

Wet Dog Glass



2021 FSP Crucible Installation Manual

Table of Contents

3) Notes, Warnings, and conventions

4) Safety Precautions

7) Warning Symbols

9) Receiving and Installation

10) Overview

12) (E)FSP135

20) (E)FSP200-400

Notes, Warnings, Disclaimers, and conventions

Notes on Handling User Manuals

- Please hand over user manuals to your end users so that they can have them on hand for convenient reference.
- Please read the user manuals thoroughly before using the product.
- The purpose of these user manuals is not to warrant that the product is well suited to any particular purpose, but rather to describe the functional details of the product.
- Wet Dog Glass reserves the right to make improvements in the user manuals and product at any time, without notice or obligation.
- If you have any questions or find mistakes or omissions in the user manuals, please contact Wet Dog Glass, LLC.

tech@wetdogglass.com

910-428-4111

100C Russell Drive

Star, NC 27356

Warnings and Disclaimers

The product is provided on an “as is” basis. Wet Dog Glass, LLC shall have neither liability nor responsibility to any person or entity with respect to any direct or indirect loss or damage arising from using the product or any defect of the product that Wet Dog Glass, LLC can not predict in advance.

Drawing Conventions

- Some drawings in the user manual may be partially emphasized, simplified, or omitted, for the convenience of description.
- Note that images in user manuals may be slightly different from the actual equipment and components and/or show only example images.

Safety Precautions

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life

Safety, Protection, and Modification of Products

In order to protect the product and the system controlled by the product, and to ensure safe operation, observe the safety precautions described in this user's manual. We assume no liability for safety if users fail to observe these instructions when operating the product.

- You must use this product according to the instructions described in user manuals. If not, protective functions of this product may not work as expected.
- If any protection or safety circuit is required for the system(s) controlled by the product or for the product itself, prepare it separately.
- Be sure to use the parts approved by Wet Dog Glass, LLC when replacing parts or consumables.
- Modification of the product is strictly prohibited.
- The symbol families on Page XXXXXXXXXX are used on the product and in this user manual to indicate that safety precautions are required.

Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water

Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, do not try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

Lid Safety Lock

The Lift safety feature will engage and lock as the lid rises, preventing sudden free fall in the unlikely event of a suspension component failure. After the lid is raised to the required working height, operators must lower the lid until it is resting safely on the locks to minimize wear on suspension components. Once the locks are engaged, the lid has to be raised slightly in order to release the safety locks (push or pull on lever).

Safety Precautions

FOR YOUR SAFETY READ BEFORE OPERATING GAS APPLIANCES

Some of our gas fired products must be ignited by hand. For those that are ignited automatically, do not attempt to ignite them by hand.

BEFORE OPERATING GAS APPLIANCES

Smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor. Read the safety information above. Use lockout/tagout procedures.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Any time adjustments have been made to a gas fired unit, exercise care when opening the door. If there is excess gas inside the unit, there can be a blast of fire that shoots out when that gas finds oxygen due to the opening of the door. Keep yourself behind the door with your head back away from the door as you expect something to jump out at you—this is basically what the blast will do—jump out at you with less than a split-second's notice. Also keep yourself low to the floor as opposed to standing up straight.

Material Safety

Unfortunately some of the best insulating products available for high temperature applications are made from materials that can negatively affect the health of those people who use or handle the material casually and excessively. The refractory materials in our high temperature products contain crystalline silica. When abraded, the dust will become airborne and consequently be inhaled. Please be aware of this hazard and wear a NIOSH approved respirator if performing maintenance or otherwise creating dust. This crystalline silica is known to cause silicosis in humans and animals.

****Wear a respirator and rubber gloves and ventilate the space well when working with ceramic fiber. Please read MSDS sheets on the Wet Dog Glass website for more information.**

Safety Precautions

Lock Out/Tag Out

Purpose

Lock Out, Tag Out (LOTO), is a safety procedure used in industry and research settings to ensure that dangerous machines are properly shut off and not able to be started up again prior to the completion of maintenance or repair work. This prevents a piece of equipment from being turned on while maintenance is being performed.

Responsibility

The responsibility for seeing that this procedure is followed is binding upon all employees. All employees shall be instructed in the safety significance of the lockout procedure by designated individual(s). Each new or transferred affected employee shall be instructed by designated individual(s) in the purpose and use of the lockout procedure.

Preparation for Lock Out

Employees authorized to perform lockout shall be certain as to which switch, valve, or other energy isolating devices apply to the equipment being locked out. More than one energy source (electrical, mechanical, or others) may be involved. Any questionable identification of sources shall be cleared by the employees with their supervisors. Before lockout commences, job authorization should be obtained.

Sequence of Lock Out Procedure

Notify all affected employees that a lockout is required and the reason therefore. If the equipment is operating, shut it down by the normal stopping procedure (such as: depress stop button, open toggle switch). Operate the switch, valve, or other energy isolating devices so that the energy source(s) (electrical, mechanical, hydraulic, other) is disconnected or isolated from the equipment. Lockout energy isolating devices with an assigned individual lock. Stored energy, such as that in capacitors, springs, elevated machine members, rotating fly wheels, hydraulic systems, and air, gas, steam or water pressure, must also be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down. After ensuring that no personnel are exposed and as a check on having disconnected the energy sources, operate the push button or other normal operating controls to make certain the equipment will not operate.

Warning Symbols

ELECTRICAL ARCS AND EXPLOSION RISK IN HAZARDOUS AREAS

If you connect or disconnect wiring, modules or communications cabling while power is applied, an electrical arc can occur. This could cause an explosion in hazardous location installations. Do not remove wiring, fuses, modules or communications cabling while circuit is energized unless area is known to be non-hazardous. Failure to follow these instructions may result in personal injury.



WARNING- MAINTENANCE

Maintenance must be carried out by people who are experienced in working on electronic equipment and in particular safety related systems. They should have knowledge of and experience with local operating and safety standards. Failure to follow these recommendations may result in situations that can lead to system damage and even personal injury.



WARNING– HEAT

Equipment contains dangerous temperatures. Use caution when interacting with this equipment. Certain areas of the equipment may pose a particular hazard, and are marked with this symbol.



Warning Symbols

CAUTION- RADIO FREQUENCY INTERFERENCE

Most electronic equipment is influenced by Radio Frequency Interference. Caution should be exercised with regard to the use of portable communications equipment around such equipment. Signs should be posted in the vicinity of the equipment cautioning against the use of portable communications equipment.



CAUTION- HEAT DISSIPATION AND ENCLOSURE POSITION

System and field power consumption by modules and termination assemblies is dissipated as heat; e.g. enclosures exposed to continuous sunlight will have a higher internal temperature that could affect the operating temperature of the modules. Modules operating at the extremes of the temperature band for a continuous period can have a reduced reliability

CAUTION- CRUSH RISK

Parts of equipment can pose a crush and/or entanglement risk. Observe caution and best practices. Only trained technicians may remove safety covers while observing Lock Out Tag Out procedures.



SPECIAL INSTRUCTIONS- A MANUAL IS PROVIDED

Do not attempt to operate or maintain this Equipment(s) until you have read and thoroughly understand all of the safety information contained in this manual.



Initial Set Up

Free Standing Pot (FSP) Crucible Installation

When receiving an FSP, the crucible will not be installed, and often is shipped separately from the furnace. The furnace will have the hatch and front fully built, which provides rigidity during shipping, and also allows you to see the proper construction and arrangement of parts when taking it apart to install the first crucible.

During this first install, take pictures as it is taken apart, and put back together. This will assist you in later crucible swaps. It is also suggested you print the following diagrams that apply to your furnace and make notes on them as you go.

Prior to this work, follow shut down and lockout/tagout procedures (see page 9)

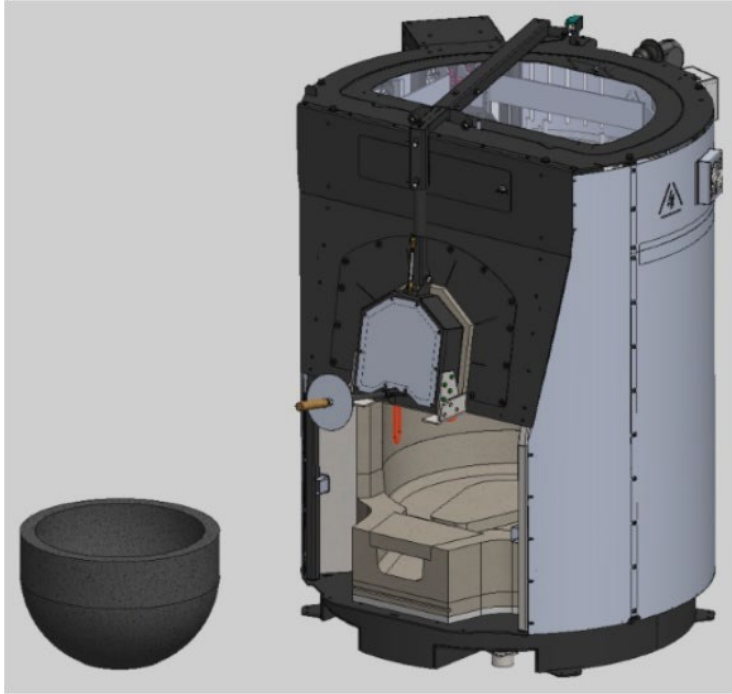
Initial Set Up

Free Standing Pot (FSP) Crucible Installation

We recommend removing all elements when changing crucibles, as one slip when removing the crucible, or placing a new one can lead to broken elements.

