

# FIRST FIRING INSTRUCTIONS FOR L&L KILNS

## **WHEN TO DO A FIRST TEST FIRING?**

Once your kiln is set up, leveled properly (very important), control panel hooked up to the kiln correctly and all the power wired properly, you are ready for your first firing. Read these instructions and plan your time accordingly.

NOTE: This version is for kilns with the DynaTrol 700 board or manual kilns.

## **WHY DO A TEST FIRING?**

The test firing is done very slowly, about 16 to 19 hours total to minimize the inner and outer surface temperature differences in the kiln while it goes through its maiden firing. Also this will slowly steam off any moisture absorbed by the firebrick during construction, shipping, and storage.

The test firing is done to cone 5 (about 2167°F) to vitrify the special coating on the inside on the firebrick and to allow an “aluminum oxide” coating to form on the element’s surfaces. The coating on the brick helps to reflect the heat radiated from the elements. The oxide layer on the elements helps to protect them from the many contaminants found in many materials fired in a kiln. This aluminum oxide layer will rejuvenate itself every time there is an oxygen rich firing to a high temperature. Going to cone 5 may also point out any problems with your electrical service - like low or incorrect voltage or wrong supply line wire size. The elements will also seat themselves in the ceramic holders - and any springiness you see when you first get your kiln will be alleviated.

NOTE: Normally bisquing is done to cone 05. Do not be confused by how the test firing uses SLOW BISQUE to cone 5, even though normally you would use a SLOW BISQUE to cone 05. The Slow Bisque program is used for the test firing BECAUSE it is a long program. We want this to be slow.

The test firing is done with the operator present as much as possible. This is to be sure the kiln is heating up safely, and that the heating kiln affects nothing else in the room or the room itself. As for the operator

being present, logistically this may be difficult as the test fire is designed to take about 16 to 19 hours. To deal with this a “Delayed Start” can be added to the test fire program, allowing you to press START at say 5PM, the kiln to start at say 8PM in order to turn off at 3PM the following day while you are there. More detail on this a little further on. You can also split it into two firings (see instructions at the end of this sheet).

The test fire is done with the kiln empty, or with the new kiln furniture. Anything else in the kiln (clay) will produce contaminants to some degree, and the elements in the kiln have not yet achieved this all important aluminum oxide coating before being subjected to these contaminants.

## **VENTING**

Leave the Vent-Sure downdraft vent system on while the kiln is heating and cooling. Keep the peephole plugs in and the lid closed. If you have no vent system then leave the top peephole plug out during the first test firing.

NOTE: it is best for the evenness and speed of the firing to keep all the peepholes closed. However, for longevity of things like the elements, thermocouples, and kiln-sitter tube, as well as for better colors in clays and glazes, it is best to have as much air as possible moving through the kiln, without compromising the speed and evenness of the firing (this is a tradeoff). Open peepholes can be an OK way to vent, except that uneven drafts through the kiln can affect thermocouple readings, or “freeze” cones, leading to uneven firings or slow firings.

## **WHAT TO EXPECT**

### **ELEMENT SMOKING**

Brand new elements will smoke a little initially the first time they are heated. A fan in a window is more than adequate to deal with this. If you have the Vent-Sure vent on this should also be adequate.

### **NOISES IN AN AUTOMATIC KILN**

A **Beep** when you press a button on the DynaTrol keypad.

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**Clicking** noises from inside the control box as the unit heats. This will happen throughout the firing until it shuts off. Sometimes it will happen more frequently than other times. It is the result of the relays opening and closing as the control tells them to, turning the electricity on or off to the elements, working to heat the kiln evenly. (On manual kilns with contactors you will also hear contactors clicking).

**Hum.** Whenever kiln elements come on they are accompanied by a humming sound from electricity in the elements. This is normal. The natural properties of electricity and the dynamics of the shape of the element combine to make a slight vibration in the element.

