



# Cone Art Pottery Kiln Instruction Manual



# **CONE ART KILNS INC.**

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## **Dear Cone Art Customer:**

Congratulations on and thank you for, your recent selection of a state-of-the-art Cone Art kiln. Offering excellence in unparalleled design and craftsmanship, Cone Art kilns are built with the highest quality materials and attention to detail, resulting in the best line of electric kilns on the market.

## **Cone Art Kilns: Your kiln is equipped with:**

- Premium fire brick for superior heat retention and durability
- All brick rings are banded with stainless steel to prevent distortion
- Rigid 1" insulation board eliminates insulation break down after years of firing on double wall kilns
- Steel base plate under floor to prevent sagging and provide extra support
- Stainless steel case designed to allow tightening after years of the effects of thermal expansion
- Built-in peephole covers relieve the frustration of lost or broken plugs
- High quality element wire ensures long element life
- Heavy duty lid hinges provide for safe lid operation without stressing the kiln
- 7" reinforced welded stainless steel stands provide positive support
- Double-wall energy efficient design except on single wall kilns
- Constructed with snap-together sections for easy installation
- Element in floor for uniform heating eliminating cold spots except on single wall kilns
- Rated for all temperatures up to cone 10
- Three thermocouples on all automatic models, 2327 & larger, for even heat distribution at no extra charge
- Easy lid lift design on models 7 cubic feet and larger provides effortless lifting
- New Control box mounting for easy installation and service
- Improved control box wiring for clarity and ease of service
- Quality inspection before shipping
- 2 year limited warranty
- Reliable customer service through our website, email account or by telephone
- Quality instrumentation such as Dawson Kiln Sitter or Bartlett V6-CF Controllers

Please remember to mail in your Warranty Form as soon as possible so that we may add your information to our records. Please read all provided instruction manuals carefully before set-up and operation.

We trust you will enjoy many years of professional results from your Cone Art Kiln.

Sincerely,

*Frank Tucker*

*Cone Art Kilns Inc.*

*President*

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# CONGRATULATIONS

## **on your recent selection of a state-of-the-art Cone Art Kiln**

Offering excellence in unparalleled design and craftsmanship, Cone Art kilns are built with the highest quality materials and attention to detail, resulting in the best line of electric kilns on the market.

Read all provided instruction manuals carefully and thoroughly before initial set-up and operation; the information contained herein will aid you in operating your Cone Art kiln safely and with excellent results. Instruction manuals have been provided for all optional kiln instrumentation such as the Dawson Kiln Sitter<sup>R</sup>, Bartlett<sup>TM</sup> V6-CF automation controllers, etc.

If you have any questions regarding the operation of your kiln, contact us directly at Cone Art Kilns Inc. 1-800-304-6185 or contact your dealer.

We trust you will enjoy many years of professional results from your Cone Art kiln.

## Kiln Set-Up

### Check Kiln for Damage Upon Delivery

Every Cone Art kiln is inspected at the warehouse prior to shipment and carefully packed to prevent damage in transit. We do recommend, however, checking for damage that may have occurred in transit. When unpacking the kiln; if damage is discovered, follow these steps:

1. Save all packaging.
2. Call your freight carrier and ask for an inspection.
3. Notify the dealer who sold you the kiln that you have found damage and have called the freight carrier for an inspection
4. DO NOT disassemble or fire the kiln until the damage claim is inspected and resolved.

### Selecting the Best Kiln Location

It is essential to select a safe, clean and convenient location for your kiln in order to ensure long kiln life and avoid a potential fire. Regulations about kiln placement vary; we strongly recommend consulting your local government's ordinances/codes to ensure safe and proper kiln location. The following are general safety and convenience guidelines to consider:

1. Ensure that the kiln is placed in a well-ventilated area.

**CAUTION:** DO NOT PLACE KILN IN A CLOSET OR CABINET; it can overheat and potentially start a fire. Any room such as a garage, shed, carport, basement, utility, or hobby room is safe if it has SUFFICIENT CIRCULATING AIR; even so, we highly recommend installing a vent system to safely exhaust potentially harmful fumes.

2. Set the kiln on a level and stable surface; if the floor is not concrete, it is essential that the kiln be placed on a non-flammable surface such as fire brick or cement block.
3. DO NOT EXPOSE YOUR KILN TO THE WEATHER CONDITIONS; safe kiln operation requires your kiln to stay dry and clean in a sheltered, yet well ventilated location.
4. Locate kiln as close as possible to an existing (or anticipated) electrical outlet.
5. Position the kiln to the left of the outlet in order to avoid strain on the kiln's electrical cord or the electrical connection.
6. Place your kiln at least 12" away from any flammable materials, including walls, drapery, paper, plastic, cloth, etc. (California requires at least 18"; consult local ordinances/codes for specific distances for your area).

## Unpack the Kiln

**NOTE:** *If you must disassemble the kiln to fit through a narrow doorway, follow the kiln disassembly instructions contained in this manual (refer to Appendix A).*

1. Carefully cut and remove the metal strapping that attaches the stand to the top of the kiln.
2. Lift kiln stand out of the box and set in the location designated for the kiln (refer to "Selecting the Best Kiln Location" section of this manual).
3. Confirm that the stand is level and does not teeter, as an uneven stand is a safety hazard and may put stress on the kiln during firing; if stand is not level, place firm shims under the kiln stand legs until stand is level.
4. With a partner, lift the kiln (using the exterior kiln handles when present) and place it securely and evenly on the kiln stand. Larger kilns may best be moved in sections.
5. Confirm that the kiln and kiln stand are both level and do not teeter.

## Ensure that Kiln's Electrical requirements match building's Electrical Service

1. It is essential that your kiln's electrical requirements are compatible to your building's electrical service; factors to consider include voltage, amperage and phase. For example, if the kiln will be placed in a building that is wired for 240V, you will want a kiln that is wired for 240V. If the kiln will be placed in a building that has 208V you will want to purchase a kiln wired for 208V.

