

Ceramic \ Pottery Porcelain \ China Firing Faults

Below is a list of common firing faults. While helpful, this list is not for instructional use and should only be used to help identify faults that may have occurred.

For comprehensive firing information on your particular type of ware and color, we suggest contacting the manufacturer or distributor. For more general instruction we suggest that you seek training from a qualified teacher.

It is important that all manufacturers directions are followed to obtain good results. Read and follow their directions carefully. The Edward Orton Jr. Foundation publishes a circular called "Firing Line" and "Firing Tips". It is received through a subscription for a nominal charge. Write to: The Edward Orton Jr. Foundation, 6991 Old 3C Highway, Westerville, Ohio 43081 or call (614) 895-2663 for information or go to <http://www.ortonceramic.com/> .

CRAZING AND CRACKING

Crazing is recognized by many hairline cracks on the glazed surface after the ware has been fired. This will not necessarily occur immediately after the final firing but over a period of time the hairline cracks will become visible. Crazing and cracking could be caused by:

1. Bisque or greenware that has not been thoroughly fired. Greenware must be completely dry before doing a bisque firing. The piece should be fired to a cone 03 or 04 making sure the pieces are not crowded and adequate heat circulation surrounds all the pieces. If the pieces are not thoroughly fired, moisture will be trapped inside the ware. This will cause the crazing and cracking to occur during the glaze firing. The moisture and gases are escaping and disrupt the smooth glaze finish.
2. Either cooling the kiln too rapidly or removing the ware before it is completely cool. Do not hurry the cooling process or raise the kiln lid before it is cool. An extreme temperature change could put stress on your ware thus causing crazing.
3. Handling ware too roughly. Greenware is very delicate and should be handled carefully. Putting stress on a particular point could cause a crack that would not appear until after firing.
4. Cracking of flat pieces could be caused from not enough ventilation surrounding the piece. Flat pieces should not be placed directly on the kiln bottom or shelf. They should be raised about 1" from the firing surface by using posts or stilts. This gives good ventilation around the entire piece and eliminates cracking during the glaze firing.
5. Inability for your clay and glazes to work together. Make sure you know what type of clay you are using and follow the paint manufacturers directions. Contact your slip or color manufacturer should you have questions on this issue.

BUBBLED GLAZE, CRATERS AND PINHOLES

1. Underfired or immature bisque. Most often the bisque is fired to a cone 03 or 04. The glaze firing is generally fired 1 or 2 cones cooler, 05 or 06. If the bisque has not been fired completely through, gases will escape from the immature bisque causing small pinholes, craters or bubbles in the glazed surface. Read all directions on the color manufacturers products for correct firing temperatures. Contact your slip or color manufacturer should you have questions on this issue
2. Glaze could be applied too heavy. Apply only the number of coats according to the color manufacturers directions and label.
3. Dust on the ware or in the kiln could cause some glaze defects. The ware should be free from dust by brushing the dust off with a soft brush or a damp sponge. Vacuum your kiln, including inside the grooves, to keep it free from unnecessary dust.
4. Firing too fast or cooling too rapidly could cause these firing faults. With the no-lead glazes, rushing through either of these processes will bring unsatisfactory results.

WARPED BISQUE

1. Incorrectly removing ware from the mold could cause the piece to warp. Ware should not be removed from the mold until it is leather hard and releases easily. This is extremely important in porcelain casting. Porcelain has a memory and cannot be reshaped.
2. Overfiring can cause distortion.
3. Placing the ware too close to an element could cause one section of the ware to mature prematurely and distort. Keep the ware approximately 1" away from the kiln side walls and tube assembly (if one is installed), and thermocouple (if one is installed) to insure proper ventilation.
4. Improper support on stress areas could cause warping. Large flat pieces should be supported with either stilts or posts. Porcelain should be supported with prop or silica sand. It is suggested that firing instructions be taken for firing porcelain.

Generally, it is impossible to salvage warped bisque.

