

Ceramics

Found in such items as vessels, toys, loom weights, pipe bowls, and decorations

Identification and General Information

Ceramics are usually made by heating natural clays at a high temperature. Typically, clays for ceramics are grouped into two general types: *red clay*, which contains primarily silicon dioxide and iron oxide; and *kaolin clay*, which contains mostly aluminum oxide and almost no iron oxide. Because red clay contains more iron, it often has a rusty brown shade somewhere between light tan and dark brown, while pure kaolin clay is white. This section will discuss only red clay ceramics.

Ceramics are often grouped into several loose categories based on the temperature at which they were fired. A general rule of thumb is that lower-fired ceramics will easily absorb water, while higher-fired ceramics will absorb little or no water. To test this, you can use a small paintbrush to apply a little water to an unglazed area of ceramic, and watch to see if it is drawn in. Because high-fired ceramics are less likely to absorb water, they have fewer salt problems (see below).

Ceramics may have different surface finishes, coloration, or impressed designs. A *glaze* is a thin layer of clear or colored glass on the ceramic surface. A *slip* is usually more like a thin layer of clay and has a matte appearance and is a different color than the clay body. Ceramics may be coated with other materials as well, including paints and inks.

Basic Care and Storage

Ceramics are decorated most commonly with a slip or glaze that is fired on, or melted onto the surface when it is fired. Ceramics with a fired-on overall glaze or other decorations are

impervious to normal variations in temperature below several hundred degrees. These fired-on decorations also help protect ceramics from humidity. In recent decades, some ceramics have been initially fired but later decorated with paint or some other decoration that is never fired. These unfired decorations are very fragile and are easily damaged by exposure to water, heat, or light. If you want to know if decorations are fired on or not, consult a conservator.

Repaired ceramics may suffer damage from temperature and humidity extremes. Broken ceramics reassembled with adhesive have weaknesses. Most adhesives soften and give way at elevated temperatures. Ceramic pots with repairs may sag, collapse, or fall apart if they are stored in a hot area, such as an attic or a building that does not have air conditioning.

Salts can also damage or destroy ceramics. The clay may have originally contained a significant amount of salt, and other types of earth added to adjust the properties of the clay may include salt. Water or foods stored in ceramic vessels often leave salts behind. Contact with seawater or burial below ground can also introduce salts.

Fluctuating humidity levels aggravate the harmful effects of salts in ceramics. Above 60 percent relative humidity, the salts dissolve and move around inside the ceramics. When the ceramics dry, the salts migrate to the surface and are left behind when the water evaporates. This is called salt *efflorescence*. Efflorescence generates tremendous forces, pushing off areas of glaze or decoration and even breaking up entire ceramics. To prevent this, ceramic items are best stored at a low humidity that does not fluctuate widely. Check ceramics frequently for salt efflorescence, which appears as fluffy, furry, or dusty deposits, as a dry white film, or as a hard, thick white crust.

Never stack ceramics, such as pots, one on top of another. This may break them or wear away parts of their surface. Store ceramics on open shelving if they are not sensitive to light.

Ideally, store each ceramic item by itself in a padded cardboard box made from preservation-quality materials. Box storage may be impractical if you have a large collection, because the boxes may take up too much space, are expensive to purchase, are time-consuming to construct, and hide the pots from view. Boxes should still be considered for especially valuable items.

Special Pest Concerns

Generally, mold will not grow on ceramics, and insects will not attack them. In very wet conditions, however, mold or lichens may grow on ceramic surfaces, although the mold will not digest the ceramic itself. Insects will eat food residues left on ceramics and will eat materials applied after firing. However, proper environmental conditions prevent mold, lichens, and insects.

Routine Handling

Ceramics are slippery when handled with cotton gloves. For a better grip, handle ceramics with clean hands or with nitrile or latex gloves. Pick items up from their lowest, widest point, finding the center of gravity and using both hands. Ceramics are extremely brittle, and they will easily break. The best protection for brittle ceramics is to handle them on a firm, stable surface padded with cloth, pillows, or sheets of polyethylene foam. Take care that they do not roll off the surface. Ceramics with paint or other unfired decorative elements are particularly fragile and should be handled with special caution. Do not allow ceramics to touch other nearby objects that can chip or damage them. Protect lids that may be loose and fall off when the ceramic is moved. Be extra careful with handles, and never use the handles to lift an item. When moving heavy and bulky ceramics, find at least one other person to assist you in the move.