**CAUTION: If you are in doubt about the compatibility of the kiln you purchased and your building's electrical service, we strongly recommend consulting an electrician, as an incompatible instalment will not allow the kiln to operate properly.**

2. With the exception of our 120V models (119D and 1801S), the Canadian Standards Association (C.S.A.) does not allow us to attach a plug to the kiln's electrical cord. Because there are a variety of configurations of electrical plugs and corresponding receptacles, it is best to have a electrician determine the connection that best suits the requirements of the kiln and your building's power supply. Additionally, we encourage your electrician to directly wire the kiln into the breaker box (rather than plugging it into an outlet) as this option allows for the safest and most efficient kiln operation.
3. We advise hiring a qualified electrician to install your kiln, as potentially dangerous voltage is involved. The information the electrician will require, such as volts, amps, watts and phase is noted on the nameplate of the kiln.
4. If the kiln you recently purchased is replacing an old kiln, confirm that the existing wire size is correct for the new kiln.

## Prepare Kiln for Test Firing

1. Confirm that the kiln is disconnected from the power supply (by either unplugging from receptacle or disconnecting at breaker box).
2. Position the power cord so that it does not touch the side of the kiln.
3. Check that the lid brace is connected securely to the kiln and kiln lid; for models 4227 and 4236 refer to "Appendix B" for instructions to install hinge supports.
4. If your kiln has multiple sections, inspect the latches (that lock sections together) to confirm that they have been securely fastened.
5. If you ordered your kiln with a Dawson Kiln Sitter<sup>R</sup>, remove the firing gauge and confirm proper calibration of the sitter (refer to the Dawson Kiln Sitter<sup>R</sup> manual )
6. Carefully vacuum any bits of brick, dust or debris that may have lodged in the kiln's elements during shipping.
7. Confirm that all heating elements are set into their grooves.
8. Wipe all new shelves clean, and apply kiln wash ONLY to the TOP of your kiln shelves; NEVER APPLY KILN WASH TO THE LID OR WALLS. Kiln wash protects your shelves against glaze drips. If you are not familiar with kiln wash, consult your local ceramic supplier for detailed instructions for the initial and future re-applications of kiln wash.
9. Load your kiln furniture: if your kiln has floor heating elements, place the bottom shelf on 1" posts; on models without floor elements, the bottom shelf may be placed directly on the kiln floor (to prevent damage to the kiln floor in case of accidents). Continue stacking kiln shelves, using THREE posts per shelf (three is more stable than four); to ensure that weight is transferred to the kiln floor instead of the shelf below, stack posts directly above each other as each shelf is installed.
10. For every firing, we recommend placing three witness cones approximately 3" behind each peephole and on to every kiln shelf. Witness cones indicate if the kiln is firing evenly from top to bottom and front to back and also confirms the proper functioning of kiln instrumentation such as the automatic controller, pyrometer and kiln sitter. For additional information, refer to the "Pyrometric Cones" section of this manual and read the Edward Orton Jr. Ceramic Foundation's brochure "Cones and Firing: a Practical Guide to successful Firing" ([http://www.ortonceramic.com/Resources/cones\\_firing.pdf](http://www.ortonceramic.com/Resources/cones_firing.pdf)).

11. Fumes are a natural part of any kiln firing; therefore, for your health and safety we strongly recommend that you install a kiln vent to exhaust fumes, even in a well-ventilated area.
12. Connect kiln to power supply.
13. Read all safety precautions in the next section before proceeding to test fire your kiln.

## Important Safety Precautions

**CAUTION:** Your kiln is a device that produces extreme heat. To prevent personal injury and/or potential fire hazards, read and follow these safety tips prior to initial kiln operation and EVERY subsequent kiln firing.

1. Read all provided instruction manuals carefully and thoroughly before initial operation of your kiln as these manuals contain very important information. Instruction manuals have been provided for all kiln instrumentation such as the Dawson Kiln Sitter<sup>R</sup> and Bartlett V6-CF<sup>TM</sup> automatic controller.
2. Before servicing your kiln always disconnect it from the power supply.
3. Do not touch exposed electrical contacts while connected to a power source.
4. Do not stand in moisture while operating kiln and/or working with electronic devices.
5. Never use an extension cord with your kiln.
6. Keep all types of flammable materials (plastic, drapes, aprons, etc.) away from the kiln.
7. Do not expose your kiln to the weather conditions; safe kiln operation requires your kiln to stay dry and clean.
8. **NEVER FIRE THE KILN UNATTENDED.**
9. Do not attempt to exceed the temperature rating listed on the nameplate of the kiln.
10. Observe caution when firing your kiln as the kiln surface will become very hot; keep children away from kiln and alert others when firing.
11. Never open the kiln unless you know it is cool.
12. Never fire the kiln without witness cones, as they virtually eliminate the risk of over-firing . Witness cones should ALWAYS be used even if your kiln is equipped with an automatic controller or kiln sitter, as pyrometers are never as accurate as cones.

**CAUTION:** *If you solely rely on the kiln sitter or controller to gauge the firing status, you risk over-firing your kiln, which may cause extensive kiln damage and/or loss of ware.*

## Test Firing

You are now ready to proceed with a test firing; it is imperative that you complete this properly BEFORE proceeding to production firing. Prior to the test firing, check electrical connections and read all provided instruction manuals carefully and thoroughly as they contain vital information on safe kiln operation.

New kiln elements give off vapours that can discolour glazes; therefore, the test firing is performed with an empty kiln, but with posts and shelves to hold witness cones. We recommend using witness cones for every firing to confirm the proper functioning of kiln instrumentation such as the automatic controller, kiln sitter and thermocouples.

**NOTE:** *Do not be alarmed if there is excessive smoke created during test firing; this is normal, due to lubrication burning off the elements and starches burning out of the insulation. A clicking sound is also normal while your kiln is firing: the elements are switching “on” and “off” in order to reach the desired temperature gradually and evenly.*

**SHOULD YOUR KILN OVER-FIRE:** Once the kiln has cooled, confirm that your firing gauge is properly calibrated (if your kiln has a sitter and timer), save your witness cones, and note any set up and firing procedures that will help a technician locate and solve your problem before you proceed with another firing.



## Initial Test Firing

The initial test firing helps set the elements in place and allows a coating of aluminum oxide to form on the elements, protecting them from corrosive materials released from clay and glazes, such as sulphur and steam. Prior to firing remember to check that the elements are in their grooves. Typically the elements will release smoke the first time they are fired. This firing will confirm that the kiln's automatic controller and/or kiln sitter and infinite switches are functioning properly and will therefore automatically turn off the kiln when the desired cone is achieved. Place witness cone packs (cones 5, 6 and 7 in each pack) on each shelf to help establish the accuracy of your firing gauges. This test fire is done to cone 6, and is especially important for those who typically fire only in the low range, as it takes a HIGH TEMPERATURE to properly set new elements.