GLAZE OR UNDERGLAZE NOT ADHERING TO THE WARE

1. A dirty surface on the bisque ware caused from dust (including greenware dust), hand lotion and skin oils are the most common causes. Make sure the bisque is free from dust and sponged to removed any foreign material or oils.
2. Bisque that has not been dried completely will not accept a good application of paint. Dry the ware completely before attempting to paint.
3. Underfired or overfired bisque could be a problem. If the bisque is underfired, refire to the correct cone. If the piece was to have a stain application, the bisque firing will not be as hot as the glaze firing. Know your design plans prior to your bisque firing.
4. If the underglaze is applied too thick, it could pop during firing. Read the color manufacturers instructions thoroughly prior to application.
5. Incompatibility could be the problem. Be sure you know what type of color and clays with which you are working to eliminate any problems.

CLOUDY, TRANSPARENT GLAZE

1. Applying glaze too heavily to the bisque could cause the glaze to appear cloudy. Apply color according to the color manufacturers directions.

2. Dirty brushes or improper cleaning of brushes can contaminate the color and cause it to cloud. Brushes should be washed in clean water and dried. With proper care of your brushes, they will last for many years.
3. Underfiring the glaze can cause a cloudy appearance. Make sure your ware is firing to color manufacturers suggested temperature.

DISCOLORED GLAZES OR GRAYED AREAS

1. Firing colors together that are not compatible will cause discoloration. Reds, oranges and greens give off a gas that can contaminate other colors and cause discoloration. Fire wisely.
2. Placing ware too close to the elements or to each other can cause a color variance or discoloration. Give the ware adequate ventilation during firing. Good color depends on good ventilation.
3. Dirty brushes can contaminate the paint and leave discolored areas. Make sure brushes are clean well in clean water.
4. Overfiring can also discolor the glaze or leave ugly grayed areas. Read the color manufacturers recommended firing temperature and follow firing directions.
5. Faded decals are most generally due to overfiring or underfiring. Before firing, read the decal manufacturers recommended firing temperature or ask when purchasing the decals. Should you underfire the decal, refire to the proper temperature.

SMOOTH TEXTURED GLAZE OR SHINY MATTE GLAZES

1. Reversing this desired effect could be caused by overfiring. Follow the color manufacturers recommended firing temperature on the label.
2. Applying an insufficient amount of glaze could reverse the effect. Apply the color per the color manufacturers directions on the label. If you continue to experience a problem with the glaze, contact the color manufacturer.

RIPPLING OF GLAZE

1. Rippling of glazes is caused by too heavy of an application of glaze. This piece of ware is not correctable but good to remember for future work. Make sure you read the color manufacturers directions prior to application and follow directions. Contact the color manufacturer should you continue to have problems.

CRACKING OR DISCOLORATION OF METAL OVERGLAZES

1. Cracking or popping can result from too thick of an application of the metal overglaze. Follow the color manufacturers instructions for application on the label.
2. Overfiring metal overglazes can cause discoloration. Follow the color manufacturers recommended firing temperature.
3. Discoloration (a soiled, purplish color) may be caused by too thin of an application of metal overglaze. It requires a good coat but not thick.
4. Discoloration may be a result of inadequate ventilation and air circulation in the kiln. Good air ventilation is very important for not only metal overglazes but all colors. Do not crowd the kiln!

REDS

Problems with reds are not unusual and care should be exercised in firing. Reds dislike high temperature, love good paint heavy paint application and good ventilation. Some firing faults on red may be caused by:

1. The glaze may be applied sparingly. Unless heavily applied, reds will bleach out into tattle-tale grays and weary looking whites. Follow the color manufacturers direction for proper application and firing temperatures.
2. Firing reds with other glazes that are not chemically compatible with the color red. The color will be distorted. Check with you color supplier on which colors are compatible.
3. Overfiring can ruin the red color. It will turn out grayish and not the bright shiny red.
4. Inadequate air circulation causing insufficient oxygen may result in black spots in the red glaze when matured. Good ventilation is a must while firing reds. Sometimes reds are best fired near the bottom of the kiln where it has a tendency to be a little cooler.

CHINA PAINT RUBBING OFF

1. The paint has not been fired to maturity which will then rub off.
2. The paint is not mixed properly and thoroughly.
3. The ware is dirty or has a film coating the piece. Clean the piece good with alcohol.
4. Improper firing procedure.