Free Standing Pot Crucible Installation

Overview



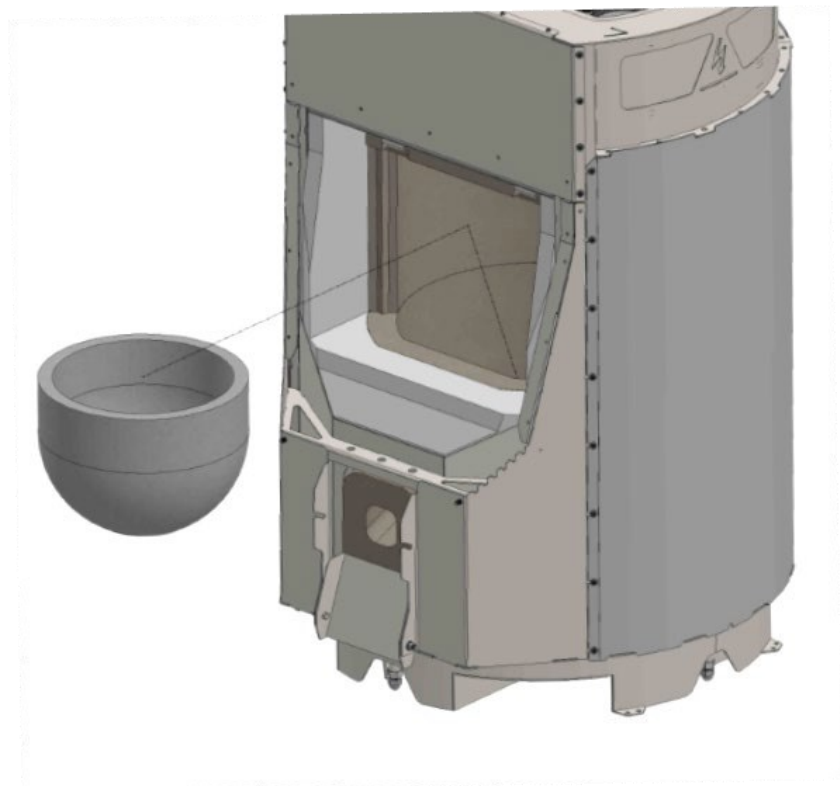
E(FSP) 275 and 400 Exploded View

Before installing the crucible, cut out a disc of card board the same diameter as the base of the crucible to act as a carbon-release between the crucible pedestal and the crucible. Place the cardboard disc on the pedestal--once the furnace begins to get hot this will burn away, leaving a carbon barrier between the crucible and the pedestal to help prevent sticking in the event that glass seeps into this seam.

Move the crucible into a position that you and your assistant can easily lift the crucible into the furnace opening. You can also set up a ramp and “walk” the crucible right into the opening.

- Larger crucible furnace models have hatches below the door, while smaller models have removable door portals for crucible replacement.

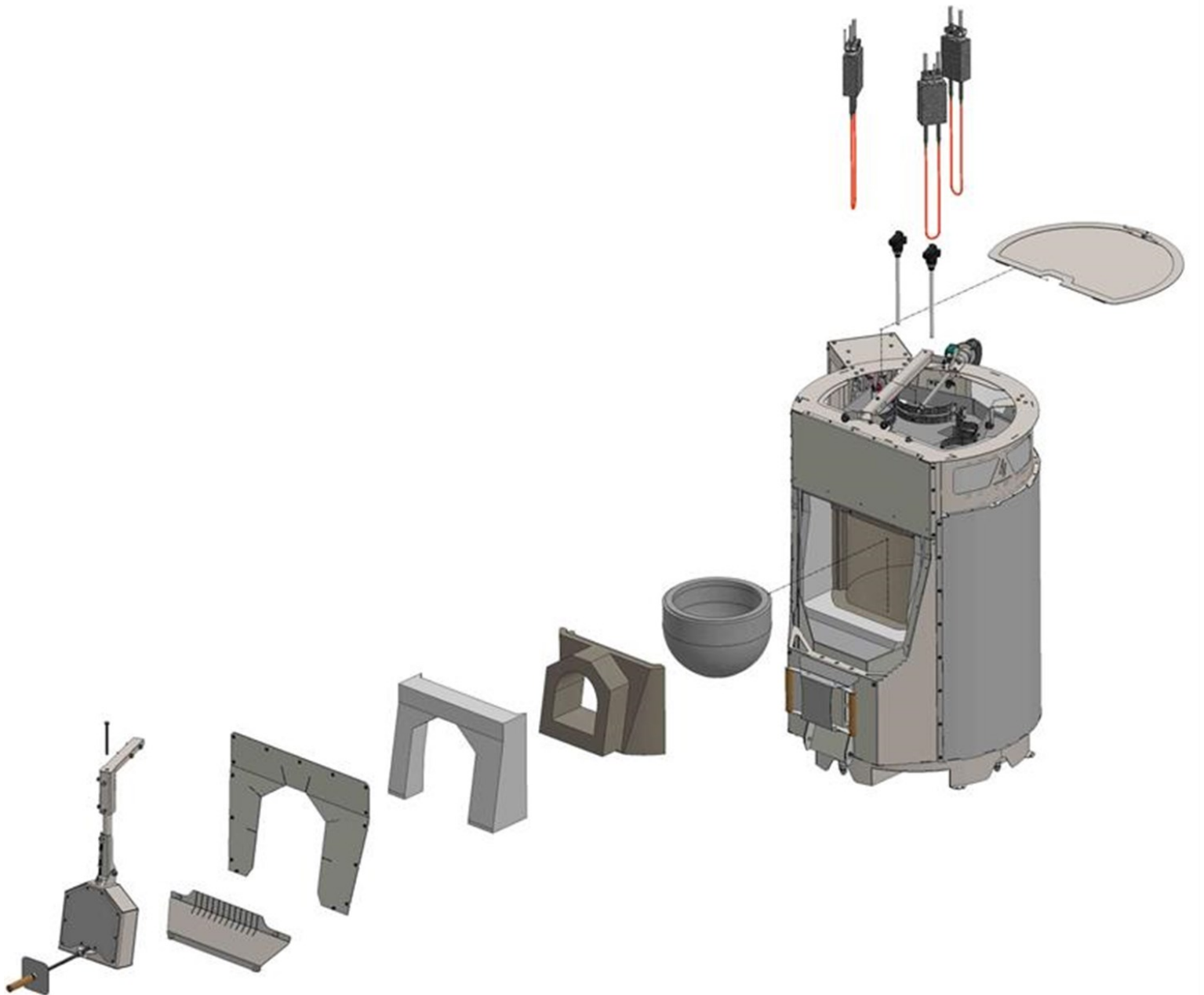
E(FSP) 135 Exploded View



Free Standing Pot Crucible Installation

(E)FSP 135

E(FSP) 135 Exploded View. Crown Lifters are provided to slightly lift the crown, allowing the door portal and sill to slide out.

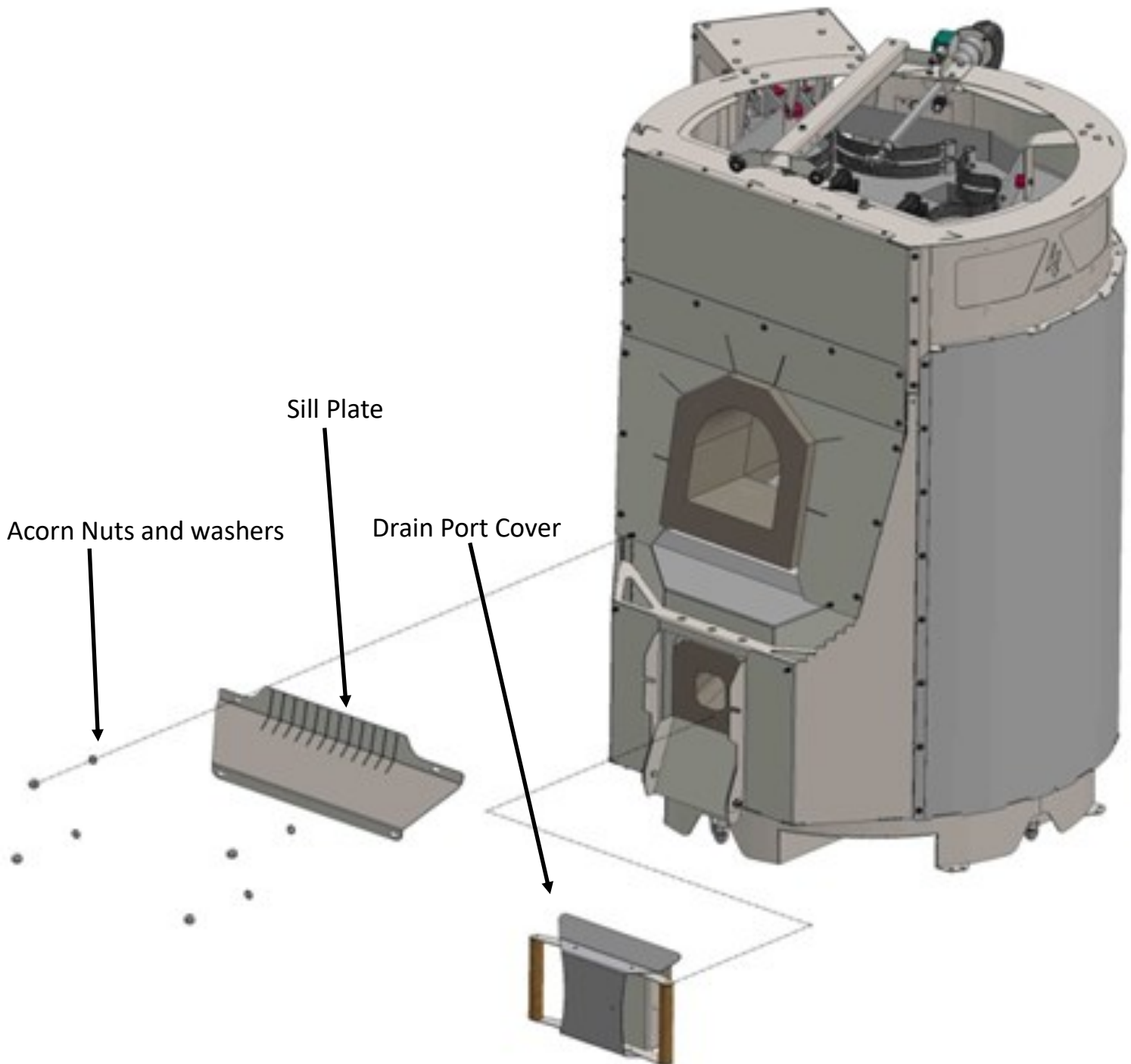


Free Standing Pot Crucible Installation

(E)FSP 135

Remove Sill Plate: The sill plate is located directly below the door and is held in place by 4 acorn nut fasteners.

Remove Drain Port Cover: Pull up and out on the drain cover and set aside.

