

Keep your kiln firing like new

By Michael Harbridge

The worst time to find out that something is wrong with your kiln is when you're trying to fire items. Preventative maintenance is a much better way to go. Taking the time to keep your kiln clean and in good repair will almost certainly save time and money in the long term.

Some checks should be performed before every firing, while others might only be needed on a monthly or even yearly basis, depending on how often the kiln is used. In a classroom setting, breaks in the school year, when you know the kiln won't be needed for a period of time, are an ideal time to take care of much of this periodic maintenance.

Over the years, I've encountered a number of people firing kilns in homes, studios, and schools who knew very little about kilns. Often, they'd been given the responsibility of operating the kiln without any teaching about proper kiln care. Nowadays, of course, all you have to do is search the Internet to come up with something to help you out. I'm amazed how many people are willing to create videos for free on sites like YouTube.

You can also ask questions in chat rooms and you'll surely get someone to give you an answer. But is the information accurate? Is there someone on any given site policing the online conversations to make sure that the information being given is correct? In most cases there isn't, so be careful what you see and hear online. It may not always be the best or most accurate information.

This column applies to anyone who has a kiln. Following these basic guidelines will help prolong the life of your kiln and keep it running with less down time. Kilns are safe to use in a studio, school, or home, as long as you follow simple precautions. Some people in the industry take simple things for granted. I know I've been guilty of that. And when it comes to training someone else, assuming anything is not a good thing — not everyone has used kilns for years or had any training.

School teachers are a perfect example. Most teachers never even got to touch a kiln in college because someone else did the firing. Then they're put in charge of a classroom, and just like that, they have to figure out how to use a kiln. Even studio owners often get into business without much actual hands-on experience with operating and maintaining a kiln. Regardless of the circumstances that bring together a kiln and its operator, training is required.

The makeup of both digital kilns and those with kiln sitters are similar. Both have bottoms, tops, walls with heating elements, and controllers. As a result, you'll see many similarities in their upkeep and care. Let's start with set-up for a new kiln — even if you're not setting up a brand-new kiln, it's a good idea to check on many of these things.

It's important to set the kiln up in a safe place. The surface below it should not be flammable, and the area surrounding the kiln should not contain things that can catch fire. Don't place things around the kiln. I've seen situations where molds have

been stacked around kilns in hopes of drying them quicker. Placing molds around a kiln can cause a couple of problems. First, you don't want to get molds too hot, because they can crack. I've also seen molds placed in front of a kiln sitter so that they didn't allow the weight to fall — resulting in the kiln over-firing to the point that the interior of the kiln was destroyed.

Worse, I've found kilns surrounded by shredded paper for packing ware and even flammable cleaners. Sometimes a kiln room gets turned into a storage room (or the storage room turns into the kiln room). I've seen this in many schools. Administration doesn't want the kiln out in the open, so a storage room in the art area is a logical option. But when you place a kiln inside a closet, it turns a room with no ventilation into an enclosed



Check the kiln vent tubing for holes and periodically vacuum the vent to prevent dust from plugging it up.

furnace. Paint, paper, and other art materials quickly dry out.

I highly recommend having vents on ceramic kilns. They generally give better firing results with a more even firing, remove fumes from clay and glazes, and take away much of the heat. But even with a vent, kilns generate heat. Kiln rooms should be vented to the outside or allow movement of air. I have vents on my kilns, along with a ceiling vent to draw out the heat in the room.

You also want to make sure the kiln is level. If a kiln is not level, every time you place shelves in the kiln, they're at risk of toppling over. In addition to being level, you don't want the kiln to rock at all. I've seen people shim a stand to even out one side, but if the kiln rocks or moves at all, you still risk the shelves fall-



Periodically check to make sure your kiln is level.

ing down, breaking everything placed inside the kiln. It's also important to note that the shims should be something that's not flammable. I've encountered kilns with wood shims not only under the stand, but also between the kiln and the stand. Metal washers are a better option. Place a level on top of the kiln and insert washers as needed. You should also periodically check to be sure the kiln stays level.

When kilns are moved, whether they're new or used, heating elements can pop out of their grooves. With a new kiln that's never been fired, you can run a plastic comb around the top of the grooves to press them back into place. But once a kiln has been fired, elements become much more brittle. If a comb is used on cold elements, there's a good chance they will break. So it's important to heat the kiln to soften the elements, which means a plastic comb won't work. Instead, turn off the kiln and disconnect the power, and then a metal butter knife will do the trick.

Check the kiln for any loose firebrick. It's better to remove loose parts than to try to hold them in place. Some people try kiln cement or use element pins to try to fasten a loose piece of firebrick to the wall. But kiln cement usually lets go as the kiln heats and cools and the brick expands and contracts. Element pins can cause brick parts to crack into even smaller parts. In the end, both options can fail and allow pieces of firebrick to fall



Remove loose brick from kiln walls so it won't fall on ware during firing.

onto ware inside the kiln. When glazes are being fired, the pieces can stick and become embedded in the glaze surface.

