

## SAFETY

Read and understand these installation instructions for safe and proper installation. Installation requires the lifting and moving of individual kiln sections. Personnel capable of lifting and managing the moving process must be used. If you have any questions please contact Evenheat Kiln at 989-856-2281 or at evenheat-kiln.com.

Kilns are as safe as any other electrical appliance when used under normal and proper operating conditions. To create and maintain this safe environment observe all installation and safety precautions.

### Warning Symbol Descriptions

Warning symbols are used throughout these installation instructions. These symbols alert the installation personnel to certain hazards and important information. Pictured below are symbols used along with a description of each.



The Exclamation Point alerts you to particular cautions, hazards and information.



The Lightning Bolt alerts you to specific information regarding the risk of electric shock. Electric shock may result in injury or death.

### Emergency Shut Off Provision



The kilns power supply connection (plug/receptacle, breaker or disconnect) acts as the emergency electrical power shut off. Access to these devices should be unobstructed and safe at all times.

All electrical installations for direct wired models (those without a plug/receptacle connection) must include a power disconnect near the kiln and that is easily accessible and safe for emergency power shutoff.

### Electrical Safety



A licensed electrician should be used for all electrical installation and service. All applicable local, state and federal electrical codes must be followed.

Use correct voltage, wire size and fuse or breakers. Kiln electrical requirements are located on the kiln nameplate. Make sure all electrical connections are tight. Avoid using aluminum wire.

Always use the proper electrical receptacle. Never alter the kiln cordset or cordset plug. Alterations can be dangerous. Alterations will void any warranties along with nullifying any Listing Agency markings.



Evenheat recommends that a voltage check be performed before placing the kiln into service, ideally before actual purchase. Operating voltage varies, with common operating voltages being 208V and 240V. The kilns operating voltage (printed on the kilns nameplate) must match the applied voltage (actual electrical service voltage). If it does not, do not install or operate the kiln as potential electrical and fire hazards exist. Contact Evenheat for guidance in such cases.

The kiln must be properly grounded.



Unplug or disconnect the kiln from the electrical service before accessing the chamber for servicing or vacuuming. Do not attempt to touch or replace the heating elements while the kiln is plugged in or connected to the electrical service. Electric shock may result in serious injury or death.

Never, ever use an extension cord to operate a kiln.

### Kiln Location Safety

The best location for the kiln is a concrete floor. If not available, the kiln must be placed on a minimum of 2" of masonry extending at least 12" beyond the outside perimeter of the kiln.



Do not place or use kiln on combustible surface.

Place only on the metal stand provided by Evenheat Kiln, Inc.

The surface on which the kiln is placed shall be capable of safely supporting the combined weight of the kiln, kiln load and any operating personnel.

Observe all building, fire and safety codes when installing the kiln.

Do not install the kiln closer than 12" (31cm) from combustible wall surface or object or 36" from any ceiling surface in all opened and closed positions.

Install in a covered, well ventilated area.

Never place the kiln in a small, enclosed area such as a closet, cabinet or very small room. The room in which the kiln is placed into service shall be capable of safely dissipating all heat produced by the kiln.

Do not place the kiln in any structure resembling a carport or screened in porch. Avoid areas that are subject to outdoors weather.

Never install a kiln outside. Avoid moisture.

It is the user's responsibility to be knowledgeable regarding any and all contaminants, produced by the ware during firing, and take steps to properly and legally contain and dispose of these contaminants.

It is the user's responsibility to provide ventilation capable of removing all gases, fumes and other airborne contaminants produced by the ware during firing safely from work the area and building structure.



Do not store flammable or combustible products near or in the same room the kiln such as gasoline, paint, aerosol cans, paper, curtains, plastics, etc. Better yet, store these items in another separate structure designed for this purpose.

Position the power supply cables, power supply conduit, controller cables, pyrometer thermocouple leads and other materials in such a way as not to create a tripping hazard around the kiln.

The area around the kiln should be free of obstructions that interfere with the proper and safe operation of the kiln.

Never place anything under or above the kiln for storage. Absolutely nothing should be propped against the kiln.