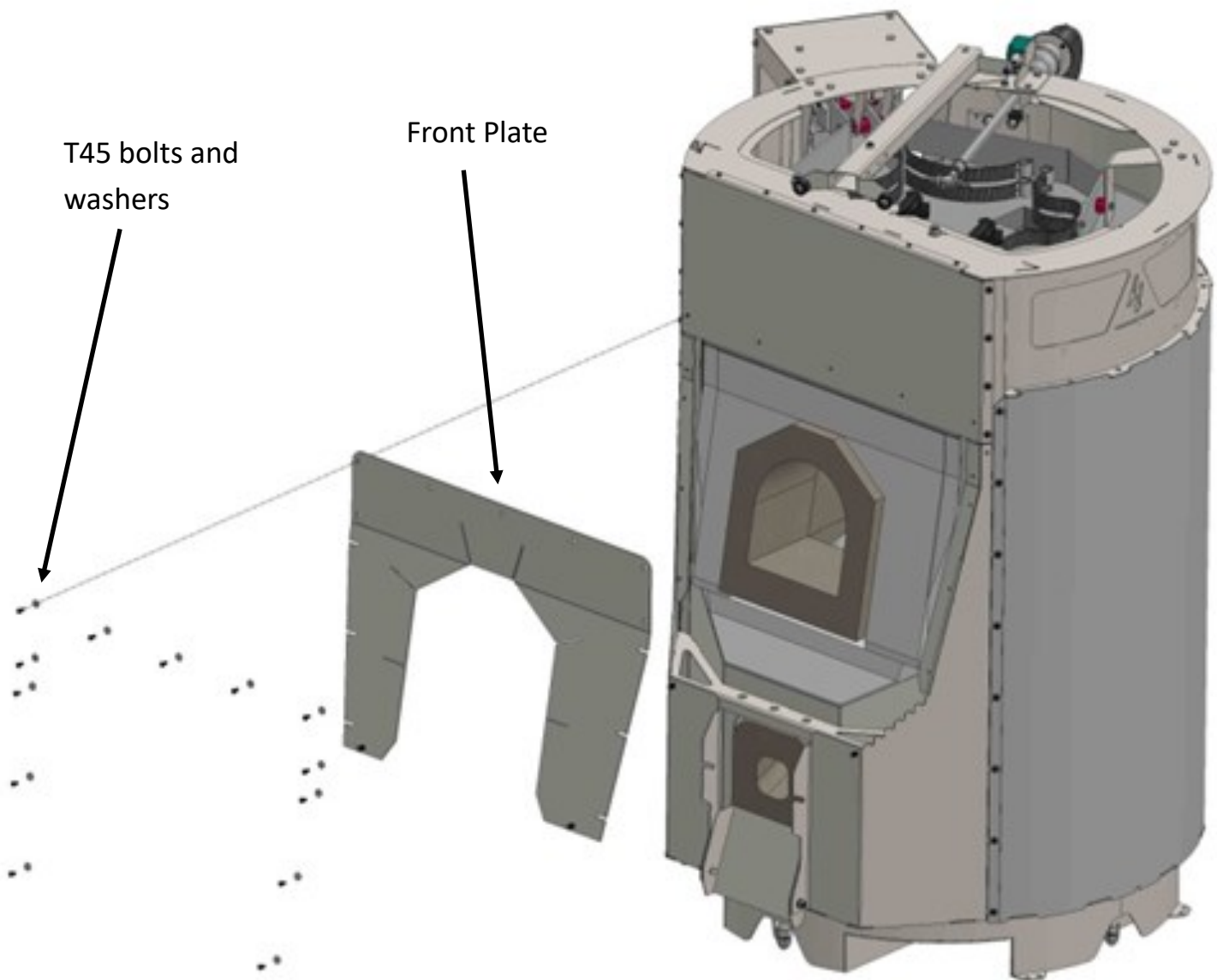


Free Standing Pot Crucible Installation

(E)FSP 135

Front Steel Cover Removal

Remove the face plate using a Torx fastener tool (T45).

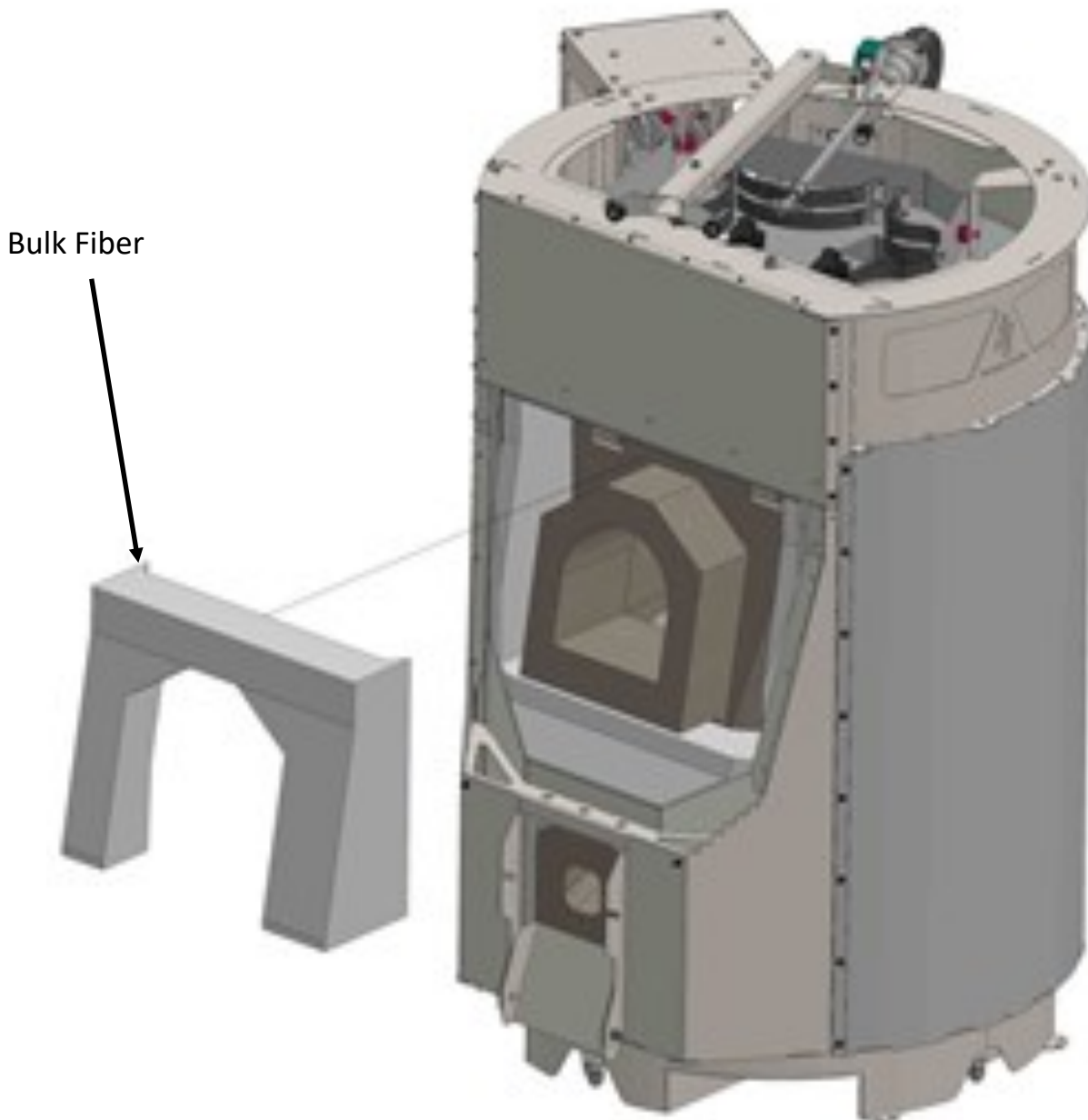


Free Standing Pot Crucible Installation

(E)FSP 135

Bulk Fiber Removal/Replacement

Behind the front steel plate is bulk ceramic fiber insulation. Use a long knife to cut back the insulation. Cut deep enough through the bulk insulation so that you can see the cast refractory behind the insulation. Look for the seams around the front cast parts needing to be removed. Take pictures as you remove each section. When replacing the bulk fiber, take extra care not to leave any voids. The fiber should be packed very tightly, but not so tight that metal or refractory parts are shifted out of place.