Display Issues

Many ceramics are strong but also brittle. This means that they will withstand stress up to a point, after which they will suddenly break. For this reason, they should always have solid and stable support while on display.

Humidity fluctuations are also a major concern for all ceramics. As explained earlier, at a relative humidity over 60 percent, water-soluble salts dissolve and start to move within the ceramics, causing damage as they dry out. For this reason, the climate in display areas should be kept dry and steady.

Ceramic items with painted, unfired decorations are susceptible to fading and should be kept out of light whenever possible. Hot spots caused by intense display lights are also damaging. In some rare cases, the heat of lights causes cracks to grow. Do not place ceramics too close to lights, and avoid any intense lights that will heat ceramics from a distance.

Mounts and Supports

External supports help pots to remain stable. Support pots with rings made of polyethylene foam tubing or with blocks of polyethylene foam carved to support the sides. Cylindrical polyethylene foam tubing in several diameters is sold through various conservation suppliers. Ideally, you should use solid, not hollow, foam. To make a pot ring, cut a short length of tubing to the appropriate length to support the underside of the pot, and glue the ends together with hot-melt adhesive. For a better appearance, consider sewing cloth around the pot ring. A ring should fully support the pot so that it does not touch the shelf where it is stored. The ring will relieve some of the strain on the bottom of the pot.

Cleaning and Minor Repairs

You will need to regularly remove accumulated dust from ceramics. Dust may disfigure the appearance of ceramics, become imbedded in pores, and lead to surface scratches. If dust accumulates quickly on your ceramics, you need to identify the source of the dust and reduce it. Reducing the amount of dust will save you a significant amount of cleaning time.

If you only have a small number of items, you may want to do your dusting in a room separate from where the items are stored or used for display. This is to prevent the dust from returning to the air and settling on other items. This, of course, requires moving the items some distance. If they are fragile or if there are many of them, the handling required to move them to another room could be a problem. With large or fragile collections, it may be better to set up a cleaning station near the items. This cleaning station can be on a table or on a cart with locking wheels that could be moved from item to item. Great care will need to be taken to avoid scattering dust to other items nearby.

Make sure ceramics are stable during cleaning, are surrounded by padding, and are not at risk of tipping or breaking. Avoid the use of household cleaners or dusting tools on ceramics. Never use a feather duster, since broken feathers may scratch the surface, and the feathers will catch on and remove small protrusions. Instead, use a soft cotton cloth, like the “magnetic” dust cloths mentioned in *Cleaning Practices*, or a soft, dry long-bristled brush.

If the dust is particularly heavy, a vacuum may help. The guidelines in *Cleaning Practices* will help you choose an appropriate vacuum. The vacuum nozzle can be placed near the ceramics, and a brush used to push dust toward the nozzle. A piece of cotton cheesecloth or flexible fiberglass screening can be stretched over the nozzle and secured with a rubber band, so that no loose pieces will be sucked into the vacuum.

After dusting, ceramics may still appear dirty or dusty. Do not wash ceramics in water

unless you have a good reason to do so. If ceramics are not completely fired, they may redissolve into soft clay when they touch water. Washing can remove fragile slip layers, flaky surfaces, unfired paints or coatings, and other elements. Washing frequently creates a water-soluble salt problem, which can badly damage or destroy the drying ceramics. Additionally, washing ceramics may also damage or remove important evidence and information, such as food residues. For these reasons, contact a conservator before washing ceramics.

Conservators can repair broken ceramics with specialized acrylic adhesives not commonly available to the public. Common emulsion adhesives, such as Elmer's white glue, should be avoided. These adhesives can be difficult to remove if the ceramics ever need to be disassembled. Do not use self-adhesive tapes on ceramics, because they can remove the glaze, slip, or other areas of decoration. Many hardware stores carry the cellulose nitrate or cellulose acetate adhesives historically used to repair ceramics. A cellulose-based adhesive, like Uhu brand glue, behaves like the acrylic adhesives conservators use and can be safely used to repair broken ceramics. The advantage of both acrylic and cellulose-based adhesives is that you can easily remove any excess adhesive with the proper solvent. With these adhesives, if reconstructed ceramics break again or any missing pieces are found, they can be easily disassembled, cleaned, and reassembled again. Consult a conservator to select and match the best adhesive to the type of ceramic and its type of damage.