## Kiln Use Safety



The surface of the kiln is hot and burn injuries are possible. Keep all children and unsupervised personnel away. Always wear protective clothing, gloves and eyewear when operating and handling a hot kiln.



Use extreme care when accessing a functioning and/or hot kiln. Under no circumstances should you touch the heating elements with your body or any other devices like tools. Electrical shock may result in serious injury or death.



Use care when accessing or looking into a hot kiln, this includes looking through a cracked lid or peepholes. High heat escapes quickly and burn injury may result. When accessing or looking into a hot kiln, approach slowly and wear protective clothing and gloves designed to withstand high heat and eyewear capable of filtering Infrared and Ultraviolet light.

Protective clothing should be worn when operating the kiln and includes, but is not limited to, cotton clothing, heat resistant gloves and eyewear capable of filtering Infrared and Ultraviolet light.

Do not operate the kiln over the maximum temperature rating printed on the nameplate.

Never fire a kiln unattended beyond its anticipated firing time.

Never allow the power cord to touch the kiln. If the cord, plug or receptacle become damaged discontinue use and replace immediately.

Be sure that kilns Lid Security Bar is secured within the wireform catch before releasing the lid. The hardware used for this safety bar should be inspected periodically for damage and wear. If this device is not operating properly discontinue kiln use until repair or adjustment is made.

It is recommended that a fire extinguisher, capable of dousing an electrical fire, be accessible in the event of fire. Smoke detectors within the kiln room are also recommended.

Keep the kiln lid closed when not in use.



It is the user's responsibility to have knowledge of the material intended to be fired. If you are unsure as to the safety of firing a particular material contact your materials supplier for guidance. If you remain unsure as to the safety of firing a particular material do not do it. Firing hazards include materials that explode or produce toxic gases. Finished ware hazards include materials containing lead. Materials containing lead should not be used for articles intended for food use.

Fire all ware according to the material manufacturer's instructions. Improper firing may result in damage to the kiln or ware.

Do not use the kiln to prepare food, heat a living space, dry clothes or ice laden articles or use as a storage devise. The kiln is designed for one purpose and one purpose only: the firing of glass materials.

All kiln models not equipped with an automatic shutoff devise (electronic control or kiln sitter) must not be allowed to exceed the rated operating temperature indicated on the kiln nametag. To prevent kiln from exceeding this maximum temperature disconnect it from the electrical power supply.

A kiln will remain very hot long after the firing is complete. All safety recommendations should be followed, even with the kiln unpowered, to avoid any burn injuries. Keep children and other unauthorized personnel away.

When firing is complete, and during periods of non-use, remove power from the kiln by unplugging or by throwing the disconnect or breakers to the OFF position.

#### **Kiln Maintenance Safety**



Disconnect electrical power from the kiln before performing any kiln maintenance. Failure to disconnect the electrical power supply may result in electrical shock which can cause serious injury or death.

Replace any worn, damaged or defective parts immediately with Evenheat Kiln replacement parts only. Discontinue use until parts are replaced.



When vacuuming the kiln use only HEPA filters on the vacuum. Prolonged expose to brick dust and other refractory materials can cause lung injury.

Inspect all electrical service connections periodically for wear.

Periodically check chamber jacket clamps for tightness. Tighten as necessary.

#### **Kiln Base**



Your Evenheat GTS unit sits on top of a metal base, the base is shipped attached to the kiln. This structure is designed to support the weight of the kiln as well as any work inside. The base provides sturdy support for you kiln.

Each base will come with 4 leveling feet, this allows the user to adjust the feet in case of an uneven floor. We recommend doublechecking the levelness of you kiln before firing any work. An uneven kiln will result in poor firing results.

Please refer to the Installation Manual for detailed images and instructions on how to adjust the leveling feet.

**\*\*Optional\*\***

**Rolling Stand**

Evenheat offers a rolling stand option for the base. The rolling stand will be 4 casters, two locking and two non-locking. Please refer to the installation manual for detailed instructions on how to install rolling casters.

**Placement of the Kiln**

Center the kiln on the stand so that it's stable and allows for the minimum of 12" to the closest wall or object.

If your kiln is equipped with swing away peephole covers, loosen the screw ¼ turn to allow the cover to swing easily. The peephole covers are fastened securely for shipping.