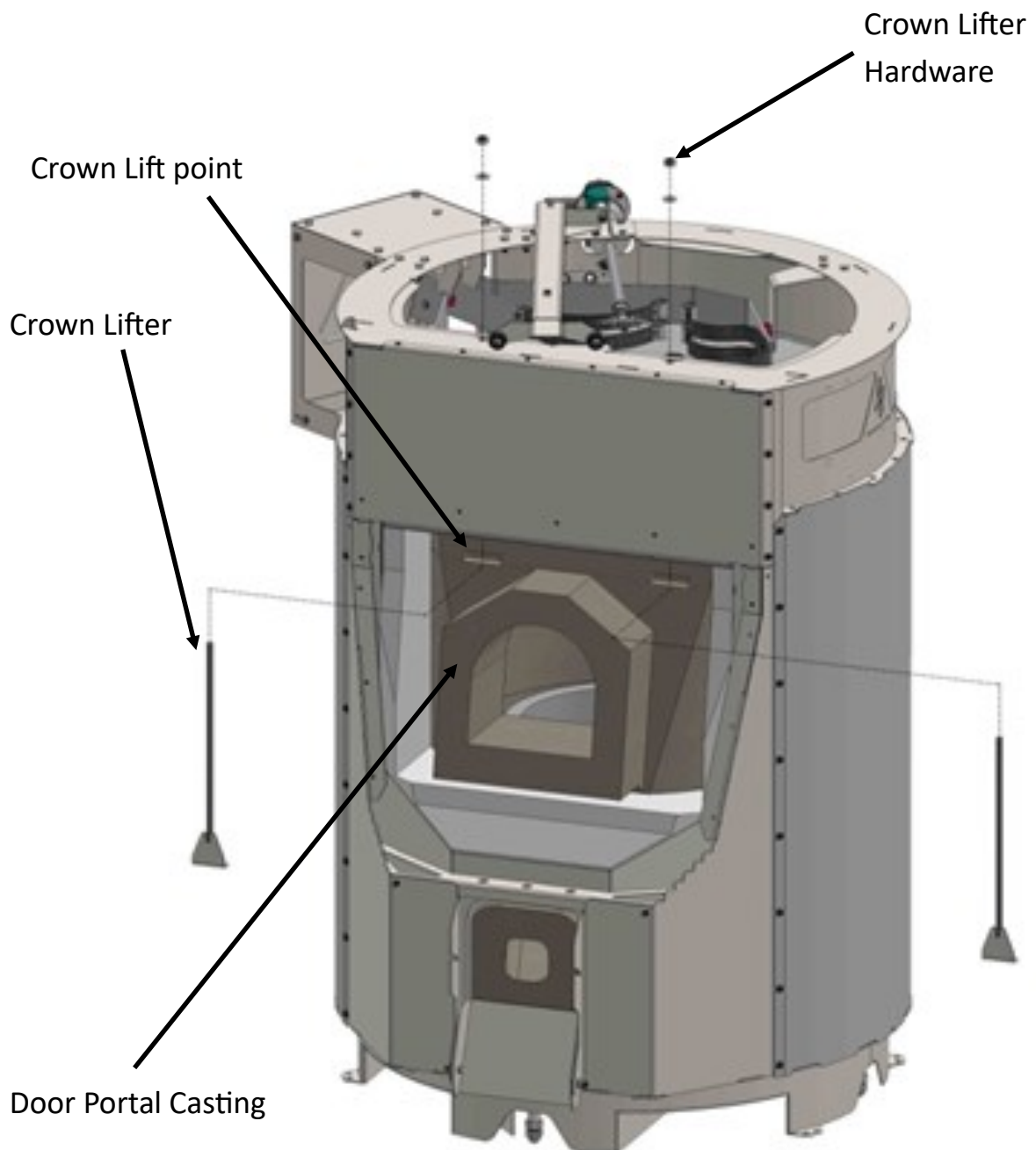


Free Standing Pot Crucible Installation

(E)FSP 135

Door Portal Removal/Replacement

Position a table near the furnace to set the portal on as opposed to on the floor. Being careful not to disrupt the blanket fiber on the top of the furnace, pull all bulk from the front face / doorway casting. Simply pull upward and outward on the portal to remove it. It is heavy, so use the help of a friend. On E/FSP135 models, the lower edge of the front face of the crown has a slot at each the left and right side. The “Crown Lifters” described on the following page use these slots as lift points



Free Standing Pot Crucible Installation

(E)FSP 135

Door Portal Removal/Replacement, See Illustration on next page.

The front face / door portal casting may be a single part, or in three pieces depending on the generation of your furnace (Left Arch, Right Arch, Sill). This whole section is designed to be removed when accessing the free standing crucible. The front face casting and the crown casting are seated together, so the front lip of the crown must to be elevated slightly in order to remove the front face casting. Use the two hook-like parts (crown lifters) that were included with your furnace-- these are installed only when the crucible is being changed. It may be helpful to remove the upper front face steel cover to insert the crown lifters into the steel cap of the furnace structure.

Small slits in the fiber blanket covering the furnace crown-- these are to insert the crown lifters. Slide the crown lifters into the fiber with hook side down into the holes in the steel cap of the furnace structure. Put the hook into the crown lift points of the crown casting and thread a nut onto the threaded end of the lifter until there is tension on that point.

Repeat the process on the other side.

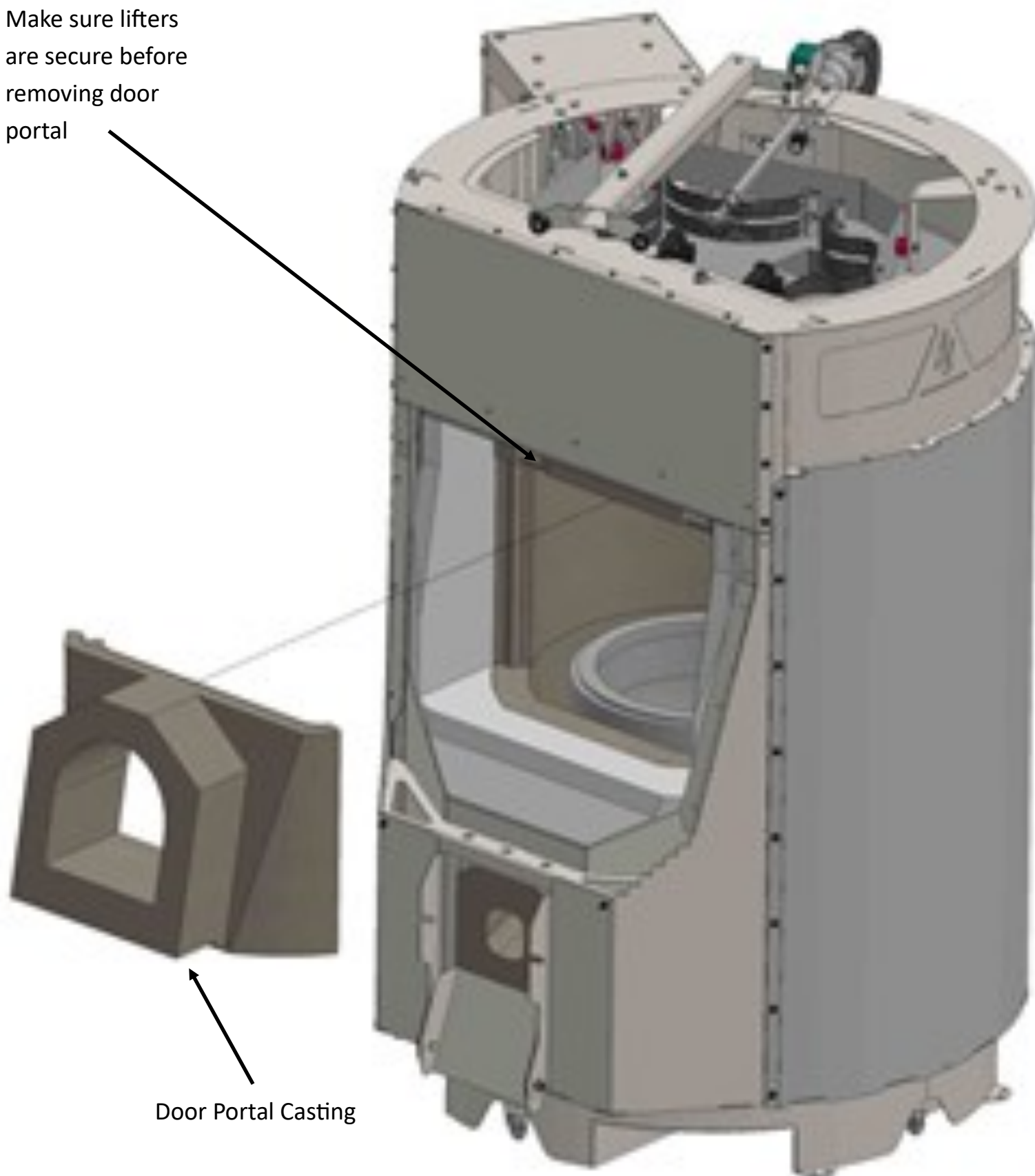
Work back and forth increasing tension on the lifters to elevate the crown only about $\frac{1}{4}$ inch. Make sure the crown lifters are inserted into the casting properly and secure.

Work with an assistant to gently pull the front face casting straight out and place on a nearby table, platform or the floor. This section is not extremely heavy, but is better handled by two people rather than one. Do not use lift truck or forklift to remove this section of the furnace.

Free Standing Pot Crucible Installation

(E)FSP 135

Make sure lifters
are secure before
removing door
portal



Free Standing Pot Crucible Installation

(E)FSP 135

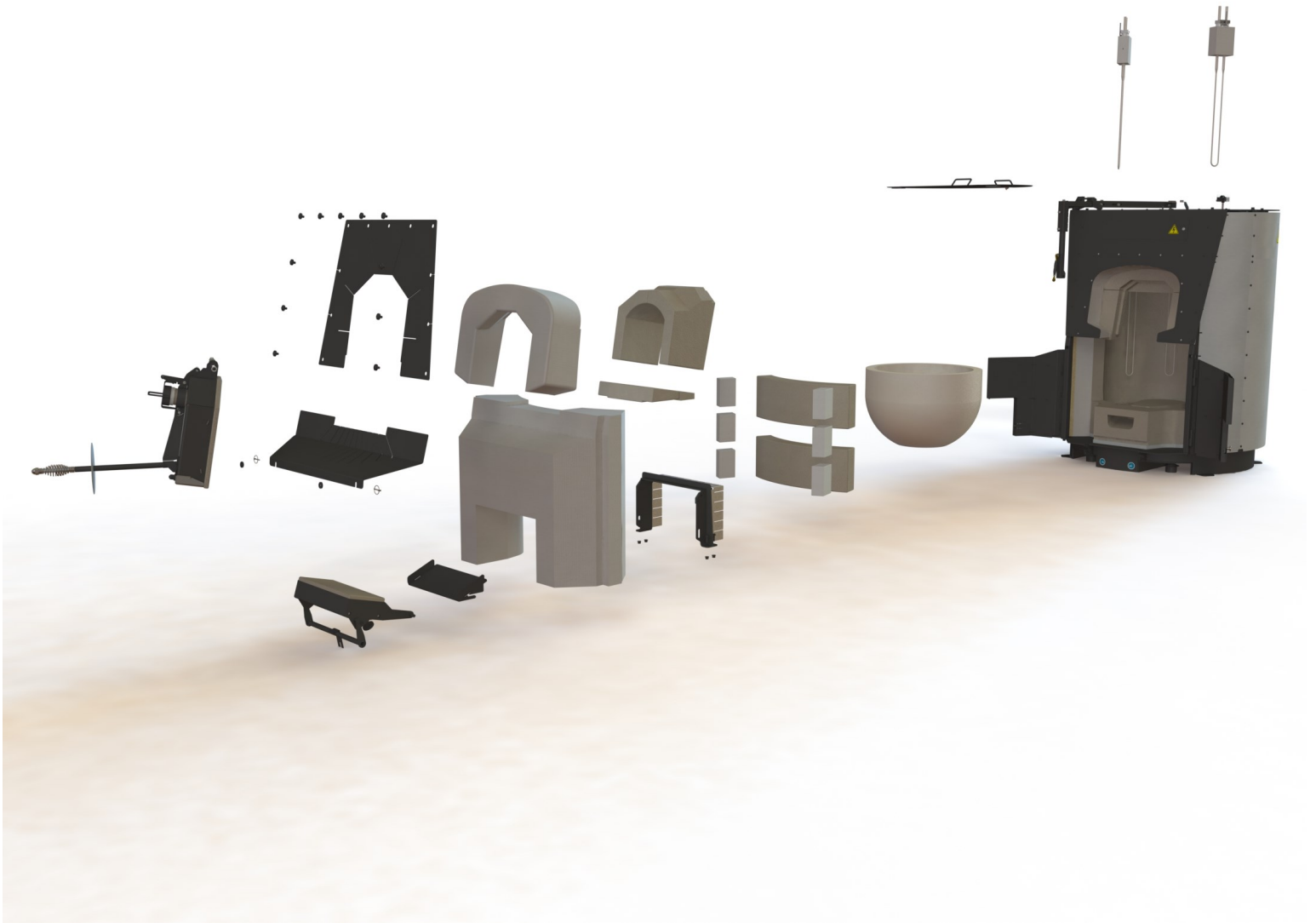
The Crucible can now be lifted into place. Use a sheet as a sling to allow two people to lift the crucible into the furnace. Once the crucible is in and set down, the sheet can be pulled out while the crucible is rocked side to side. Slide a circle of cardboard underneath the crucible. This will act as a carbon layer and helps prevent the crucible from sticking to the furnace floor.