## WHAT HAPPENS AS THE KILN HEATS UP

All the materials used in the kiln's construction expand incrementally as they are heated. First the inside materials- i.e. the elements, holders, and inside surfaces of the walls, floor, and lid heat and expand slightly. Then, the heat moves slowly through the walls, lid and floor until it begins to heat the outer surface of the kiln. The greater the difference in temperature is between the inside surface vs. outside surface, the more stress there is on the material itself. Walls, lids and floors can sometimes hairline-crack on the surface or in the some cases, all the way through. Really this is normal and to be expected sooner or later to some degree. If you tighten the stainless steel bands that surround the floor, lid, and walls of the kiln every so often, the fact that the firebrick expands as it heats will mean that the cracks are actually closing up while the kiln is heating, expanding against the cooler outer shell. The geometry of the kiln and the tightness of the stainless steel bands are what holds everything together, whether the brick is in a few pieces or all one piece should not matter a whole lot, although cracked floors should be fully supported as they are with our full-support stands. See the *maintain.pdf* in the MAINTENANCE section and *troubleshoot-brick.pdf* in the TROUBLESHOOTING section for more information.

## VISIBLE RED HEAT

Another thing to expect is to see the "red heat" through the seams, between the sections of the kiln, beginning around 1000°F. This is normal. The seam

between the lid and the top section will probably appear the largest. This is partly because, when the top heats up, it becomes slightly concave and the edge lifts up.

**IMPORTANT NOTE:** It is VERY important for this gap between the lid and the rest of the kiln to be even all the way around throughout the firing. If it is more open in the front when hot, then the hinge is out of adjustment and must be raised up. Your kiln's Assembly instructions detail the hinge adjustment. The danger of this condition is that all the weight of the lid is now resting on the inner upper edge of the back firebricks on the top section. They will crack off in a firing or so and probably damage the lid too.

The outer metal and brick surfaces of the kiln will get very hot, as hot as 450°F - easily hot enough to burn you.

The interior of the kiln will look white hot at the highest temperatures. **CAUTION:** Be sure to always use kiln safety glasses when looking through the peepholes to protect your eyes from infrared radiation.

## CONTROL DISPLAY ON DYNATROL

Acronyms on the DynaTrol's display screen stand for important messages, they are its way of communicating with the user:

An acronym is a group of letters, each letter or the whole group of letters represents an entire word. For example; "USA" is the acronym for, of course, "United States of America". **TCOS** is the acronym the DynaTrol uses for "thermocouple offset". The DynaTrol display is limited to four letters or numbers at a time. Always pay attention to the acronyms the Dyna-Trol displays as the info it gives can be useful later. Once it hits its target temperature, it will shut off with a **CPLT** message. Once this message is seen the kiln is no longer running. It is safe to shut off the power to it. If no controlled cool-down was programmed, the kiln will cool quickly at first, then more and more slowly. As it is cooling it will display the **CPLT**, the **amount of time it took to complete the firing**, the **TC2**, and the **current temperature** over and over again.

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The temperature will normally be displayed from **TC2**, which is thermocouple number two. Press **1** to see the temperature in the top section- **TC1**. Press **3** to see the temperature in the bottom section of a three or more section kiln. The DynaTrol is checking all three thermocouples every eight seconds even though just one thermocouple's temperature is displayed. The displayed temperature will rise as the kiln heats up, cycling from **TC2** to current temperature inside the kiln over and over again. (A kiln with just one thermocouple will just show the temperature reading, no **TC number**).

## **FIRST FIRING OF A MANUAL KILN**

Turn on one or two switches to low for three hours. Then turn on all switches to low for two more hours to bake out any moisture. Then set to medium for three hours and then increase enough to reach final temperature. Fire it to cone 5 (approximately 2165°F).

## **IF YOU HAVE A DAWSON BACK UP OPTION ON AN AUTOMATIC KILN**

If your kiln has the Dawson Kiln-sitter/timer (as a back-up safety system - not the main control) AND a DynaTrol follow these next sub-steps, otherwise skip this section.