**NOTE:** *If you have a manual (MX) model kiln your test firing will vary from the instructions below. Follow the instructions given under Manual Kilns on the next page.*

### (BX Models) Automatic Kilns

1. Program your controller to do a cone 6 firing (refer to page 6 of your Bartlett controller operation manual).
2. Press "1" to clear "ERR" if flashing to receive a flashing "IDLE" message.
3. ON the "CONE FIRE PAD" press "SLOW GLAZE", then "ENTER"
4. "CONE..." will be displayed, press "6" to choose cone 6 then press "ENTER"
5. "HLD..oo.oo" will be displayed, press "ENTER"
6. "CPL" will be displayed. The panel will return to displaying "IDLE" and the temperature.
7. Press "START/STOP" to start firing
8. If you have a vent system installed, turn it on. Follow the vent manufacturer's operation instructions. If your kiln is not equipped with a vent system, for the test fire only, leave all peepholes open (to allow gases to escape).

## Earlier Automatic Models

### Orton Autofire™ Controllers only, with Switches and/or Kiln Sitter

1. Follow the "Cone Fire" instructions on page 7 of the Orton User's Guide to do a cone 6 test fire.
2. If your kiln is also equipped with a Dawson Kiln Sitter<sup>R</sup>, place a small (junior) cone or bar at least two cones hotter than the selected test fire temperature, in the kiln sitter PRIOR to starting the automatic controller.
3. Confirm that three witness cones are placed approximately 3" behind each peephole and on every kiln shelf.
4. Set all switches on "high" for the entire firing.
5. If you have installed a vent system, start the vent now (follow vent manufacturer's operation instructions). If your kiln is not equipped with a vent system leave all peepholes open to allow gases to escape.
6. READ YOUR CONTROLLER MANUAL THOROUGHLY BEFORE FIRING; follow the controller's firing instructions for your first test firing, as the cone for the first firing varies amongst individual controller manufacturers and with the type of controller.

**CAUTION:** IF THE KILN SITTER AND AUTOMATIC CONTROLLER ARE NOT FUNCTIONING PROPERLY, DO NOT CONTINUE WITH OTHER FIRINGS; CALL YOUR LOCAL AUTHORIZED CONE ART DEALER.

**NOTE:** Exact firing times vary due to kiln size and voltage; we therefore suggest frequently checking the witness cones to gauge the firing time for your kiln.



## **(MX Models) Manual Kiln with Dawson Kiln Sitter<sup>R</sup> and Timer, with infinite switches**

Your **Dawson Kiln Sitter<sup>R</sup>** instruction package contains two 019 test cones. Perform two test firings; the first to cone 019 to test the **Dawson Kiln Sitter<sup>R</sup>** and the second to cone 6, a high temperature test firing. Typically the elements and insulation material will release smoke the first time they are fired.

**CAUTION:** Never fire the kiln unattended.

### **First Test Firing – cone 019**

1. Place three witness cones approximately 3” behind each peephole on every kiln shelf.
2. Place a junior cone 019 in the sitter; prior to cone insertion, make sure the sitter is properly calibrated with the firing gauge and the gauge is then removed (see Dawson Kiln Sitter manual for details)
3. Set the timer for 3 hours\*.
4. Set all switches on “high” for the entire firing.
5. Push in the kiln sitter’s plunger to start the firing.
6. If you have installed a vent system, start the vent now (follow vent manufacturer’s operation instructions); if your kiln is not equipped with a vent system, leave all peepholes open (to allow gases to escape).
7. If functioning properly, the kiln sitter will automatically shut off the kiln when it reaches cone 019. Should you fire past cone 018, manually turn the kiln “OFF” by turning switches to “off” and timer to “0”.
8. If the kiln is functioning correctly, then proceed to second test firing.

**CAUTION:** IF THE KILN SITTER IS NOT FUNCTIONING PROPERLY, DO NOT PROCEED TO THE SECOND TEST FIRING; CALL YOUR LOCAL AUTHORIZED CONE ART DEALER.

**CAUTION:** NEVER FIRE THE KILN UNATTENDED. PARTICULARLY FOR THE TEST FIRE, MONITOR THE KILN DURING THE ENTIRE DURATION OF THE FIRING. YOU WILL GAIN FAMILIARITY WITH YOUR KILN AND ALSO PREVENT ANY MALFUNCTIONS.

*\*NOTE: Exact firing times vary due to kiln size and voltage; we therefore suggest frequently checking the witness cones to gauge the firing time for your kiln.*

### **Second Test Firing (MX Models) – cone 6**

The second test firing allows a coating of aluminum oxide to form on the elements, protecting them from corrosive materials released from clay and glazes, such as sulphur and steam. This firing will also help set the elements in place. Prior to firing remember to check that the elements are in their grooves. This firing is especially important for those who typically fire only in the low range, as it takes a high temperature to properly set new elements. Place witness cone packs (cone 5, 6 and 7 in each pack) on each shelf to help establish the accuracy of your firing gauges. Once again, this firing may also create smoke; after this firing you should not see smoke again unless foreign materials enter the clay or kiln.

**CAUTION:** Never fire the kiln unattended.

## **Manual Kilns with Dawson Kiln Sitter<sup>R</sup> and Timer**

1. Confirm that three witness cones are placed approximately 3” behind each peephole and on every kiln shelf.
2. Place a junior cone 6 in the sitter; prior to cone insertion, make sure the sitter is properly calibrated with the firing gauge and the gauge is then removed (see Dawson Kiln Sitter<sup>R</sup> manual for details).
3. Set the timer for 6 hours\*.
4. Set all switches on “high” for the entire firing

5. Push in the kiln sitter's plunger to start the firing.
6. If you have installed a vent system, start the vent system, start the vent now (follow vent manufacturer's operation instructions); if your kiln is not equipped with a vent system, leave all peepholes open (to allow gasses to escape).
7. Check witness cones regularly: if functioning properly, the kiln sitter will automatically shut off the kiln when it reaches cone 6. Should you fire past cone 7, manually turn the kiln "OFF" by turning switches to "OFF" and timer to "0".
8. If the kiln is functioning correctly you may proceed with production firing.