Repeat this process in reverse to reassemble the furnace front. Be attentive to ensuring the castings fit tightly together. Repack the fiber tightly, using a tool to tamp it tight (1"x2" stick, or back of a tool). When the metal is replaced, it should compress the fiber further, but not so much as to warp any metal.

Free Standing Pot Crucible Installation

(E)FSP 200-400 Crucible Installation

(E)FSP200-400 exploded view



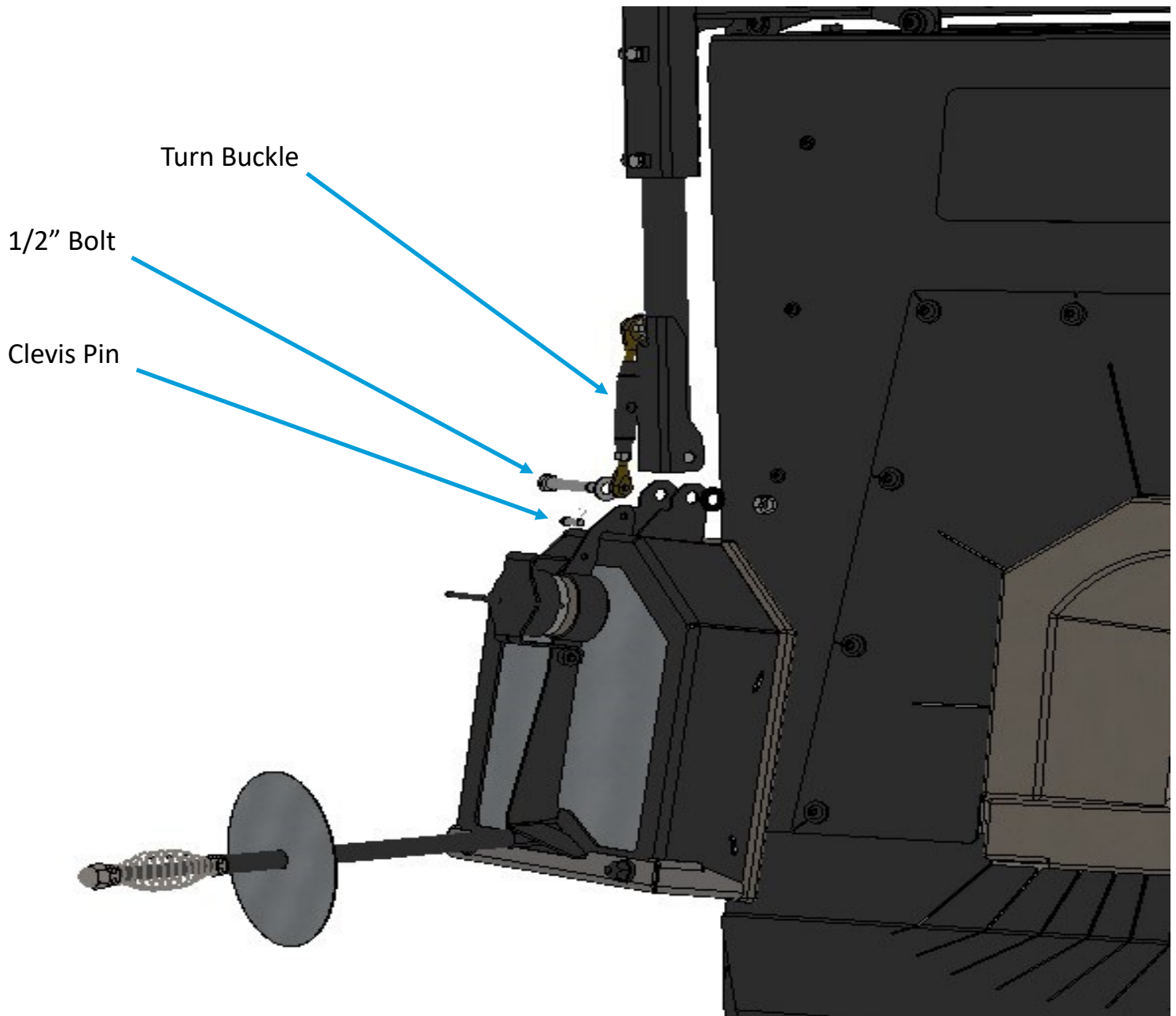
Free Standing Pot Crucible Installation

(E)FSP 200-400 Crucible Installation

Remove Door

The furnace door is secured to the door arm by a 1/2" Bolt and a clevis pin attached to a turn buckle. Rotate the turn buckle to lower the door angle until the clevis pin isn't under tension. Remove the cotter pin and clevis pin to disconnect the turn buckle from the door. When removing the 1/2" bolt, have another person support the door weight to avoid damage, doors weigh 50 pounds or more.

Door assemblies are nearly identical across all FSP and RDT Furnaces.



Free Standing Pot Crucible Installation

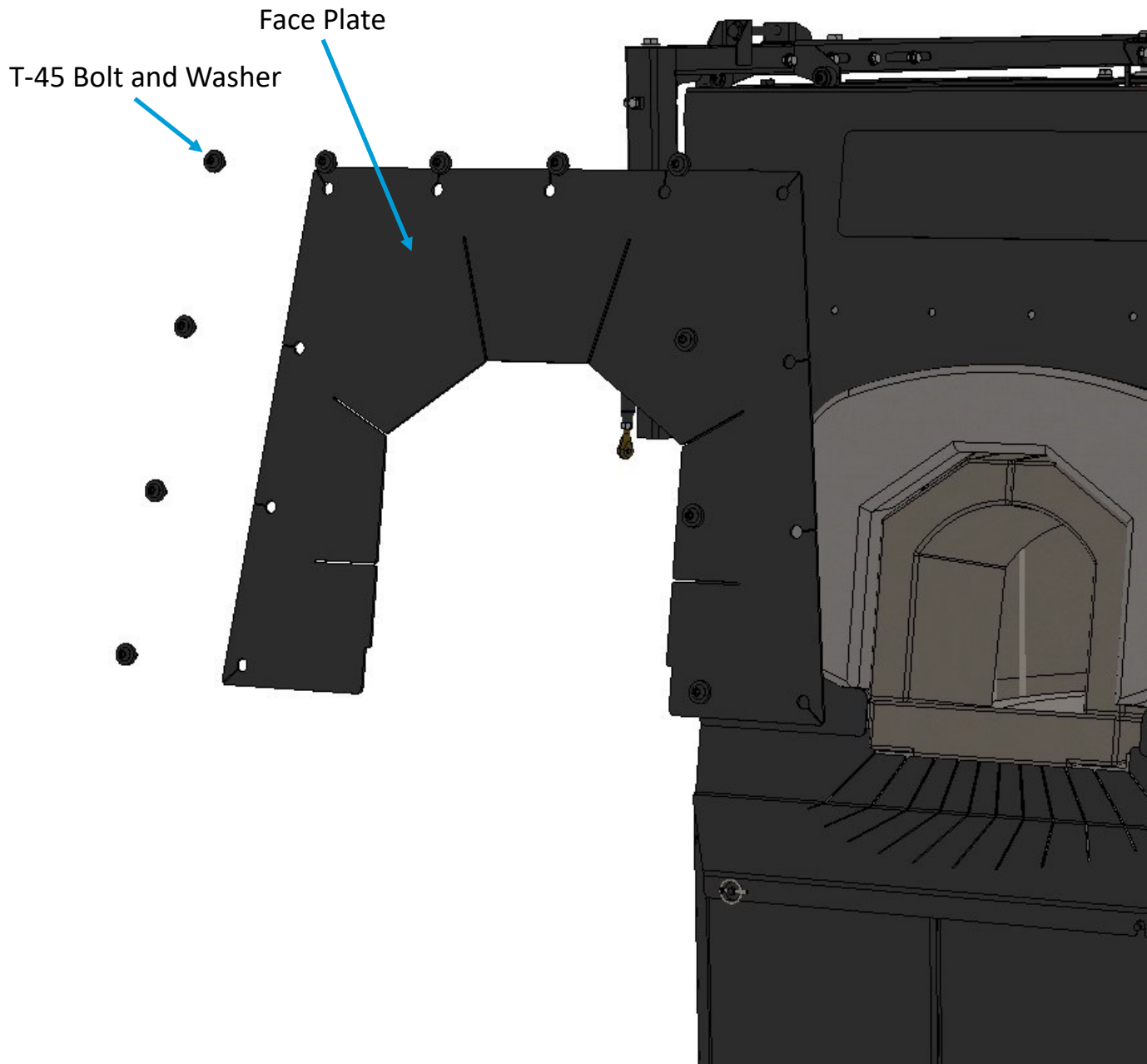
(E)FSP 200-400 Crucible Installation

Electric Furnaces Only

The front most element on each side needs to be removed for the crucible to slide into place. It is recommended to remove all elements to avoid accidental breakage.