The kiln should be vacuumed completely with a small dusting brush to remove any brick or brick dust generated during shipping. Be sure to vacuum the lid element groove. Dust in these grooves will cause imperfections in the finished piece. Be careful as brick is fragile.

**Pre-Fire**

Evenheat suggests that you perform a test fire with your new kiln before putting it into service.

A pre fire gives you an opportunity to become familiar with the features and functions of the kiln before committing to an actual firing. It also allows your heating elements to form a protective oxide barrier. A light lubricant was used in the production of your heating elements. The pre fire will burn this off, almost immediately! You may notice a light smoke as this occurs. It's normal.

A separate control manual is included with your kiln. Refer to these manual(s) for controls programming instructions.

Program the control to reach 1200°F as fast as possible and hold for 15 minutes (see the included controls programming manual for instruction). Once the kiln reaches 1200°F it will begin to hold for 15 minutes.

*As the kiln is heating you may notice a clicking sound along with an increasing chamber temperature, this will be true for mechanical relay operated models. This continual clicking sound is the mechanical relay(s) turning on and off.*

*Models fitted with our Quiet Drive Solid State Relay(s) will not make any audible clicking sounds during the firing except for a single click at the beginning of the firing.*

We would encourage you to repeat this pre fire procedure if you've never fired a kiln of this design before. You won't hurt anything. Kilns are wonderful machines and they're even more wonderful when you know what to expect and how to work them.

**Positioning of the Shelf and Glass**

Always use a shelf when firing, even when firing with a mold. If problems arise it is much easier and cheaper to replace a shelf than a kiln bottom.

Posts are used to bring the shelf up from the floor of the kiln. This allows the work to be moved closer to the lid elements while allowing heat to reach the underside of the shelf. A post length of 2" to 3" is typical. Use enough posts to support the shelf securely, 4 being the minimum.

Set the shelf on the posts positioning equally from all sides of the chamber. Set the mold on the shelf if one is being used. Position the glass on the shelf or mold as desired.

**Firing the Kiln**

Once the kiln has been properly loaded and closed you may now fire the kiln.

Throw the power switch, located on the kiln control panel, to the ON position. The temperature control will illuminate and programming of the control is now possible.

A separate instructional manual for the controls has been included. Please refer to these manuals for all programming and operation details. We have included a Basic Glass Firing Guide at the end of this manual that you may find helpful.

### Initial Kiln Maintenance (Chamber Tightening)

The kiln uses worm-gear clamps to secure the stainless steel chamber jacket to the brick chamber. During firing, particularly on a new kiln, the stainless steel jacket expands causing the worm-gear clamps to loosen slightly. These worm-gear clamps (located on the left side of the chamber) must be checked for tightness and tightened if necessary. While holding the worm-gear clamp securely with a pair of pliers or channel locks, use a 5/16" socket to tighten each worm-gear. Snug is good, do not overtighten.

Evenheat recommends that these clamps be checked for tightness after each of the first three firings and then after every other third firing.

## EVENTHEAT KILN, INC. LIMITED KILN WARRANTY

Evenheat Kiln, Inc. guarantees to the original purchaser that for a period of two full years (1 year for Superwool lids) from the date of purchase the kiln will be free of defects in workmanship and materials when used under normal and proper operating conditions. Evenheat will replace or repair any defective part as specified.

#### FOR THE WARRANTY TO BE EFFECTIVE THE PURCHASE MUST:

- (1) Provide written proof of date of purchase. (Warranty card sent in at time of purchase.)
- (2) Notify the Evenheat Distributor/Dealer from whom the kiln was purchased, within 10 days after defect has been discovered.
- (3) Make kiln immediately available for inspection.