If removing loose brick will result in an element sagging, use element pins to hold the element in place. Remember to always heat elements to a couple hundred degrees to soften them before trying to bend or manipulate them, because they are brittle when cold and can easily break. Also remember to always cut the power to the kiln before working with the elements.

Crumbling brick on the interior of a kiln lid can also wreak havoc when glazed items are being fired. Be sure to remove any loose bits. There may come a point where the lid needs to be replaced or, in many cases, the lid can be flipped over if the exterior of the lid is in better shape. An alternative is to load your kiln and position posts so you can place a full shelf above the top



Remove loose chips from lid and replace crumbling lids to prevent chunks from falling on ware during firing.



Use a soft brush attachment to vacuum the interior of the kiln.



Tighten the kiln lid bands as needed.



Remove loose, flaking kiln wash from shelves and recoat them.

level of glazed items, catching any falling brick. But this is really only a temporary fix.

Is the lid crumbling because it's old or is it coming apart because the metal band around the exterior needs to be tightened? Check the band and, if it's loose, check the kiln manual to see how it gets tightened.

Caring for the interior of your kiln is very important. Did you know vacuuming the interior monthly can extend the life of the elements? One of the main causes of element failure is foreign materials melting into the elements. Things like chips of glaze can easily fall into element grooves as items are loaded into the kiln. If kiln shelves are tilted as they're placed inside or taken out of the kiln, glaze, bisque fragments, and even flaking kiln

wash from the shelves can fall into the elements. All of these can ruin your coils over time. So frequently disconnect the kiln from the power, put the brush attachment on your vacuum hose, and run it over the entire interior of your kiln. And if you have a clay shape blow up in the kiln, vacuum it as soon as the kiln has cooled down. Don't fire it with any of those chunks of clay in the grooves. If your kiln has a kiln sitter, be sure no chunks of clay have made their way into the tube assembly, preventing the rod that holds the cone in the sitter. Lodged pieces of clay can prevent the sitter from working properly.

Kiln sitters are simple devices, but they play a very important role in kiln operation. If they work correctly, they turn the kiln off at the proper time. If they don't work right, they can cause a kiln to turn off too early or to over-fire. Many people don't realize they need to be adjusted. It's easy to do, and your kiln manual will show you the steps. It's usually just loosening a small screw and moving a small plate. This should be checked (and adjusted as needed) several times a year.

Within that kiln sitter, there are a couple of parts that should be replaced when needed. You probably won't notice it, but that rod wears down over time and gets thinner. This completely throws off the weight of the rod and its effectiveness, possibly resulting in inaccurate firings. It really depends on how frequently you fire and how hot you fire to determine how often you should replace the sensing rod. The other parts that can require replacing are the cone supports. Over time they can bend or get caked with kiln wash and melted cone fragments. They should easily pull out so that new ones can be slid in.

On digital kilns, the thermocouple (the tube inside the kiln that measures temperature) needs to be replaced occasionally. If you regularly fire a few times a week, it may be an annual thing. They are very easy to replace and usually require the removal of the control box on the kiln and a few screws inside. Thermocouples will start to stray and not give accurate temperature readings, so it's important to replace them before the kiln starts to over- or under-fire.

Another thing that can cause a thermocouple to fail is bumping it with a kiln shelf or ware as you load and unload the kiln. Use extreme caution when placing shelves and ware in the kiln. I've seen cases where a very small crack in the thermocouple led to problems down the road. Eventually a crack will expand and cause the controller to get an error message.

Heating elements in kilns will eventually wear down and lose power. It usually takes years, and it really depends how often and how hot they're fired. If you are consistently doing high firings, you want to make certain you have a kiln designed for that. Some kiln manufacturers make kilns specifically for that sort of production work. They have thicker wall brick and elements that will hold up better and fire hotter. As elements age, you'll notice the kiln gradually taking longer to fire; it may even struggle to reach top temperatures. When the time comes to replace the elements, it's best to change them all at the same time. The only time I replace a single element is when it fails due to something coming into contact with it and melting through. But if I notice the kiln is taking longer to fire and the kiln has fired for several years without element replacement, I will replace them all.

On manual kilns with kiln sitters, you can have switches go out. It's not common, but it can happen. Fortunately, they're fairly easy to replace. Digital kilns use relay switches to cycle the power to the elements. They, too, have been known to fail and need replacing. I've had digital kilns run for 12 years without replacing relays, but I know some people who have replaced them within a year.

Many kilns have metal plates on the bottom that will erode over time. You may start to notice a ring of rust below the kiln, and eventually you'll see chunks of rusted metal. If you dry wet clay in your kiln, you may notice the rusting happening sooner. Replacing the plate is fairly inexpensive and simple to do, though it does require two to three people to lift the kiln and position the new plate below.