Face Plate Removal

Remove the T-45 Torx head bolts and oversized washers that secure the face plate, and remove the face plate.



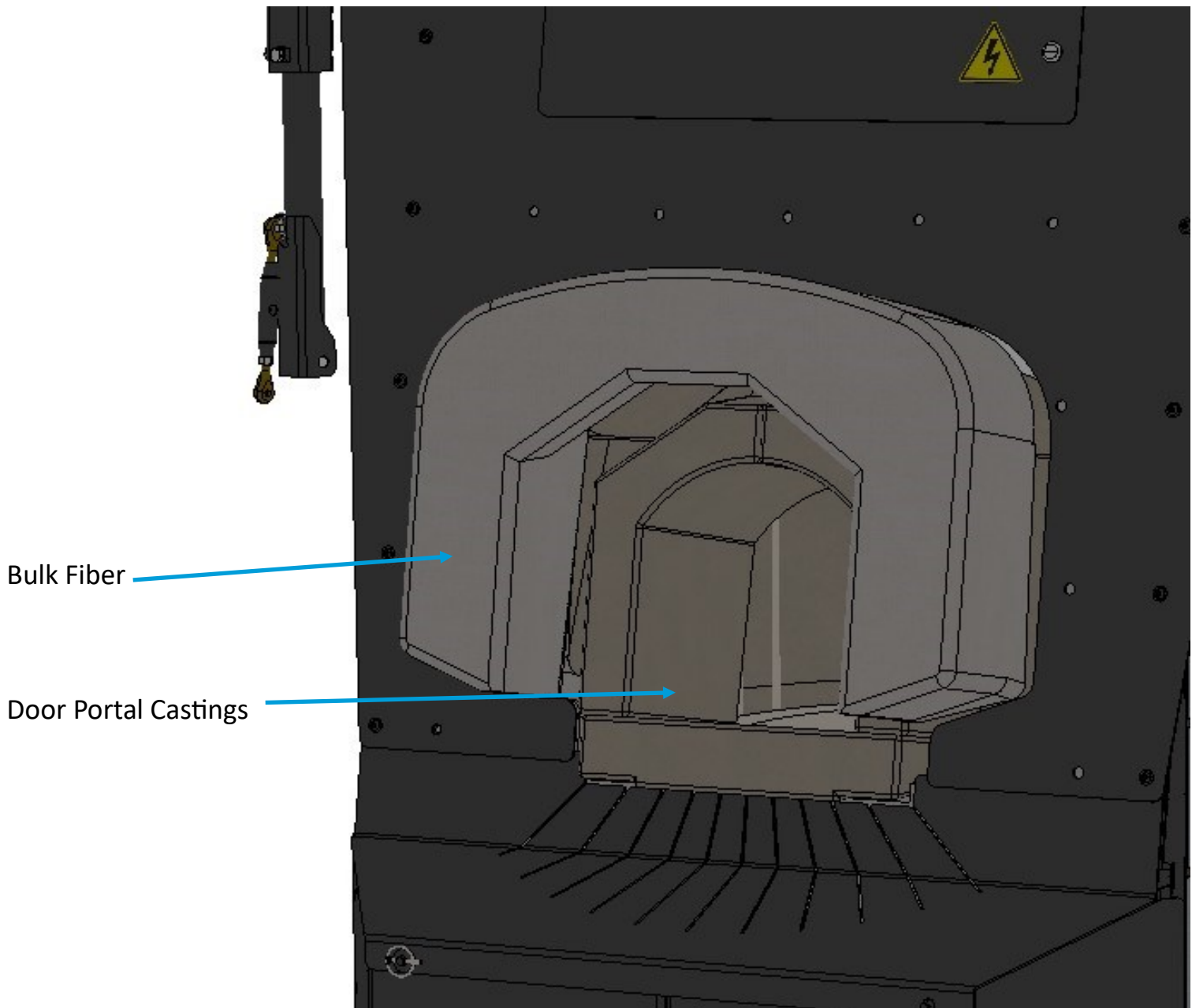
Free Standing Pot Crucible Installation

(E)FSP 200-400 Crucible Installation

Door Portal Fiber Removal (Wear proper PPE)

Behind the front steel plate is bulk ceramic fiber insulation. Use a long knife to cut back the insulation. Cut deep enough through the bulk insulation so that you can see the cast refractory behind the insulation. Look for the seams around the front cast parts needing to be removed. Take pictures as you remove each section. When replacing the bulk fiber, take extra care not to leave any voids. The fiber should be packed very tightly, but not so tight that metal or refractory parts are shifted out of place.

This fiber becomes brittle overtime and with temperature, you will want to keep enough replacement on hand to swap out older fiber that cannot be put back into place.

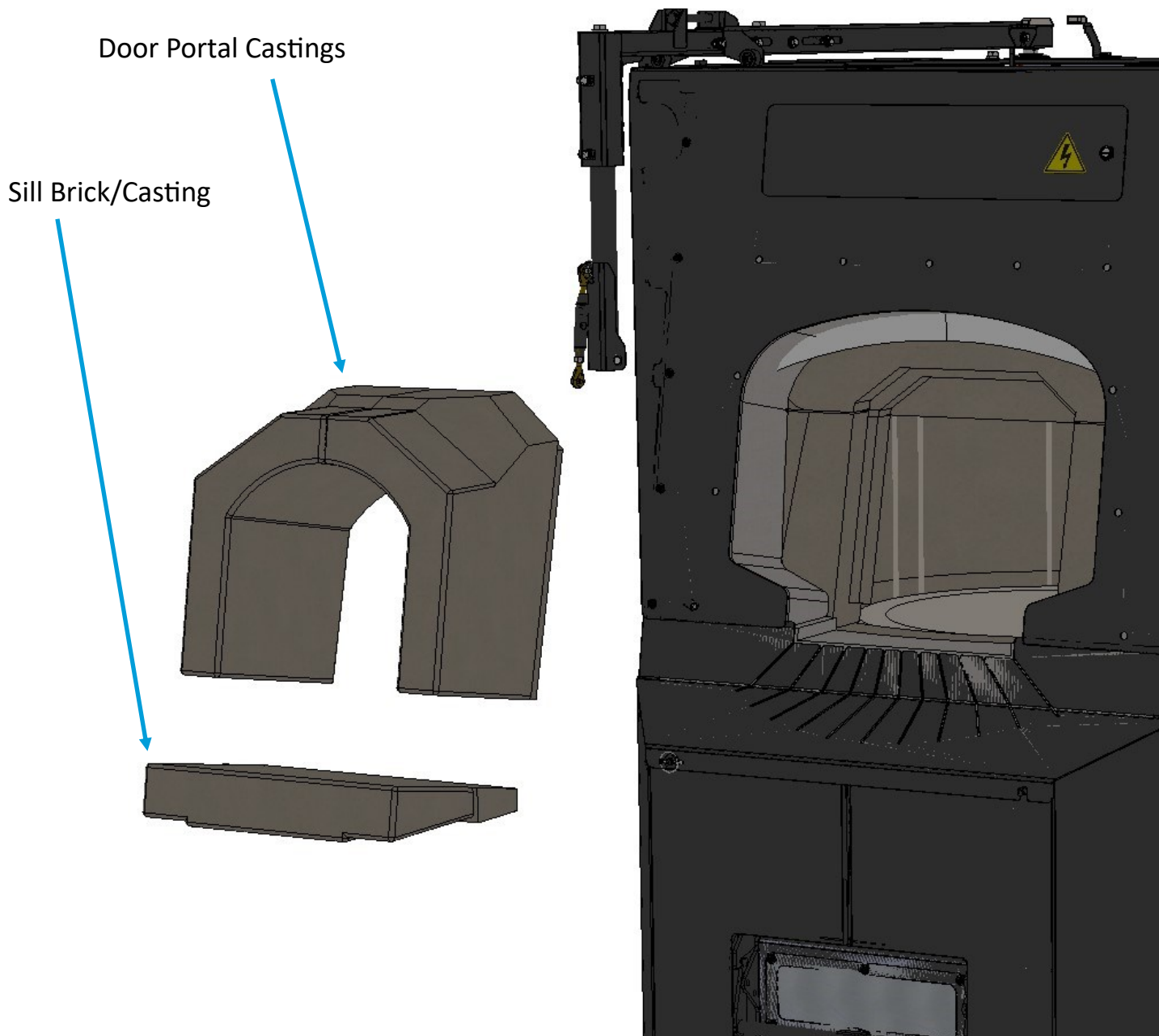


Free Standing Pot Crucible Installation

(E)FSP 200-400 Crucible Installation

Remove the Sill and Door Portal

The door portal castings sit on the sill casting. First remove the door portals, and then the sill. If they are wedged in and will not come out, the sill can be removed part way to loosen things up. Be cautious of the door portals slipping and always have a helper holding the other as one is removed. Remove the sill once the portals are removed.