**CAUTION:** IF THE KILN IS NOT FUNCTIONING PROPERLY, DO NOT PROCEED WITH PRODUCTION FIRING; CALL YOUR LOCAL AUTHORIZED CONE ART DEALER.

**Note:** *exact firing times vary due to kiln size and voltage; we therefore suggest frequently checking the witness cones to gauge the firing time for your kiln.*

## **Kiln Operation**

Once the test firings have been performed satisfactorily, you are ready to fire ware. Central to the firing process is the use of Pyrometric cones; therefore, we suggest reading the section on Pyrometric cones before firing ware to ensure accurate firing results.

### **Always Use Pyrometric Cones**

Pyrometric cones are small pyramids of ceramic material that react to heat absorption the same way as your ware; they are designed to bend when exposed to a certain rate of increase in temperature over a specific period of time. In other words, they measure the amount of heat absorbed rather than only temperature or time.

Pyrometric cones are used to confirm the proper functioning of kiln instrumentation such as the automatic controller, kiln sitter and pyrometer. One of the most important functions of witness cones is to indicate how evenly and accurately the kiln is firing; you will be able to adjust your kiln temperature if needed.

Cones come in two sizes: the small (junior) cones and bars are used in the kiln sitter and the large cones are used as witness cones. The witness cones are placed at an 8° angle from vertical in a cone holder (we recommend using Orton cone plaques, which may be purchased from your local dealer); self-supporting cones are also available. The witness cones are placed so that they are visible through the peepholes and are used to check the progression of the firing.

Witness cones are usually used in groups of three. The first cone, called the guide cone, is one cone cooler than the desired cone; when it begins to bend, the firing is near maturity. The second cone is the firing cone, which indicates that maturity has been reached. Lastly, the guard cone is one cone hotter than the firing cone; if it bends, it will indicate how much higher than maturity the kiln has fired.

If you determine that the kiln is firing unevenly (indicated by a variation in the cones), you can manually adjust the kiln by increasing or decreasing switches at each zone. For example, if the top section is firing hotter than the other sections, start firing with the bottom switches on "low" and leave the top switch "off"; when you turn the bottom switches to "4" turn the top to "low".

The Edward Orton Jr. Ceramic Foundation (<http://www.ortonceramic.com>) prints an excellent brochure on the use of cones, "Cones and Firing: a Practical Guide to Successful Firing". It is recommended that all kiln owners read this brochure.

## Ensure that Kiln is Loaded Properly

Excellent and consistent firing results require careful loading of the kiln; your ware and/or kiln may be damaged if loading is rushed, incorrect or careless.

1. Confirm that the kiln is disconnected from the power supply (by either unplugging from receptacle or disconnecting at breaker box).
2. If your kiln has a Bartlett V6-CF™ automatic controller, confirm that no ware, shelves, or posts are within 1” of the thermocouple inside the kiln chamber.
3. If the kiln is equipped with a Dawson Kiln Sitter<sup>R</sup>, ensure that no ware, shelves, or posts are within 1” of the cone holder/sensing rod inside the kiln chamber; confirm that nothing is near or against your kiln sitter which would prohibit the weighted trigger on the exterior of the kiln from dropping and shutting off the kiln.
4. Ware should be bone dry in order to fire; firing damp ware is problematic and, without expertise, can easily result in the loss of ware and/or damage to the kiln by explosion from rapidly escaping steam.
5. Always load a kiln as fully and evenly as possible: this will ensure even heat distribution and oxygen circulation throughout the kiln.
6. For a bisque firing, pieces may touch one another and some pieces can be stacked; in a glaze firing, the pieces should not touch each other or have glaze on the bottom touching the shelf (after molten glaze cools and hardens, they will fuse together).
7. After loading is complete, re-connect kiln to power supply.
8. Determine firing schedule and prepare to fire.

## Allow Kiln to Completely cool before Unloading

**CAUTION:** *As your kiln will have become very hot during firing, allow sufficient cooling time and use extreme caution when unloading ware.*

1. Confirm that the kiln is disconnected from the power supply (by either unplugging from receptacle or disconnecting at breaker box).
2. Wait until the kiln has completely cooled before unloading to avoid accidental injury or damage to the kiln and/or ware.

**CAUTION:** *Force cooling a kiln will cause the bricks to deteriorate; unloading your ware when hot can contribute to clay and glaze defects.*

## General Firing Schedules

The following firing schedules are VERY GENERAL and are suggested only to get beginners started. There are many factors that will affect the firing results of your ware: size of load, stacking arrangements, open or closed peepholes (for oxygen intake), etc. conversely, these factors will vary depending upon the glazes used and the results desired.

When determining a firing schedule, consult all accompanying kiln instrumentation manuals for firing schedules and tips.

We recommend developing a firing schedule best suited to your ware. Over time, by acquiring information and experience, you will be able to adjust your firing schedule to achieve exact results. We suggest consulting the many fine publications available on electric kiln firing of ceramic and glassware.

**CAUTION:** **Never fire the kiln unattended.**

## Bisque Firing

Bisque firing drives off water from the clay's surface as well as molecular water bonded in the clay mineral. Impurities such as carbonaceous material, which can cause glaze defects, are burnt out. This firing allows the ware to harden sufficiently to handle, yet remain porous enough to readily accept glaze. The following is a suggest firing schedule when using a Dawson Kiln Sitter<sup>R</sup> and timer.

1. Place the small (junior) cone or bar in the kiln sitter.
2. Using the Lid Prop Bracket, prop the kiln lid open approximately 1"\*\*\*.
3. Set the timer; turn all switches to "low".
4. Push in the kiln sitter's plunger to start the firing.
5. Fire on a low setting ("low" to "2" on the dial) for 1.5 hours\*.
6. Close the lid; turn all switches to a medium setting ("3"- "5") and fire for 1.5 hours\*.
7. Cover the top peephole\*\*\*.
8. Turn all switches to "high" and continue firing until witness cones indicate that firing is complete.
9. Turn all switches to the "off" position; confirm that the kiln sitter's plunger has dropped and timer is at "0".

