General Information

This procedure describes the process for measuring the loose bulk density of ceramic powder after it has been granulated. This test will tell us how much space the free-flowing powder takes up. During the pressing process, the powder will flow from the hopper, through the shoe, and into the die. The size of the die (diameter, etc.) and the depth of fill determine how much space the powder can flow into before the compaction stroke.

This process is derived from ASTM D7481-18, Standard Test Method for Determining Loose and Tapped Bulk Density of Powders using a Graduated Cylinder, Method A.

Equipment Needed

1. Balance with a minimum 400g capacity and 0.1g resolution.
2. 100mL standard glass graduated cylinder.
3. 100mL standard glass beaker.
4. Protective gloves and safety glasses.
5. Plastic spoon.
6. Temperature and relative humidity probe.

Procedure

1. Check that the balance is level and the output is zeroed.
2. Make sure the graduated cylinder, beaker and spoon are all clean and dry.
3. Set the temperature and relative humidity probe near the balance and begin measurement.
4. Place the beaker onto the balance and tare the mass.
5. Scoop the powder out of its primary container and into the beaker using the spoon. Continue to add powder to the beaker until the powder mass is 150+/-1 grams.
6. Remove the beaker of powder from the balance.
7. Place the empty graduated cylinder onto the balance and tare the mass.
8. Pour the powder out of the beaker and into the graduated cylinder slowly and steadily.
9. Record the mass of the powder and graduated cylinder, to the nearest 0.1 gram, on CR043.
10. Pick up the graduated cylinder and gently shake it to level the powder.

NOTE: This should be done as little as possible, preferably only once or twice, only as necessary to level the powder to within 1 gradation.

1. Record the volume of the powder in the graduated cylinder, to the nearest 1mL, on CR043.
2. Divide the powder mass by the powder volume. This is the loose bulk density. Record this value, rounding to 2 significant digits, on CR043.
3. Record the Temperature and Humidity in the room, as read from the probe, on CR043.

Cleanup

1. If the powder is going to be kept, pour it out of the graduated cylinder and back into its primary container. If the powder is going to be disposed of, pour it out of the graduated cylinder directly into the lead waste receptacle.
2. Wash the beaker and graduated cylinder in the DI water sink and dry.
3. If a small amount of powder has spilled on or near the scale, wipe it up using a wet paper towel. If a large amount of powder has spilled on or near the scale, vacuum it up using the HEPA-vac.
4. Dispose of powder-contaminated items (plastic spoon, gloves, wipes) in the lead waste.