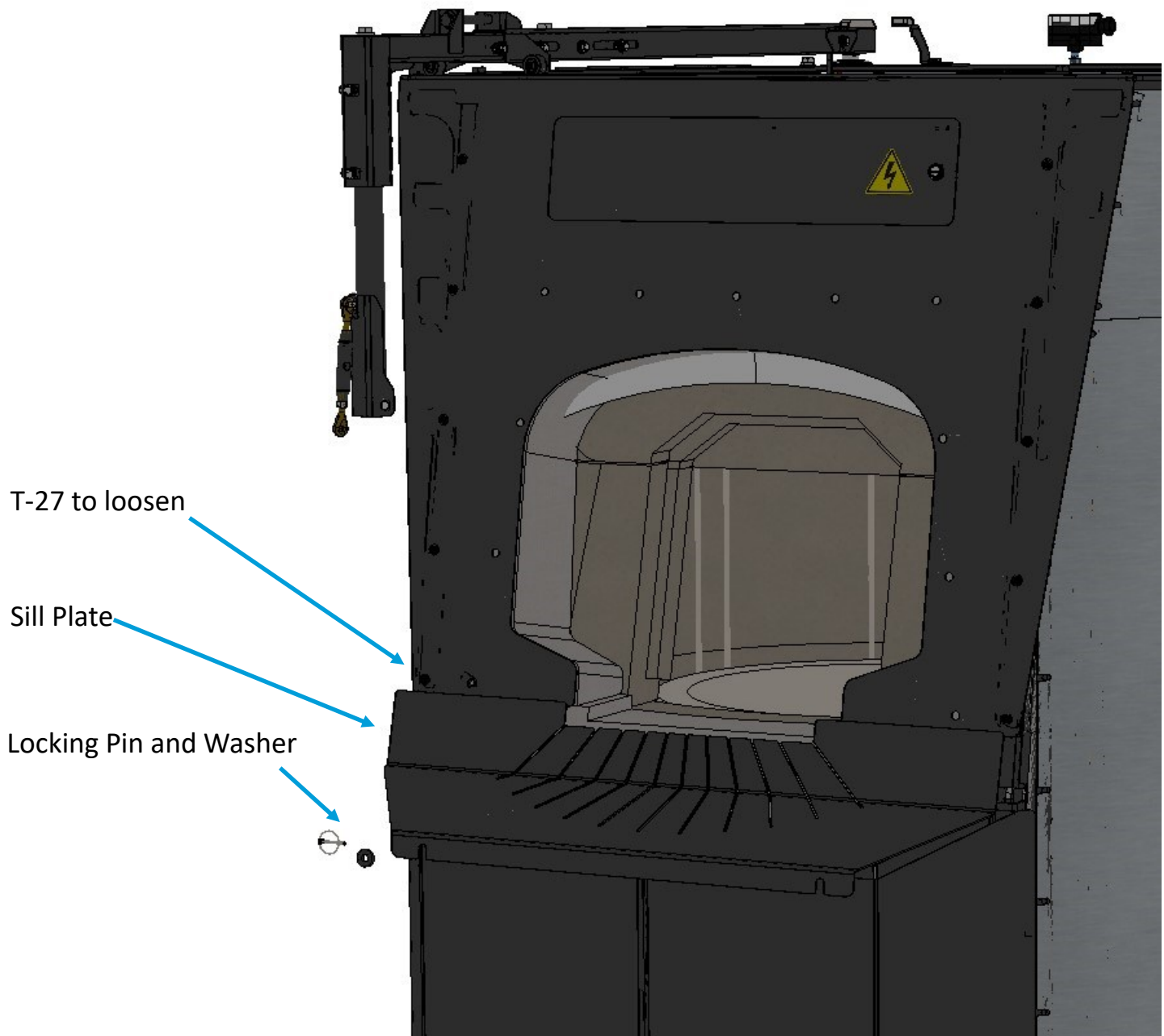


Free Standing Pot Crucible Installation

(E)FSP 200-400 Crucible Installation

Remove the Sill Plate

The sill plate is located directly below the door opening. It is secured by a locking pin and ring with an oversized washer at the bottom and by the face plate removed in a previous step at the top. Pull the pins and remove the washers. The bottom most T-27 of the Front Panel bolts may need to be loosened. The sill plate can then be slid down and away.



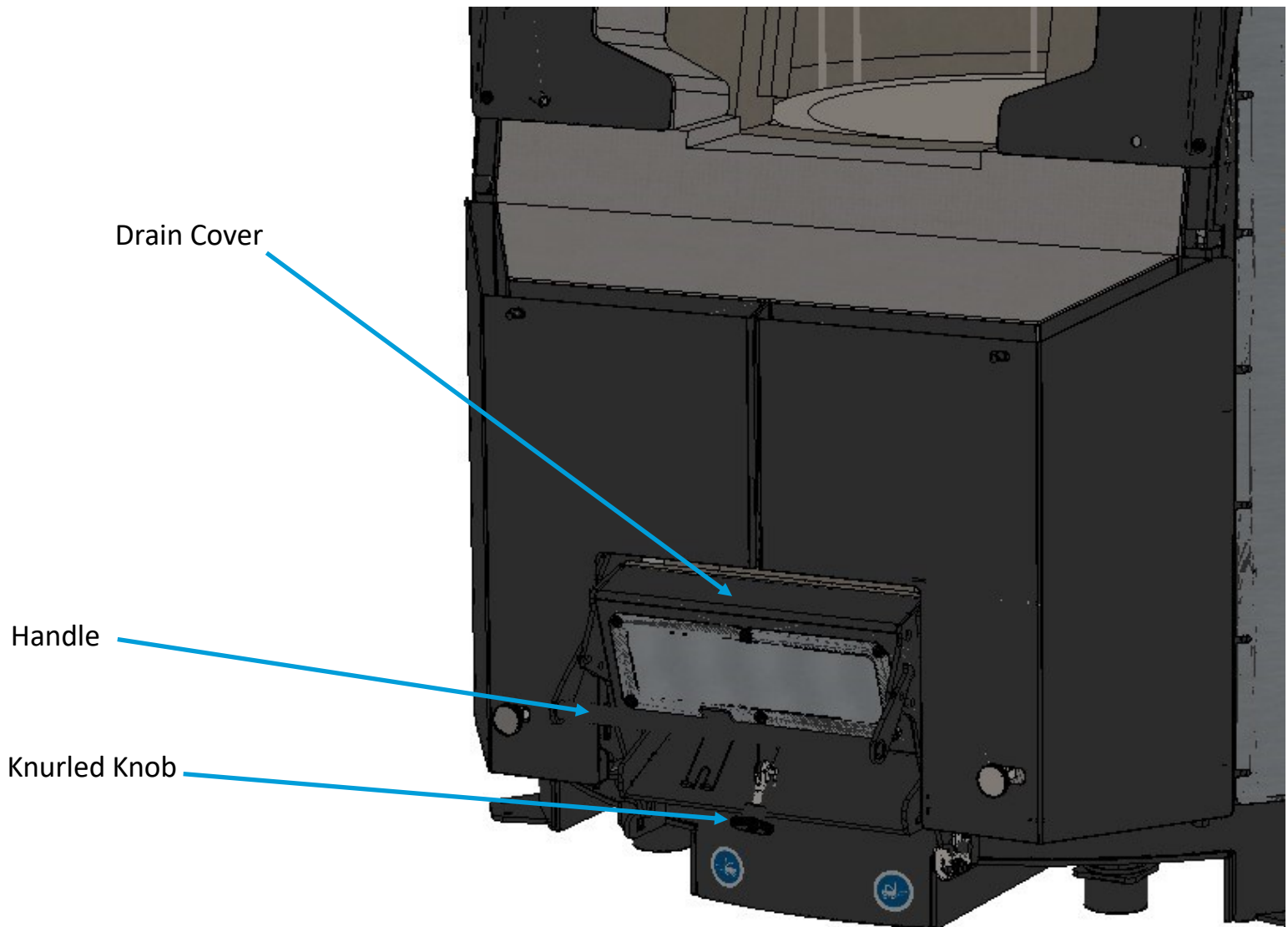
Free Standing Pot Crucible Installation

(E)FSP 200-400 Crucible Installation

Remove the Drain Plate and Drain Cover

The drain plate is only secured by friction. Slide it away from the furnace.

The drain cover is held in place by the handle and the knurled knob. Loosen the knurled knob until it can swing away from the securing bracket. Lift the handle and pull the drain cover away from the furnace. In furnaces that have been up to temperature, it may stick and need some encouragement.

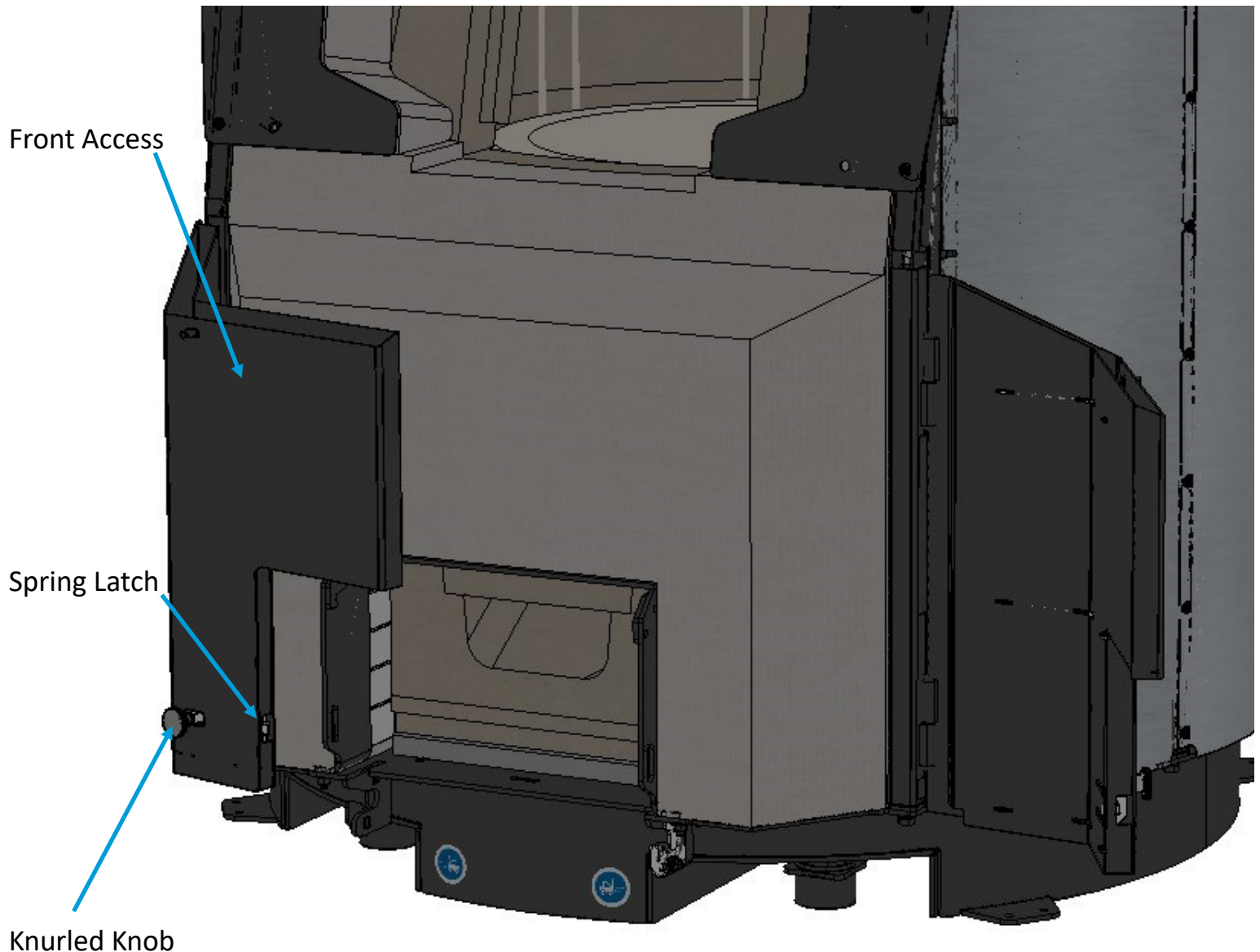


Free Standing Pot Crucible Installation

(E)FSP 200-400 Crucible Installation

Open the Front Access Doors

The front access door are hinged and swing open. Do not loosen the knurled knob, just slide it away from the center of the furnace. The latch can be seen in the gap between the drain port and the access door. It is spring load and may be under tension, if it is stuck press on the door while sliding it to loosen. With the doors open you will expose bulk fiber. Remove the bulk fiber in the same process as the door portal fiber.

