

Ceramics

Health Hazards and Safe Work Practices

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1. Dry Clay Mixing

a) Health Hazards

Inhalation of toxic dusts, such as:

Free Silica:

- A common impurity of the hydrated aluminum silicate component of clays, including China Clay.
- The amount of free silica varies between clays.
- Chronic exposures to low concentrations may cause silicosis.

Kaolin (Or China Clay):

- Chronic exposures to high concentrations may cause Kaolinosis.

Talcs:

- May contain asbestos and/ or free silica.
- Check composition and substitute for silica-free and asbestos-free talcs.

b) Safe Work Practices:

- Wear a NIOSH approved toxic dust respirator when mixing dry clay.
- Mix clays in the presence of local exhaust ventilation.
- Mix large batches of clay where possible instead of several small ones.
- Following mixing wet mop or hose down the floor.
- Wear clothes of closely woven synthetic material, which trap less dust.
- Wash clothes often.
- Do not eat, drink or smoke in the mixing area.

2. Wet Clay Mixing and Forming

Molds:

- Inhalation may cause pneumonia and asthma type allergies.
- Skin contact may result in skin infections.
- Abrasion and cracking of the skin on hands, facilitating skin absorption of molds.
- Mechanical hazard from the kick wheel motion.

- Stress on the muscles of the back, arms and hands from handling the bulk wet clay.
- Sitting at the kick wheel incorrectly and/ or for long periods of time.

Use proper lifting techniques when handling heavy materials. Alternate sitting time at the kick wheel with time spent performing other activities.

a) Safe Work Practices

- Wash hands frequently. Apply hand creams to maintain skin moisture.
- Collect wet clay scraps in a sealed container, before they dry out and pose a dust hazard.
- Be careful when working with a moving kick wheel.
- Use proper posture when working at a kick wheel. Minimize muscle tension of the back, arms and hand muscles by alternating sitting at the kick wheel, with time spent performing other activities.
- Use proper lifting techniques when handling heavy materials.

3. Glazing: Hand and Spray Application

a) Health Hazards

- Inhalation of dry glaze ingredients during the mixing process.
- Inhalation of glaze aerosols during spray application.
- Ingestion of glaze ingredients through contamination of food, drink and hands.
- Skin irritation may result from handling glaze ingredients directly.
- Common glaze ingredients of concern:
 - Free Silica
 - Metal Glaze pigments:
 - Lead
 - Cadmium
 - Chromium
 - Beryllium
 - Zinc
 - Copper
 - Iron
 - Nickel
 - Aluminum
 - Cobalt
 - Magnesium

b) Safe Work Practices

- Do not eat, smoke or drink in areas where glaze ingredients are used or stored.
- Spray application should only be performed in a locally ventilated spray booth. Clean spray booth filter regularly.
- Do not mix glaze ingredients with hands, mix with a stirrer. Wear gloves when handling glaze materials.
- A NIOSH approved toxic dust and mist respirator should be worn when preparing and spraying glazes, especially in the absence of adequate ventilation.
- Glazes should be applied onto a work piece situated on a washable surface, which can be easily cleaned upon completion of the glaze application.
- Use wet cleaning methods to remove all glaze dusts that accumulate.

- Store all glaze materials in covered containers away from traffic areas.
- After mixing and applying glazes wash hands and clean fingernails well.
- Frequently wash clothes worn in the work area.
- Eye protection when grinding finished glazed pieces.

4. Firing: Electric and Gas Kilns

a) Health Hazards

In addition to the physical hazards presented by the kiln firing process, toxic gases and fumes are produced. The composition of the gases and fumes released depends upon the clay and glaze ingredients used, and type of kiln.

- Carbon monoxide: An asphyxiant gas which may cause fatigue, headache and dizziness.
- Sulfur oxides: Strong lung irritants.
- Nitrogen oxides and ozone: Strong lung and eye irritants.
- Fluorine or chlorine gas: Strong eye, skin and lung irritants.
- Hydrogen Chlorine (produced by firing of salt glazes): strong eye, skin and lung irritant.
- Metal fumes:
 - Toxic in varying degrees depending on the type of metal.
 - Metal fumes are produced by vaporization and subsequent re-condensation of a solid metal.
 - Usually produced when a metal is heated above its melting point.
 - Exposure may result in chills and fever.
 - Thermal burns from direct contact with heated materials.
 - Infrared radiation, emitted by heated surfaces presents an eye hazard.
 - Prolonged exposure may result in the formation of cataracts.
- Fire hazard.

b) Safe Work Practices:

- Gas and electric kilns should only be operated in the presence of local exhaust ventilation.
- Perform raku firing outdoors.
- Wear welder's goggles with a shade number of 2.0 to 5.0 when looking into the kiln.
- Wear insulated gloves when handling hot materials, made of non-asbestos material.
- Wool and leather are recommended materials for clothing. Cotton and synthetic fabrics are highly flammable.
- Know the location and operation of the fire extinguisher mounted in the kiln area.