There are three possible ways in which such a kiln can be shut off automatically. Either the DynaTrol, Dawson cone device or Dawson timer will shut off the kiln during this first firing. If the kiln-sitter's cone device or the kiln-sitter's timer shuts the kiln off, then the DynaTrol's screen will be blank. Typically you would let the DynaTrol shut off the kiln, by initially adding more hours on the Dawson timer and using a cone number that is one or two cones hotter than what the DynaTrol is programmed to fire to. Realize too that if you are not around for the end of the firing, the Dawson timer will still continue to count down after the DynaTrol has properly shut off the kiln. Once the timer runs out, it will seem as though the Dawson timer has shut off the kiln, not the DynaTrol, as the DynaTrol screen will be blank when you come in. (Note: some people use the Dawson as the final shut off device and some people disconnect the timer

function).

- 1) Read the entire Dawson instruction manual.
- 2) Insert the proper cone for a cone 5 test fire into the kiln-sitter tube inside the kiln, while holding the "trigger" under the "claw" on the outside of the kiln- (as described in the Dawson instruction manual.) You may want to actually use a Cone 6 so the Dawson doesn't shut off the kiln first but this is not critical if you don't have a Cone 6 cone.
- 3) Set the kiln-sitter's timer for the maximum time. Once you know how much time the kiln generally needs to fire you can set this timer closer to how long the kiln actually takes.
- 4) Press the "white button" in the middle of the "trigger" in. It should stay in. It will not stay in if the timer is on or close to zero, or if the "trigger" is not up. With the button in, power is allowed to pass through the Kiln-sitter to the DynaTrol.
- 5) NOTE: You can bypass the Dawson for the first firing by doing the following: Set the Dawson Timer to maximum, hold the "weighted trigger" up, press the white button in, then gently lower the weighted trigger until it stays. Do not bump it!
- 6) Flip the toggle switch up on the main control box. The DynaTrol display should light up with the **WAIT** message or the **IDLE** message.

## **AUTOMATIC KILNS: STEP BY STEP**

- 1) Power to the kiln is ON (kiln is plugged in), turn the toggle switch ON, display reads **WAIT** or **IDLE**
- 2) Press **ENTER** and wait until you see **IDLE, TC2**, and the **current temperature** cycling over and over again.
- 3) Press **SLOW BISQUE** and see **S-bC**.
- 4) Press **ENTER** and see **CONE**, and a number (which represents the cone number currently programmed in the control) flashing back and forth.
- 5) Press **5**, and see the number **5** in the display. .
- 6) Press **ENTER** and see **HOLD, 0.00** flashing back and forth.

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- 7) Press **ENTER** and see **IDLE**, **TC2**, and the current temperature cycling over and over.
- 8) Press the **Preheat** button in the Easy-Options section.
- 9) See **HLd**, **0.00** flashing back and forth.
- 10) Press **300** so the display reads **3.00**.
- 11) Press **ENTER** and see **IDLE**.
- 12) Press **START/STOP** to begin the test firing.

You have just entered an “Easy-Fire Slow Bisque” Program to cone 5 with a three hour preheat, the combined total of which will take roughly 16-19 hours. The preheat part increases the heat in the kiln at 60°F per hour from room temperature up to 200°F where the hold time comes on, the timer appears, and it holds at 200F for the set amount of time. Once the timer runs out, the rest of the program follows.

Now you must figure out how to be around for the end of the 16-19 hour firing. This is where the Delay Start feature may come in handy. It is a digital hours and minutes timer you can add to the beginning of any program. You tell the timer how many hours and minutes to count down before the DynaTrol turns up the kiln and runs the rest of the program. (Do not confuse the operation of this timer with the “hour timer” that comes on the Dawson Kiln-sitters).

NOTE: Again, it is critical for someone to be present especially at the end of the firing, and especially for this first firing. Even if you have a Dawson Back-up - no safety device is entirely foolproof.

## DO YOU NEED A DELAYED START?

Picture a clock-face and count forward 16 hours from when you planned to press **START/STOP** to begin this program. Will you be present for at least the last few hours? If “YES” then you do not need a delayed start time and you can start the firing when you planned to, skip the rest of step 6 and step 7. If “NO” then you do need a delayed start time, continue on here.