#### FOR WARRANTY REPAIRS:

- (1) Warranty repairs should be handled through the Distributor/Dealer from whom the kiln was purchased, who will arrange for any repairs or replacement of parts under the terms of this warranty upon receipt of the kiln (or defective part). Otherwise the defective part may be returned (postage prepaid) to Evenheat Kiln, Inc. P.O. Box 399, 6949 Legion Drive Caseville, MI 48725. If, after factory examination, the original part is found to be defective, a new or repaired part will be shipped prepaid by Evenheat Kiln, Inc.
- (2) If the entire kiln is to be returned to the factory, all transportation costs will be borne by the purchaser. The purchaser should notify Evenheat Kiln, Inc. (989) 856-2281 prior to shipping. Evenheat will help advise the best shipping method and if it is necessary to return the entire kiln or only certain parts. Warranty work will be performed within 30 days after defective part is returned to the factory.
- (3) Evenheat Kiln, Inc. reserves the right, at its option, to replace the entire kiln or any part of it in order to fulfill its obligation under this warranty.

#### THIS WARRANTY DOES NOT COVER:

- (1) Freight damage, kilns altered in any way, abuse or neglect, moisture, improper storage or installation.
- (2) Kiln overfired (reaching temperature higher than melting point of ware inside kiln) regardless of cause.
- (3) Dawson Kiln Sitter or Limit Timer.
- (4) Kilns operated on incorrect voltage.
- (5) Improper electrical installation.
- (6) Kiln furniture or ware.
- (7) Kilns used for reduction or salt firing.
- (8) Kilns used for purposes other than the firing of glass materials.
- (9) Kilns operated in excess of the cone or temperature on the rating plate.
- (10) Damage to Property or personal injury that may occur from kilns that are fired on or near wood floors or combustibles.
- (11) Damage to property or personal injury that may occur from improper ventilation of the work area and building structure.

This warranty is in lieu of all other warranties, expressed, or implied.

Evenheat Kiln, Inc. neither assumes nor authorizes any Distributor/Dealer, Retailer or employee to assume for it any other obligations or liabilities in connection with Evenheat Kilns.

This warranty is limited as specified above and excludes incidental or consequential damages. Some states or providences do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

## Basic Glass Firing Guide

We've included this Basic Glass Firing Guide to provide you with a general overview and simple discussion of typical glass firing. This guide is in no way the definitive answer to glass firing, far from it. We urge you to seek out various sources of knowledge such as books, seminars, formal training and the Internet.

Glass firing is not a "paint-by-numbers" proposition. While not difficult, it does require an fundamental understanding of the process. There are many types of glass firing. Among them are fusing, slumping, painting, casting and annealing. While they're all different, they do use many of the same firing steps. Once you get to know these basic steps, making changes and trying new things will happen with confidence.

*The temperature controls we offer on our glass kilns do contain preset firing schedules for various glass firing techniques. While these preset programs can be helpful they may not give you the results you are looking for. We freely admit we were never a big fan of preset glass programs but offer them as a way to get you started in a particular direction. We recommend that you learn as much as you can and begin to create your own firing programs when you feel comfortable in doing so. We would call that full artistic control and is worth seeking out.*

Please note that this guide assumes that you are using "compatible" glass. Glass expands and contracts at measurable rate when heated and cooled. For successful kiln work all glass must expand and contract at the same rate. Glasses are labeled with a COE number and only glasses with the same COE are considered compatible and may be used together. Doing otherwise will lead to frustration and breakage.

For this guide we will consider 4 firing steps: Initial Heating, Working or Process Temperature, Cooling Rate and Annealing.

### Initial Heating

It's generally considered proper to heat the glass from room temperature up to 1000°F at a given rate of temperature increase. This is called Initial Heating. If heated too quickly the glass is at risk of breaking (thermal shock). If you have ever broken a cold drinking glass by running hot water over it you have seen thermal shock in action! Heating too slowly at this point really doesn't present problems other than increasing the total firing time.

How fast is fast enough? The answer to this question depends largely upon the total thickness of the glass. The thinner the glass, the faster it can be fired. Conversely, the thicker the glass the slower the rate of firing. Thicker glass takes longer to absorb heat which calls for a slower rate.

1/8" thick	600°F per hour
3/16" thick	525°F per hour
1/4" thick	250° to 450°F per hour
3/8" thick	250° to 375°F per hour
Casting Work	120°F per hour

### Working Temperature

Once the glass is heated to 1000°F it can now go to the ultimate working or process temperature (temperature at which your fusing, slumping, casting, etc. takes place). What is the magic temperature and how fast do we need to go?