\*\*\*NOTE: *If you are using a vent system, follow the manufacturer's directions for lid opening and peepholes.*

\*NOTE: *Exact firing times vary due to kiln size and voltage; we therefore suggest frequently checking the witness cones to gauge the firing time for your kiln.*

## Glaze Firing

The purpose of this firing is to mature the clay body and melt the glaze; the cone to which you fire will depend on the clay and glaze manufacturers' specifications. The following is a suggested firing schedule when using a Dawson Kiln Sitter<sup>R</sup> and timer.

1. Place the small (junior) cone or bar in the kiln sitter.
2. Close the kiln lid\*\*\*\*.
3. Set the timer; turn all switches to "low".
4. Push in the kiln sitter's plunger to start the firing.
5. Fire on a low setting ("low" to "2" on the dial) for 1.5 hours\*.
6. Cover the top peephole\*\*\*\*.
7. Turn all switches to a medium setting ("3"- "5" on the dial) for 1.5 hours\*.
8. Turn all switches to "high" and continue firing until the witness cones indicate that the firing is complete.
9. Turn all switches to the "off" position; confirm that the kiln sitter's plunger has dropped and timer is at "0".

\*\*\*\*NOTE: *If you are using a vent system, follow the manufacturer's directions for lid opening and peepholes.*

\*NOTE: *Exact firing times vary due to kiln size and voltage; we therefore suggest frequently checking the witness cones to gauge the firing time for your kiln.*

## Lustre and Overglaze Firing

Follow the same procedure as for a glaze firing; remember, however, a lustre or Overglaze firing will be much shorter than a glaze firing since it requires a much lower temperature. If using a kiln vent system, follow the vent manufacturer's recommendations for peepholes; if not using a vent, lustre and Overglaze firings are typically fired with peepholes open.

## Firing With an Automatic Controller

To achieve the best firing results, refer to your kiln's controller manual for detailed firing instructions.

## Glass Slumping

Glass slumping is when glass (in sheet or bottle form) is placed in or on a mould and heated until the glass softens, taking the shape of the mould. The following is a very general glass slumping schedule, which may be programmed for a kiln equipped with a Bartlett V6-CF<sup>TM</sup> automatic controller:

1. Fire at 300° F/hour to 900 °F for 30 minutes
2. Fire at 500° F/hour to 1250 °F; hold at 1250°F for 30 minutes
3. Fire at 999° F/hour to 1025 °F; hold at 1025°F for 30 minutes
4. Fire at 80° F/hour to 700 °F; (no hold)
5. End

## Preventive Kiln Maintenance

Your Cone Art kiln will provide you with many years of use; to prolong the life of the kiln and ensure error-free operation, it is necessary to perform regular maintenance on your kiln and kiln instrumentation. We suggest the following:

1. Inspect and vacuum element grooves regularly: clay, glaze, dust and other debris not removed will eventually damage the elements.
2. Check the lid and remove any brick particles; carefully remove glaze spots from kiln bricks.
3. Shelves may need a new layer of kiln wash; occasionally old kiln wash must be completely removed with a scraper and wire brush and a new layer of kiln wash evenly re-applied.
4. If you own a manual kiln equipped with a Dawson Kiln Sitter<sup>R</sup>, check the sensing rod and cone supports for wear every firing. The rod and supports should be replaced when they start to corrode or warp (approximately every 30 firings); if not replaced, abnormally long firing times or over firing may occur.
5. Before every firing, confirm that the sensing rod of the Dawson Kiln Sitter<sup>R</sup> moves freely in the tube assembly and that the sitter is properly calibrated; use the firing gauge you received with the kiln sitter to check the sitter's adjustment (see Dawson Kiln Sitter<sup>R</sup> manual for directions).
6. If your kiln is equipped with a Bartlett V6-CF<sup>TM</sup> automatic controller, check the thermocouples before every firing and replace them if they appear thin or corroded (approximately every 30 firings); if it breaks during a firing the safety system will automatically shut off the kiln, resulting in an interrupted firing and potential ware damage.
7. ALWAYS use witness cones to check the accuracy of the firing and to prevent over-firing of the kiln.
8. Regularly check for elements that are popping out of the grooves (careful, elements are very brittle when cold). To repair a "popped" element: heat the element until it is glowing orange; shut off the kiln and disconnect from electrical source by either unplugging from receptacle or disconnecting at breaker box. With a metal instrument, carefully push the element back into place and pin with staples made from Kanthal A-1 wire or equivalent.

**TIP:** *Fire the kiln hotter than normal once in a while if the elements pop out regularly (this problem may occur for those firing only to low temperatures).*

9. Regularly check elements for signs of aging or need of replacement; element life span varies greatly with element size as well as temperature and atmosphere to which you are firing.
10. Due to the expansion and contraction of heating, the electrical connections inside the switch panel may gradually loosen; we recommend checking the connections every 25 firings to confirm that they are tight.

## TROUBLESHOOTING

**CAUTION:** The following general checkpoints assume a basic working knowledge of electricity; it is recommended that electrical testing, work, or repairs, only be performed by qualified persons since potentially dangerous voltage is involved. Please also refer to the safety precautions on page 5.

### **The Kiln Does Not Turn On**

1. Check all electrical components (power cord, fuses, circuit breaker, etc.) for loose connections, damage or malfunctions.
2. For kiln with Bartlett V6-CF™ automatic controllers, inspect controller fuse to confirm it is functioning (refer to controller manual).
3. For manual kilns equipped with a Dawson Kiln Sitter<sup>R</sup> and timer, confirm that the timer is set past “0” and the kiln sitter’s plunger is pushed in.

### **Tripped Circuit Breaker and/or Blown Fuses**

1. Confirm that power source wiring exceeds kiln requirements; wire gauge may be insufficient to carry the amperage demands of the kiln (if in doubt, we suggest consulting your electrician as this is a potential fire hazard situation).
2. Ensure breaker size and/or fuse rating exceeds kiln requirements; breaker/fuses may be too small, causing an overload (a qualified electrician should install correct breaker/fuses).
3. Check if other equipment/appliances are operating on the same circuit, potentially causing an overload.
4. Inspect the power cord for loose connections or frayed wiring.
5. Inspect the control box for signs of heat damage and loose or frayed wiring and/or connections.
6. Consult an electrician if the breaker continues to trip or fuses are continually blown.