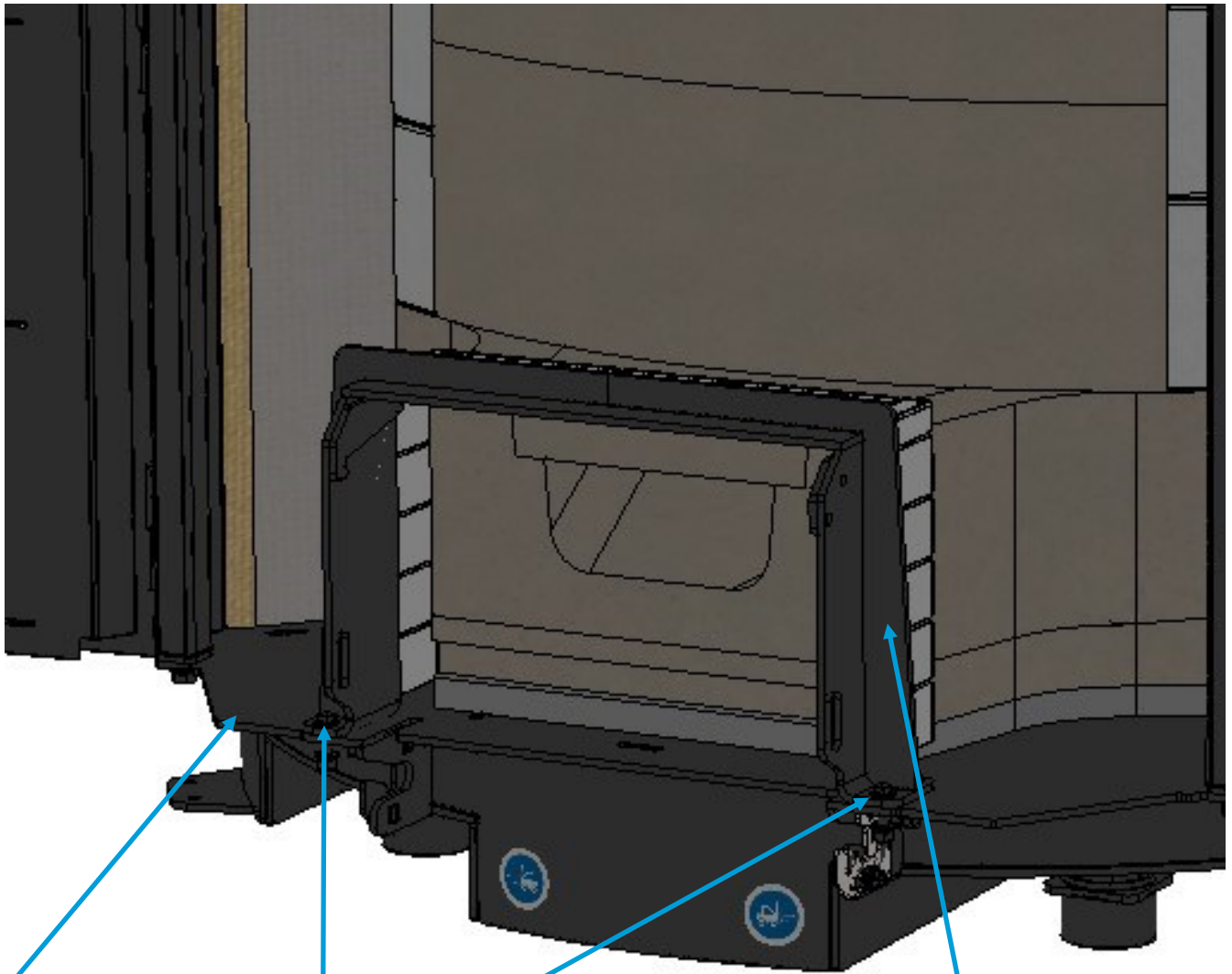


Free Standing Pot Crucible Installation

(E)FSP 200-400 Crucible Installation

Remove the Drain Portal

The metal drain portal is bolted down to the base by 2 bolts on each side. Remove these bolts and set aside the drain portal.



Furnace Base

Bolts

Metal Drain Portal

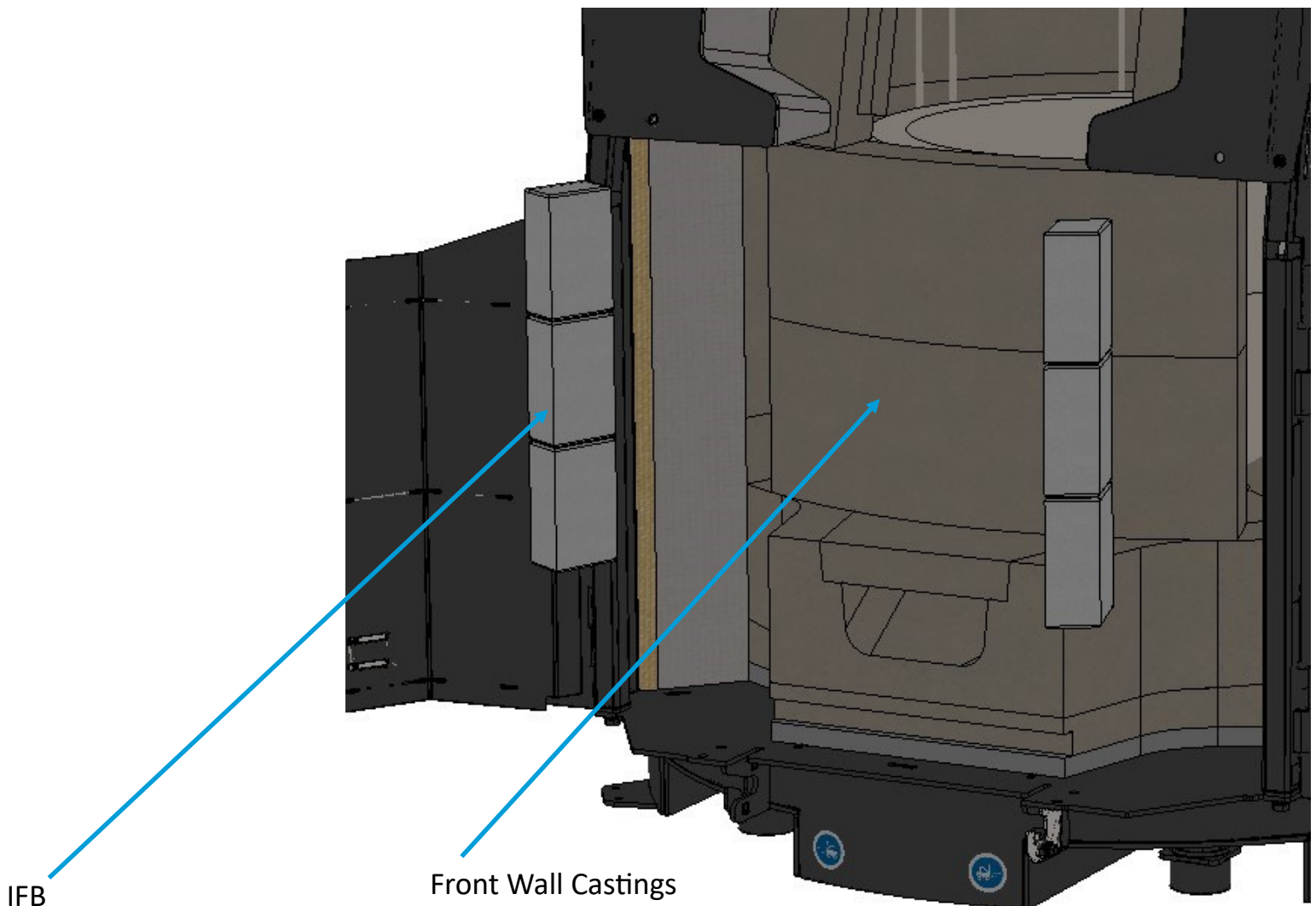
Free Standing Pot Crucible Installation

(E)FSP 200-400 Crucible Installation

Remove the Insulating Fire Brick (IFB) and Front Wall Castings

First remove the IFB brick on either side of the front wall castings. These are wedges that hold the front wall castings tight. On crucible changes after the first installation, these bricks usually need to be replaced.

Once the IFB are removed the front wall block will be loose. Be cautious they do not fall. Remove the two front wall castings and set aside.



Free Standing Pot Crucible Installation

(E)FSP 200-400 Crucible Installation

Remove and Replace Crucible

The old crucible can now be removed and a new crucible put into place. Use a board as a ramp up into the furnace and walk the crucible into place. Place a circle of cardboard or some sand or grog underneath the crucible to act as a release which will aid in removing the crucible when it is time again.

Repeat this process in reverse to reassemble the furnace. Additional fiber may be needed if old fiber became too brittle to reuse. Repack fiber with no voids, and mesh the cut seams together to avoid gaps. There should be enough fiber that there is a small amount of squeezing needed when replacing the metal, but not so much as to deform the metal or require a mallet to get things back into place.