## CALCULATING THE DELAY START

Picture the same clock-face, and see when the firing would have ended if you had pressed **START/STOP** when you planned (i.e. 16 hours from when you want the firing to begin). Now picture how many hours later the firing would have to end, in order to have someone there for the last few hours of this 16-19-hour firing. That “number of hours later” is what to program in for the Delay Start.

## An example

You are planning to start the program at 7 pm. Your program is going to take minimum 16 hours. 16 hours from 7pm is 11am the following day. You plan to get into the kiln room at 9am. 9am to 11am is only two hours. You would need to get there one hour earlier to be there for the last three hours, OR start the program one hour later than 7PM so that the program completes at 12pm the following day. You will need to program a one hour delayed start. First you will enter the program, then the preheat, then the delayed start. You will press **START/STOP** at 7pm, but now a timer will appear and count down the one hour before the rest of the program begins.

## ADDING A DELAYED START

- 1) Press **DELAY** and see **dELA**, **0.00** flashing over and over.
- 2) Enter the number of hours and minutes to delay the start for. For example: For a two hour delay press **2, 0, 0** so it says **2.00**. For a 1 hour and thirty minute delay press **1, 3, 0** so it says **01.30**. Numbers in the display to the right of the decimal represent minutes. Numbers to the left of the decimal represent hours.
- 3) When the correct number of hours and minutes has been keyed in, press **ENTER**, see **IDLE**

## START FIRING

When the correct time to begin the firing arrives, press **START/STOP**. The display will say **-ON-**, then it will cycle through a sequence showing **TC2**, and the **current temperature** in the kiln over and over as it heats. Here is what to expect the kiln will do based on what you have programmed, after you press **START/STOP**.

If you programmed a delayed start, there will be an

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hours and minutes timer displayed along with the **TC2, current temperature** message. It will be displayed until the timer runs out.

It will climb at about 60°F per hour until it reaches 200°F, then the timer will appear again and the three hour preheat will begin counting down on the display with the **TC2, current temperature** message. It will sit around 200°F until the timer runs out.

Now it will begin to climb at about 80°F per hour up to 250°F

Once the hottest thermocouple reading reaches 250°F, the kiln will begin climbing at 200°F per hour until it reaches 1000°F

Once the hottest thermocouple reading reaches 1000F, the kiln will begin climbing at 100°F per hour until it reaches 1100°F

Once the hottest thermocouple reading reaches 1100F, the kiln will begin climbing at 180°F per hour until it reaches 1915°F

Once the hottest thermocouple reading reaches 1915°F, the kiln will begin climbing at 80°F per hour until it reaches somewhere between 2100-2190°F

Once the hottest thermocouple reading reaches ~2165°F, the kiln display will say **CPLT**, a time like **17.47**, the **TC2**, and the current temperature in the kiln as it is cooling.

Once **CPLT** is seen the firing is complete. It is best to now shut all power to the kiln off. It is safe enough to leave the display on with the current messages cycling over and over, or it is also safe to press **START/STOP** to get back to **IdLE**, **TC2, current temp** and leave it there.

NOTE: If the first firing ended in an error code please make note of which one it was; i.e. **E—1** or **E—d** etc, and call us.

## **SPLITTING TEST FIRING INTO TWO FIRINGS**

This is done by entering in the standard program for the test fire on Day 1, first thing in the morning. Turn this on as early on Day 1 as possible and let it run all day until you go home in the afternoon. Before you go home Press **START/STOP**, then turn off the kiln.

On day 2, first thing in the morning, program in a **SLOW GLAZE** to cone 5, no hold or preheat is necessary. Regardless of how hot it still may be in the kiln, turn this program on as early as possible in the morning on Day 2. It will run up to somewhere between 2100°F and 2190°F in about 7-8 hours. If it is still not done when you go home, as long as 8 hours have passed since you turned it on, you can press **START/STOP** and turn the toggle switch off and go home. Otherwise when it is done it will give the **CPLT** message and it is then safe to Press **START/STOP**, turn the toggle switch off and go home.