### **Abnormally Long Firing Time**

1. Confirm that the voltage of the power source matches kiln requirements.
2. If kiln is operated on 240V service, check fuses or circuit breaker: one of the two circuit breakers may have tripped or one of the two fuses may have blown; if so, replace fuses or reset breaker (if fuses continue to blow or breaker continues to trip, consult an electrician).
3. One or two components may have burned out; analyze whether it is a heating element, relay, switch, wire or connector. Check if the heating elements are damaged or separated; check the control box for burnt, discoloured, loose or broken wires or connectors. Finally, inspect the relays and switches for damage; replace any damaged components.
4. If your kiln is equipped with a Dawson Kiln Sitter<sup>R</sup>, check if the sensing rod or cone supports are corroded, diminished in size and weight, or for any reason need replacement (over time these components oxidize and diminish in size and weight, affecting their ability to properly function; sensing rods and cone supports should be checked prior to every firing and replaced approximately every 30 firings).
5. Elements gradually age and need replacing; element life span varies greatly with element size as well as temperature and atmosphere to which you are firing, so check regularly (see Appendix D for element replacement instructions).
6. Check if other equipment/appliances are operating on the same circuit, potentially causing a power drain.

### **One Section of Kiln is Hotter than Normal**

Check switches or relays for any visible signs of heat damage that may be forcing a switch or relay to continuously send power to the elements, causing a section to overheat.

### **One Section of Kiln is Cooler than Normal**

1. One or two components may have burned out; analyze whether it is a heating element, relay, switch, wire or connector. Check if the heating elements are damaged or separated; check the control box for burnt, discoloured, loose or broken wires or connectors. Finally, inspect the relays and switches for damage; replace any damaged components.
2. Elements gradually age and need replacing; element life span varies greatly with element size as well as temperature and atmosphere to which you are firing, so check regularly (see Appendix D for element replacement instructions).

## **There are Cracks in the Kiln Lid and/or Floor Bricks**

1. Hairline cracks in the lid and kiln floor are common and often occur during the first few firings as a result of the bricks expanding and contracting.
2. These cracks will not affect the firing and it is best not to try and repair them, as repair cement will usually shrink and crack off, taking more brick with it.

## **Kiln is Over-Fired**

**CAUTION:** *Do not fire the kiln again until the cause of the over-firing is determined and corrected.*

1. Once the kiln has cooled, save the witness cones and note any set-up and firing procedures that will help a technician locate and solve the problem before proceeding with an other firing.
2. If your kiln is equipped with a Dawson Kiln Sitter<sup>R</sup>, confirm that nothing is preventing the cone from bending or the trigger from falling (refer to Dawson Kiln Sitter<sup>R</sup> manual). Confirm that the firing gauge is properly calibrated and check if the sensing rod or cone supports are corroded, diminished in size and weight, or for any reason need replacement (over time these components oxidize and diminish in size and weight, affecting their ability to properly function; sensing rods and cone supports should be checked prior to every firing and replaced approximately every 30 firings).
3. For Kilns with a Bartlett V6-Cf<sup>TM</sup> automatic controller, inspect the thermocouples for oxidation, corrosion or breakage and replace if necessary (refer to Appendix E). Should a thermocouple break during firing, the controller's safety system will automatically shut off the kiln.

**CAUTION:** **Never fire the kiln unattended.**

## **Appendix A: Kiln Disassembly**

In some instances it may be necessary to disassemble the kiln to go through a narrow doorway. Before disassembling disconnect kiln from power source, save all screws and hardware for reattachment.

### **ASSEMBLY/DISASSEMBLY INSTRUCTIONS**

1. Remove screws from right side of blue (or red) box, to open cover and gain access to wiring. There is also one screw on the top left. Remove it.
2. Remove wires 1 through 6 from terminal blocks on left side. Remove the yellow thermocouple wire from the oval shape thermocouple block.
3. Remove remaining screws from blue (or red) box, slide to left to release and set aside.
4. Remove the 2 black wires, which connect the elements from the middle section to the bottom section.
5. Remove 2 screws from front of kiln at joints.
6. Unlatch all latches that hold kiln together.
7. Remove hinge supports at rear of kiln. Set aside. (On oval kilns only)
8. Set kiln stand in kiln location.
9. With help, lift top section straight up and off, set aside.
10. Do the same as above (9) with middle section.
11. Place bottom section on kiln stand.
12. Attach middle section lining up front and back. Close latches.
13. Attach top section as above (12). Replace screws in front and close latches, replace hinge supports.
14. Replace blue (or red) box. Reverse procedure #3 above.
15. Rewire. Reverse procedure #2.
16. Close blue (or red) box cover. Reverse procedure #1.
17. Adjust hinge support extensions to contact floor for good support. Tighten wing nuts (on oval kilns only).
18. Have an electrician connect to electrical supply.
19. Test fire.



**\*NOTE:** *With long nose pliers, crimp connectors slightly tighter once detached from switches or relays. Connectors must fit tightly on to leads from switches and relays where attached to prevent possible electrical malfunction.*

## **Appendix B: Installation of Hinge Supports for Model 4227 and 4236**

The hinge supports are designed to transfer the weight of the kiln lid to the floor, thus preventing distortion of the kiln body, lid and hinge over time.

### **To Install Hinge Supports:**

1. Confirm that the kiln is disconnected from the power supply (by either unplugging from receptacle or disconnecting at breaker box).
2. Kiln should be placed on stand provided; confirm stand and kiln are level and do not teeter.
3. Attach the two long support angles to the inside of the lower portion of the lid hinge with ¼” bolts and nuts\*.
4. Position each angle against the exterior of the kiln and place a sheet metal screw\* in each of the angles' predrilled holes; tap each screw sharply to pierce the kiln's sheet metal and tighten with a screw driver (NOTE: FOR THIS STEP IT IS NOT NECESSARY TO PRE-DRILL THE KILN).
5. Once all screws are in place, adjust the bottom bolts so that they come in contact with the floor; tighten the nuts to keep bolts firmly in position.
6. Confirm that hinge supports are secure.

**\*NOTE:** *All required hardware has been provided.*

## **Appendix C: Installation of Cone Art Counter Balance System**

The optional Cone Art<sup>R</sup> Counter Balance System makes even the heaviest kiln lid feather light due to its pulley mechanism.

