



**KILNS BUILT TO LAST**

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## **INSTRUCTIONS FOR USING BRICK REPAIR KIT**

**GENERAL NOTE:** Firebrick is a very fragile material and subject to breakage, spalling and heat shock. The good news is that it is very easy to repair and maintain with the proper materials and techniques. Enclosed in this brick repair kit are all the materials you will need to do a first class job. **This brick repair kit is ONLY meant to be used on L&L kilns. If you use it on anything else you do so at your own risk. It will not work on other types of refractories such as are used in woodstoves, etc.**



### **LIST OF BRICK REPAIR KIT MATERIALS**

- 1 Firebrick piece
- 1 1/8 pint of brick cement (in a 1/2 pint container)
- 1 Quart container of firebrick dust
- 1 1/2 pint brick facing
- MSDS Sheet concerning the cement
- Instructions

**MIXING A BATCH OF GROUT:** The grout should be mixed up **JUST** prior to use. (Otherwise it will dry out). Mix the ingredients with a small spatula in a container (like a glass jar or plastic cup). Mix in the following:

- 1/2 cup firebrick dust
- 1/4 cup water
- 1 tablespoon special cement

**NOTE ABOUT GROUT:** The special grout material is firebrick dust mixed with water and a small amount of cement. The cement makes a matrix of the firebrick dust. This compound dries into a material almost exactly like the original firebrick with the same color, consistency, texture and insulating properties.

**IMPORTANT CAUTION CONCERNING THE CEMENT:** This special cement that is used by itself and with the grout is a phosphorous based cement. It has unusually strong adhesive properties

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which makes it ideal for repair work. It is different from the cement we normally use for cementing our firebrick. **The phosphorus makes phosphoric acid. It is best to use rubber gloves. If you don't be sure to wash your hands with soap and water immediately following your use. Protect your eyes with glasses.**

## **BRICK PROBLEMS**

### **EXCESSIVE BRICK WEAR**

1. Excessive brick wear can be the result of various conditions. Most common is improper curing of the brick when first fired. **FOLLOW THE INSTRUCTIONS IN THE INSTALLATION SECTION FOR THE FIRST FIRING AND CURING CYCLE!**
2. All insulating firebrick expands and contracts when heated and cooled. Over time this will lead to cracking and spalling. Spalling is the continued cracking of the brick, which eventually results in large pieces of the brick falling out from the brick section. This is a normal condition as long as the emphasis is on eventually. Factors such as how close the kiln is operated at or near maximum temperature, how often and how fast the kiln is cycled up to heat and then cooled, how heavy the loads are, all figure into the brick wear equation. There is no set rule as to how long a brick lining will last. There are some L&L kilns, which are 25 to 30 years old with the original lining still in place. Note that the type of brick we use is the same that we have always used and is the same brick generally used in the hobby kiln industry.
3. Frequent door openings when the kiln is at high temperatures can cause thermal shock, leading to excessive cracking and spalling.
4. For light to moderate spalling, re-coat the brick with the brick hardener facing available from the factory. This procedure can allow the brick to remain operational.

### **GENERAL BOTTOM MAINTENANCE**

1. Cover the bottom with kiln wash to prevent glaze from sticking to the bottom.
2. If glaze does get onto the bottom be sure to scrape it off. Apply kiln wash over area that you have scraped clean.

### **REMOVING GLAZE SPOTS**

1. Be sure to remove any spots of glaze that get onto the firebrick sides. When the kiln is heated up the glaze will remelt and potentially cause problems with the elements.
2. Repair hole as per instruction below.

### **BOTTOM OR TOP IS CRACKING OR FAILING**

1. Do not be concerned with small hairline cracks in the firebrick. These are normal and will close up as the brick expands when firing.
2. Be careful not to overload the bottom.
3. Try putting a full ceramic shelf directly on the bottom.
4. If you have had several cracked bottoms try putting a piece of sheet metal on top of the stand (L&L's larger stands have this built into them). The metal should be stainless or aluminized steel to resist the high temperatures. (Contact factory for a price if you need this.)
5. Mechanical shock can crack the fragile top if you let it down too quickly.
6. Do not open kiln when hot. Heat shock will destroy the brick (just as it will your ceramic pieces.)
7. In many L&L Kilns the bottom can be reversed once the initial inside surface has become deteriorated over time.

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8. It is OK to double up the bottom. Buy another bottom and put this underneath your cracked or spalled bottom. This will also improve the insulating characteristics of the kiln and will improve heat up time.

### **APPLICATION OF HIGH TEMPERATURE BRICK HARDENER**

1. To apply the hardener first brush the surface of the brick clean to remove any loose material or crumbling firebrick. Wet the brick surface lightly. Then apply a thin coat of the brick hardener with a soft brush over the surface of the firebrick. Do not make too thick a coat of the hardener or it will spall off. Let the hardener dry for 24 hours and then use. On your first firing keep the kiln on low for 3 hours minimum and fire as slowly as possible.

### **REPAIRING SMALL HOLES OR CHIPS IN BRICK**

1. Clean and wet (with water) the surface of the brick where the hole or chip is. Ideally use a spray bottle to wet the surface. Use a brush if you don't have a spray bottle.
2. Apply a thin coat of brick cement all over the hole. This is defined as about 1/32" to 1/16" thick. Do this with your finger or a small brush.
3. Fill hole with the special grout material. Apply kiln grout with a spatula (like plaster.) You can also use your finger. Push it into the hole. It is OK to let it be a rough surface or slightly larger than the hole it is filling.
4. Let dry for 24 hours.
5. Take some rough sandpaper and sand surface to even it out with the rest of the firebrick.
6. Turn kiln on low for 3 hours to completely dry.
7. Do a "first firing" of kiln
8. You can brush on hardener or facing afterward if you desire.

### **REPAIRING VERY LARGE HOLES IN BRICK**

1. Cut out an area around the brick chip with a small knife, saw or router.
2. Cut a piece of firebrick to fit into this cut out hole. The piece should be slightly smaller than the hole (by about 1/16" to 1/8".)
3. Both the hole and the brick piece should be brushed clean.
4. Wet the firebrick with a water spray bottle (or brush with water).
5. Using kiln cement - cement the brick piece into the hole. Use only about 1/16" of an inch of cement.
6. Let dry for 24 hours at a minimum.
7. Cut off and/or sand off excess brick and cement.
8. Cover with brick hardener and allow to dry for another 24 hours.
9. Turn kiln onto low for 3 hours to dry totally,

### **FIRST FIRING OF THE KILN AFTER REPAIR**

On the first firing of the kiln fire it empty except for shelves and posts. For kilns with the manual control fire the kiln on low (setting #2) for two hours to bake out any moisture. Then set to medium (setting #5) for two hours and then increase enough to reach final temperature. Fire it to cone 5 (2150°F). If you have the DYNA-TROL program control fire the following program: Using the "Easy-Fire" mode fire on slow Bisque to Cone 05 with a "candling" setting of 4 hours.

### **VIDEOS**

See various videos for help in [hotkilns.com/videos](http://hotkilns.com/videos) and filter for the "Repair & Diagnose Brick" category.