryer frame and basket, excluding all auger and auger drive components, shall be free from defects in materials for a period of time beginning on the twelfth (12th) month from the date of purchase and continuing until the sixtieth (60th) month from the date of purchase (extended warranty period). During the extended warranty period, GSI will replace the frame or basket components that prove to be defective under normal conditions of use without charge, excluding the labor, transportation, and/or shipping costs incurred in the performance of this extended warranty.

Conditions and Limitations:

THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE LIMITED WARRANTY DESCRIPTION SET FORTH ABOVE. SPECIFICALLY, GSI MAKES NO FURTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE IN CONNECTION WITH: (I) PRODUCT MANUFACTURED OR SOLD BY GSI OR (II) ANY ADVICE, INSTRUCTION, RECOMMENDATION OR SUGGESTION PROVIDED BY AN AGENT, REPRESENTATIVE OR EMPLOYEE OF GSI REGARDING OR RELATED TO THE CONFIGURATION, INSTALLATION, LAYOUT, SUITABILITY FOR A PARTICULAR PURPOSE, OR DESIGN OF SUCH PRODUCTS.

GSI shall not be liable for any direct, indirect, incidental or consequential damages, including, without limitation, loss of anticipated profits or benefits. The sole and exclusive remedy is set forth in the Limited Warranty, which shall not exceed the amount paid for the product purchased. This warranty is not transferable and applies only to the original end-user. GSI shall have no obligation or responsibility for any representations or warranties made by or on behalf of any dealer, agent or distributor.

GSI assumes no responsibility for claims resulting from construction defects or unauthorized modifications to products which it manufactured. Modifications to products not specifically delineated in the manual accompanying the equipment at initial sale will void the Limited Warranty.

This Limited Warranty shall not extend to products or parts which have been damaged by negligent use, misuse, alteration, accident or which have been improperly/inadequately maintained. This Limited Warranty extends solely to products manufactured by GSI.

Prior to installation, the end-user has the responsibility to comply with federal, state and local codes which apply to the location and installation of products manufactured or sold by GSI.

9101239_1_CR_rev7.DOC (revised July 2009)
This equipment shall be installed in accordance with the current installation codes and applicable regulations which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.