### **To Install the Counter Balance System:**

1. Confirm the kiln is disconnected from the power supply (by either unplugging from receptacle or disconnecting at breaker box).
2. Place the counter balance system upright, aligned with the centre of the back of the kiln exterior (the base of the system should sit on the floor).
3. Screw the small, U-shaped bracket to the back of the lid hinge (holes have been pre-drilled into the bracket and hinge).
4. Manually screw\* the base of the counter balance system to the back of the kiln's exterior (holes have been pre-drilled into the kiln exterior and counter balance base).
5. The counter balance bucket has been secured with a single screw for shipping purposes; remove the screw.
6. At the front end of the counter balance cable is a 3-hole hinge; keeping the kiln lid closed, screw\* the hinge to the front, centre of kiln lid (holes have been pre-drilled in both the hinge and lid).
7. Adjust the back end of the cable so that the counter balance bucket rests 2”-3” below the pulley when kiln lid is closed.
8. Adjust the remaining cable clamp so that it rests against the counter balance when kiln lid is approximately 1” from its open position.
9. Add enough weight (grog, sand, etc.) to the bucket so that the kiln lid is easier to lift but does not begin to raise itself without assistance.

**CAUTION:** Do not add too much weight, as the kiln lid will open slightly when hot due to brick expansion resulting in abnormally long firing times and potential ware damage.

**\*NOTE:** *All required hardware has been provided.*

## **Appendix D: Element Replacement**

Kiln elements deteriorate every time the kiln is fired; the extent of element wear depends upon the cone range to which the kiln is fired and the amount of corrosive gases and steam released from the clays and glazes. As the average lifetime of a kiln element varies from 50-150 firings, occasionally one element or set of elements will require replacement.

### **To Replace the Element:**

1. Confirm that the kiln is disconnected from the power supply (by either unplugging from receptacle or disconnecting at breaker box).
2. Remove the screws on the right side of the control box panel and set aside; if your kiln was purchased with a Dawson Kiln Sitter<sup>R</sup> remove the kiln sitter guide plate to avoid damaging the sensing rod. Pull the control box panel open.
3. Use a 3mm Allen wrench to loosen the two copper connectors on each end of the element to be replaced (take note of the wires to which the element will be re-connected); if the connectors are corroded, replace with new connectors purchased from your dealer.
4. Pull the ends of the element through the brick, taking care not to damage the brick (if the element is brittle it may break into pieces- a pair of needle-nosed pliers can aid in removal). Remove any debris from the element's grooves, especially bits of glaze or melted elements (if these are not removed, the new element will burn out).
5. Place the new element in the grooves; push the ends through the holes in the kiln wall. If grooves are worn or chipped, pin the element into the grooves with staples made from Kanthal A-1 wire (element wire) or equivalent.
6. Re-connect the element to the correct switch wires with the copper connectors (confirm that they are tight); cut off any excess element wire extending beyond the copper connector.
7. Close the control box panel: replace the panel screws and kiln sitter guide plate.
8. Turn on the power supply and confirm that the new element works properly by visually checking for an orange glow.

## **Appendix E: Thermocouple Replacement**

Over time, thermocouples gradually corrode and should be replaced at the very first signs of corrosion (approximately every 30 firings), as even partially corroded thermocouples are not able to gauge temperature correctly and therefore may cause an over-firing.

Your kiln is equipped with TYPE K THERMOCOUPLES. Older models carry 14 gauge thermocouples. Either type may be used with the Cone Art pyrometer. The following are steps for replacing both types.

### **Replacing Thermocouple(s) in a Bartlett or Orton Automatic Controller:**

1. Confirm that the kiln is disconnected from the power supply (by either unplugging from receptacle or disconnecting at breaker box).
2. Remove the screws on the right side of the control box panel and set aside; if your kiln was purchased with a Dawson Kiln Sitter, remove the kiln sitter guide plate to avoid damaging the sensing rod. Pull the control box panel open.
3. Unscrew two screws on the outer edges securing thermocouple block to the kiln. Gently pull out thermocouple and block. (BE SURE KILN IS COLD BEFORE DOING THIS).
4. Unscrew the two centre screws holding down thermocouple.
5. Remove old thermocouple
6. Install new thermocouple (ensure that the red leg is placed in the NEGATIVE (-) receptacle).
7. Replace and tighten screws.
8. Thread thermocouple into kiln through brick. Re-attach thermocouple block to kiln with two outer screws.
9. Close the control box panel; replace the panel screws and kiln sitter guide plate.
10. Turn on the power supply and confirm that the new thermocouple works properly by observing the temperature readout, as elements become hot.

### **Replacing the Thermocouple in the Cone Art Pyrometer:**

1. Confirm that the kiln is disconnected from the power supply (by either unplugging from receptacle or disconnecting at breaker box).
2. Remove the thermocouple block from the kiln (BE SURE KILN IS COLD BEFORE DOING THIS).
3. Unscrew the two centre screws of the thermocouple block.
4. Remove old thermocouple
5. Install new thermocouple (ensure that the red lead is paired in the NEGATIVE (-) receptacle).
6. Replace the two centre screws of the thermocouple block.
7. Replace the thermocouple and block in the kiln. Turn on the power supply and confirm that the new thermocouple works properly by observing the temperature readout as elements become hot.

### **Appendix F: Switch or Relay Replacement:**

Occasionally you may need to replace a switch or relay in order for your kiln to function.

#### **To Install a New Switch:**

1. Confirm that the kiln is disconnected from the power supply (by either unplugging from receptacle or disconnecting at breaker box).
2. Remove the knob from the switch (this may require a small straight-blade screwdriver).
3. Remove the screws on the right side of the control box panel and set aside; if your kiln was purchased with a Dawson Kiln Sitter<sup>R</sup> remove the kiln sitter guide plate to avoid damaging the sensing rod. Pull the control box panel open.
4. Each switch has multiple wires; with masking tape, label the damaged switch's wires and remove.
5. Unscrew the switch nut on the front of the control box panel; remove the old switch.
6. Put the new switch in place and tighten the switch nut.
7. Re-connect the wires (marked with masking tape) to the new switch.
8. Close the control box panel; replace the screws, switch knob and the kiln sitter guide plate.
9. Turn on the power and confirm that the new switch works properly by noting that the element is glowing and emitting a "humming" sound.

