What is Crazing

Crazing is one of the most common problems related to glaze defects. It appears in the glazed surface of fired ware as a network of fine hairline cracks. The initial cracks are thicker and spiral upward. These are filled in horizontally with finer cracks.

Crazing is caused by the glaze being under too much tension. This tension occur when the glaze contracts more than the body during cooling. Because glazes are a very thin coating, most will pull apart or craze under very little tension.

Crazing can make foodsafe glazes unsafe and ruin the look of a piece.

There are two types of crazing, each with a different cause:

Immediate Crazing

Size Changes During Firing

All ceramic bodies change in size during heating (firing) and cooling. What is desired is for the glaze to shrink a little more than the body during cooling. If it doesn’t then glaze problems may occur.

It is important for ware and glaze expansion and shrinkage to match or crazing can occur.

Glazes During Firing

1. during firing, glaze undergoes physical and chemical changes
2. as heating progresses, glaze melts
3. with further heating more liquid forms until viscous or thick fluid
4. more heating, more fluid glaze
5. at this point, viscous (thick flowing) glaze still conforms to size of the bisque.
6. any gas evolving from body will form blisters which can heal if glaze is still fluid
7. when kiln shuts off, glaze and body cool together
8. during cooling, both the body and glaze shrink
9. eventually glaze becomes a hard glass that will no longer flow

delayed crazing

• shows up weeks/months later
• caused by moisture getting into ware
Thermal expansion/shrinkage properties of both the body and the glaze determine if the glaze crazes.

Glazes are designed to shrink less than the body which puts them in compression, makes them stronger, and makes them less susceptible to crazing.

**Solution to Glaze and Body Fit**

1. test samples for a good fit
2. bisque to 1-2 cone numbers hotter than glaze to insure body is mature
3. use Self-Supporting Witness Cones to verify heatwork
4. recognize that bodies and glazes will have different fits for different heatwork. A glaze might fit bisque fired to 03, but craze on 07 bisque to verify the heatwork the ware receives.

If the Kiln-Sitter® turns the kiln off and a witness cone is not properly deformed, then the ware is not fired to maturity.

Underfiring can occur because of:
- variations in kiln heating uniformity
- Kiln-Sitter® out of adjustment and shutting kiln off early
- controller thermocouple inaccurate
- differences in heatwork between kiln shelf and Kiln-Sitter® location

Crazing can also be reduced by slower cooling and slower firing.

**LEAD FREE GLAZES**

Lead-free glaze formulations today have less of firing range. They develop their fired properties more quickly and this makes proper firing more critical.

**Want to learn more?**

Read more about crazing in the Orton Firing Line and Technical Tips publications. Published 8 times a year, each issue is packed full of articles to help you learn more about firing. Members of the Orton Firing Institute receive these publications at no charge. Single copies are available to non-members at a per issue rate.

For information on Orton products, see your Orton dealer or distributor.

For information on the Firing Institute or publications, contact

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