Keep an eye on the connection where the kiln plugs into the outlet (if it's not directly wired into the power supply). A loose connection can result in arcing. When this happens, the plug gets very hot, and you'll notice the area around the prongs turning brown and actually melting. It will usually show up around the openings in the receptacle as well. When you see this happening, replace the wall receptacle and the plug on the cord. I've had one kiln where the cord had melted into the re-



Check the plug connections regularly.

ceptacle to the point where I was unable to separate them. The connection can become loose if the cord is in a place where it can get bumped frequently. In one of my studios, we had issues with this happening frequently because the kilns were located along the side of the building where semis came by all day and night, vibrating that area. Eventually, the plugs would loosen. It became an annual replacement. Most people will never have to make the change if they always check to be sure the connections are snug.

Whenever firing a kiln, you should use test cones in the bottom, middle and top of the kiln. Why? Because shelf cones can let you know if something is going wrong with the kiln, before it becomes a huge problem. If an element has gone out, the cones will probably bend differently in that area. You'll also learn if one part of your kiln fires hotter than another. If you discover a load is under-fired, based on the results of the test cone you can re-fire it. If you don't, you could end up with blistering, pinholes, or other imperfections.

Kiln ownership is something to be proud of. They're safe to use, provided you take the proper precautions and perform maintenance to keep them running properly and safely. Always follow the suggestions in the kiln owner's manual. I purchased my first kiln when I was 11 years old and have sold and purchased many over the years. Some of those kilns lasted 10 to 12 years with nothing more than general maintenance. Enjoy it and be safe!

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Kiln Maintenance Checklist

Before Each Firing

- Check the interior of your kiln for anything that looks out of place.
- Remove any loose pieces of firebrick from the walls or lid. Replace brick when elements start bulging out or sagging. Element staples will work to hold elements for short periods.
- Remove any glaze spots from walls, shelves, posts, or bottom of kiln.
- Doublecheck shelves for cracks. Do not use a cracked shelf.
- Cover bare spots on shelves with fresh kiln wash (most important in glaze firings).
- Check for loose or bulging elements. Use element staples to hold them in place or replace firebrick.
- If your kiln is equipped with a kiln sitter, clean any residue or kiln wash off the sensing rod and cone supports and coat with fresh kiln wash. This will prevent the cones from sticking. If any materials cannot be removed from the cone supports, they must be replaced. Move the rod up and down to be sure it moves freely.
- If your kiln is equipped with a thermocouple, gently wiggle it to be sure it is not cracked. Also, make sure it's sticking inside the kiln about an inch. If it gets bumped and pushed back into the brick, it won't be effective.
- Make sure nothing flammable is coming into contact with the kiln and that the cord is not touching the sides of the kiln.
- Be sure nothing is in front of the kiln preventing the weight from dropping on a kiln sitter (if equipped).

Monthly

- Vacuum the interior of your kiln.
- Make sure your kiln is level.
- Remove and inspect your cone supports if the kiln is equipped with a kiln sitter. If they are bent at all, replace them.
- Check the porcelain tube assembly on the kiln sitter (if equipped). If you detect any cracks or chips, replace it.
- Tighten kiln lid and jacket if needed. Most kilns have screws on one side.

- If your kiln is equipped with a kiln sitter, use the firing gauge to check accuracy of sitter.
- Check the receptacle and plug for any corrosion or melted areas. If you detect any problems, immediately replace the plug and receptacle. If your kiln is sectional or has a ring, check the connections between sections.
- Use a putty knife to remove any loose kiln wash on shelves and recoat. Also be sure the bottom of your kiln has a good coating. It's best to fire items on a shelf up off the bottom of the kiln, but you should still coat the bottom to protect from any small chips of glaze or crystals that may make their way to the bottom.
- If you have a vent on the kiln, check the exhaust tubing for cracks or breaks. Also vacuum the vent to remove any dust.

Annually

- Remove the control panel (after disconnecting power) and check over all wiring and connections. Replace or repair any loose or brittle wires or connections. Remove dust or debris by blowing with compressed air or using a soft brush attachment on a vacuum to suck it away.

As Needed

Some things on your kiln will need to be replaced depending on how frequently you fire.

- Sensing rod on kiln sitters: Always have a new rod on hand. Hold it up periodically to the one in your kiln. If you notice the diameter of the one in your kiln is wearing down, replace it.
- Thermocouple(s) on digital kilns: Always have a new thermocouple on hand. All it takes is a slip of a shelf while loading or unloading the kiln to break this important part. Your kiln will not work without it. This part can also wear out without notice. If you notice your kiln is over- or under-firing consistently, it may be time to replace the thermocouple.
- Heating elements: Always have extra elements on hand. Some kilns have more than one kind of element, so be sure you have spares for each kind. The most common cause of element failure is foreign objects melting in the element groove. Barring damage, elements may last for years, but they will eventually wear down and you will notice it taking longer and longer to complete a firing. At that point, you may want to consider replacing them.

Refer to your kiln manual for specific instructions for your brand and model.