#### **To Install a New Relay:**

1. Confirm that the kiln is disconnected from the power supply (by either unplugging from receptacle or disconnecting at breaker box).
2. Remove the screws on the right side of the control box panel and set aside; if your kiln was purchased with a Dawson Kiln Sitter<sup>R</sup> remove the kiln sitter guide plate to avoid damaging the sensing rod. Pull the control box panel open.
3. Each relay has multiple wires. Plug each wire (one at a time) onto new relay DIRECTLY as you pull off from old relay.
4. Unscrew the two side screws holding old relay in place, replace with new relay, and tighten in to place.
5. Close the control box panel; replace the screws, switch knob and the kiln sitter guide plate.
6. Turn on the power and confirm that the new relay works properly by noting that the element is glowing and the relay is emitting a "clicking" sound.



## **LIMITED WARRANTY**

### **What does this Warranty cover?**

This warranty covers any defect or malfunctions in your new Cone Art kiln that affect the performance of your new Cone Art kiln.

### **How long does the coverage last?**

The coverage of this warranty lasts for two years from the date of purchase.

### **What does this Warranty not cover?**

This warranty does not cover the pyrometer and heating elements. In addition, any problem that is caused by abuse, misuse (such as overriding or not operating the kiln in accordance with the printed instructions provided with the kiln), vandalism, or an act of God (such as a fire or flood) are not covered. Incidental and consequential damages are not covered. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. Any optional kiln instrumentation you may purchase is covered by the warranties, if any, provided by its manufacturer and not by Cone Art Kilns Inc.

### **What will Cone Art Kilns Inc. do?**

Cone Art Kiln Inc. will repair or replace any part, at its discretion, that proves to be defective or is malfunctioning at no charge to you.

### **What will Cone Art Kilns Inc. do?**

Cone Art Kiln Inc. will repair or replace any part, at its discretion, that proves to be defective or is malfunctioning at no charge to you.

### **How do I get service?**

Contact Cone Art Kiln Inc. or your dealer to arrange the return of defective parts.

Take a moment to fill in the following concerning your kiln; this information will be required to obtain warranty repair.

Kiln's Owner: \_\_\_\_\_

Country kiln is used in: \_\_\_\_\_

Purchased from: \_\_\_\_\_

Date of Purchase: \_\_\_\_\_

Model Number: \_\_\_\_\_

Serial Number: \_\_\_\_\_

Service Voltage: \_\_\_\_\_



# CONE ART KILNS INC.

**Please return this Warranty Form to:**

**Cone Art Kilns Inc. – Kiln Warranty**  
15 West Pearce Street, Unit 7  
Richmond Hill, Ontario. L4B 1H6

SERIAL NUMBER:
DATE OF PURCHASE:
KILN MODEL:

Name & Address of Purchaser:
Who did you purchase this kiln from?
How did you learn of Cone Art Kilns?
How will this kiln be used?
What influenced your decision to purchase this particular kiln?
What type of ceramic equipment do you plan to obtain next?
Miscellaneous comments:

**\*Limited Warranty** – Covers any defects or malfunctions in your new Cone Art Kiln that affect the performance of the kiln. This warranty does not cover the pyrometer and heating elements. In addition, any problem that is caused by abuse, misuse (such as overriding or not operating the kiln in accordance with the printed instructions provided with the kiln), vandalism, or an act of God (such as a fire or flood) are not covered. Any optional kiln instrumentation you may purchase is covered by the warranties, if any, provided by its manufacturer and not by Cone Art Kilns Inc. Cone Art Kilns Inc. will repair or replace any part, at its discretion, that proves to be defective or is malfunctioning, at no charge to you. Contact customer service (800-304-6185) before shipping any part back to Cone Art Kilns Inc.

This warranty does not cover over firing. Never fire the kiln unattended.





# CONE ART KILNS INC.

15 West Pearce Street, Unit 7, Richmond Hill, Ontario L4B 1H6

Tel: (905) 889-7705/1(800) 304-6185 Fax: (905) 889-7707

## QUALITY INSPECTION SHEET FOR THE FOLLOWING KILN (Each Kiln must be inspected prior to shipment)

KILN TYPE: \_\_\_\_\_

INSPECTED BY: \_\_\_\_\_

SERIAL NUMBER: \_\_\_\_\_

INPECTION DATE: \_\_\_\_\_

### OUTSIDE OF THE KILN

(PLACE CHECK NEXT TO OK)

1	NO SCRATCHES OR DAMAGES ON KILN STAINLESS BODY OR PAIN	OK
2	ALL EDGES ARE ROUNDED	OK
3	KILN TYPE SHOWN ON NAME PLATE IS EQUAL TO KILNS SPECIFICATIONS	OK
4	ALL BOLTS ARE FASTEDNED INTO SOCKETS FIRMLY	OK
5	ALL HANDLES ARE FIXED FIRMLY	OK
6	ALL BOLTS AROUND CONTROLLER ARE FASTED FIRMLY	OK

### INSIDE OF KILN

1	NO DAMEGE TO BRICKS	OK
2	ALL HEAT ELEMENTS ARE PLACED INTO THE GROOVEOF BRICKS	OK
3	NO DAMAGE TO THE BRICK FOR KILN TOP COVER	OK
4	NO REMOVAL OF COATING ON KILN TOP COVER	OK

### WIRING

1	ALL HEAT ELEMENTS AND WIRES ARE CONNECTED CORRECTLY	OK
2	CONTROLLER IS CONNECTED CORRECTLY	OK
3	THERMO-COUPLE IS CONNECTED CORRECTLY (WITHOUT REVERSIBLY + AND -)	OK
4	CONTROLLER IS WORKING CORRECTLY	OK
5	AMPERE (Check correct amperage)	OK
6	FUSE, FUSE HOLDER AND CONNECTIONS ARE TIGT	OK
7	RELAYS DO NOT HAVE EXCESSIVE NOISE	OK
8	ELEMENT LEADS ARE LONG ENOUGH TO ALLOW FOR HEAT SHIELD EXPENSION	OK
9	ELEMENT LEADS HAVE SUFFICIENT AMOUNT OF CERAMIC INSULATION	OK

### ACCESSORIES

1	PACKED TO PREVENT DAMAGE DURING SHIPPING	OK
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