Let's talk temperature first. Slumping usually begins to takes place around 1200° to 1250°F. Fusing offers a range of effects from fuse-to-stick to full fuse, it's really wide open here depending upon the desired effect. Fuse-to-stick (just beginning to fuse) happens anywhere between 1220° and 1350°F. Full fuse (completely smooth) generally occurs around 1450° to 1520°F. Casting temperatures are generally slightly higher than fusing temperatures.

What about rate of temperature increase during this period? The answer varies considerably according to the glass manufacturers data. Bullseye suggests using the same rate as the Initial Heating Rate when slumping and a rate of 1000°F per hour when fusing. Uroboros gives a rate of 250°F regardless of the type of firing. Spectrum ranges anywhere between 650° and 2000°F depending upon the work. Sorry, no easy answer here. It should be noted that firing too slowly during this time may contribute to devitrification (a matte / scum looking finish on the final piece).

It's quite common to Hold or Soak the glass at the working temperature for a period of time. This process tends to equalize the temperature of the glass. It also allows the glass to continue to move (fuse, slump, etc.) in a uniform and slower fashion. To put it another way, soaking doesn't stop the action it slows it down. How much time to soak? Manufacturer data varies on this point as well, but anywhere between 5 and 15 minutes is a good start. When the precise effect is achieved simply stop the action by skipping ahead to the cooling portion of the firing (which does stop further action).

### Cooling to Anneal

Once the glass has achieved the desired effect it's time to cool. Cooling prevents any further changes and takes the temperature down to the annealing point. At this point, cool as fast as possible down to the annealing temperature. This step is often referred to as the "crash cool" or "flash vent". What often takes place is that the lid of the kiln is opened and closed a few times to get rid of heat quickly. This is done until it reaches around 1100°F or so. Take

care to wear heat resistant gloves, eye protection and other protective clothing when flash venting. Hot gases will exit the kiln quickly and may cause burns.....so do this maneuver with great care and an understanding of what will happen when the lid is lifted.

It should be noted that the temperature of the kiln will begin to rise once the flash vent is completed. This is normal as the kiln and glass continue to release heat. This increase in temperature will not normally cause the glass to change, so rest easy.

### **Annealing**

The process of firing introduces stress into the glass. If this stress is not relieved the finished glass will break at some point: either immediately or over time. The process of relieving this stress is called annealing. Each glass has a specific temperature at which annealing takes place. Bullseye and Spectrum use an anneal temperature of around 960°F with a soak time at this temperature of anywhere between 10 and 45 minutes for glass up to 3/8" thick. Uroboros takes a slightly different approach by cooling very slowly (20° to 60°F an hour) through the temperature range of 1000°F to 800°F.

Glass thickness is an important factor during the anneal portion of the firing. The thicker the glass the longer the soak or the slower the cooling.

Once annealing has been completed it is still necessary to allow the glass to cool to about 800°F at a rather slow rate. This tends to promote a more complete annealing. Rates vary from 60° to 250°F per hour. Again, glass thickness will determine this.

### **Programming Hints**

We've explained the general process of firing glass with its temperature rates, temperatures and soak times. Now, how does the controller do all this?

First we need to explain a term known as Segment. A segment is a grouping of *a rate of temperature increase (or decrease), the temperature you're going to and any soak time you need at that temperature.* That's as tough as it gets. Your program will be made up of these segments. The control allows programming of multiple segments per firing.

Developing your program is actually a pen and paper operation first. Using the enclosed firing data from the glass manufacturers let's program the control for a 12" plate, 1/4" thick, full fuse. Here's our pen and paper take on this firing. For a step by step description of actual programming keystrokes please refer to the controller manual included with your kiln.

#### **Segment 1 (Initial Heating)**

450°F/hour  
to 1000°F  
0 soak time

#### **Segment 2 (Working Temperature)**

1000°F/hour  
to 1500°F  
10 minute soak time

#### **Segment 3 (Cooling to Anneal and Anneal)**

9999°F/hour or Full\*  
to 960°F  
30 minute soak

#### **Segment 4 (Cool Down)**

210°F/hour  
to 750°F  
0 soak time