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Measurement of Turbidity of Chromite Sand

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Scope: To determine the amount of turbidity (in NTU) of a given chromite foundry sand.

Summary: Turbidity is a measure of the light scattering caused by small silicates and other tramp materials associated with the chromite sand, these materials are thought to contribute to certain types of foundry defects. Outlined here is a method to consistently and reliably agitate and measure chromite sand for turbidity measurement.

Safety: This test requires the use of moving equipment which can present risk to operator if not used appropriately. Safety Shield must be in placed in front of the turbidity shaker arm before instrument is used.

Equipment:

Before beginning any testing or activity in a laboratory setting, please take the time to evaluate any risks associated with the task to make sure the testing can be done safely. Also ensure the necessary personal protective equipment (PPE) is used.

- 500 ml polycarbonate Erlenmeyer flask with screw top and cap:
Thermo Scientific Nalgene PC Screw top Erlenmeyer flask 500 mls
Mfg # 4108-0500
Cole Parmer Catalog # FF-06112-54
Polycarbonate flasks have been found to reduce the risk associated with glass flasks cracking or breaking.
- Plexiglas / Lexan shield between operator and shaker to prevent any contact between moving instrument and flask and operator
- Hach 2100N laboratory Turbidity Meter, calibrated with Hach Stab Cal standard solutions of 0, 20, 200, 1000 and 4000 NTU as per manufacturer's instructions. Instrument should be recalibrated quarterly.
- Burrell – Wrist Action Shaker (**amplitude lever set to 7**) or Labcon FS-M model Flask Shaker
- Turbidity Free water (Distilled/ De-ionized Water)
- Drying oven capable of at least 110°C
- Scale- Capable of accurately measuring at least 250 grams

Procedure:

Before beginning test, inspect the equipment and lab ware for any damage or wear and review laboratory safety practices to ensure the task can be done safely.

1. Dry a sufficient amount of chromite sand to a constant weight in a drying oven (110°C)
2. Weigh **250 grams** distilled water into a beaker and add to 500 ml polycarbonate flask
3. Weigh **50g** dry chromite sand in a weigh boat and add to 500 ml polycarbonate flask
4. Place polycarbonate flask into Grip of Wrist Action Shaker and tighten until secure (do not over tighten or risk cracking the neck of the flask) and shake for 1 minute on maximum amplitude (separate lever on side on shaker, set to "7").
5. Place shield in front of shaker arm in such a manner to prevent anyone from being able to come in contact with the moving arm of the shaker during movement (see Image 1 in Appendix A)
6. Turn Wrist Action Shaker on.
7. After shaking 1 minute, turn shaker off.
8. Remove shield from in front of shaker and carefully remove polycarbonate flask from shaker grips.
9. Allow Flask to stand for 30 seconds, after settling seconds pour off turbid water into beaker.
10. Carefully pour water from beaker into clean, dry 30 ml Hach sample vial, secure cap
11. Wipe vial with cloth, apply silicone oil to vials as necessary, and insert into Hach instrument

12. Make sure ratio and signal averaging modes are active (lights will be green on these keys), and make sure the units are NTU
13. Record first value displayed by Hach, as the numbers fluctuate due to settling while in instrument

Image 1: Plexiglas shield in front of shaker



Image 2: Polycarbonate 500 ml Erlenmeyer Flasks

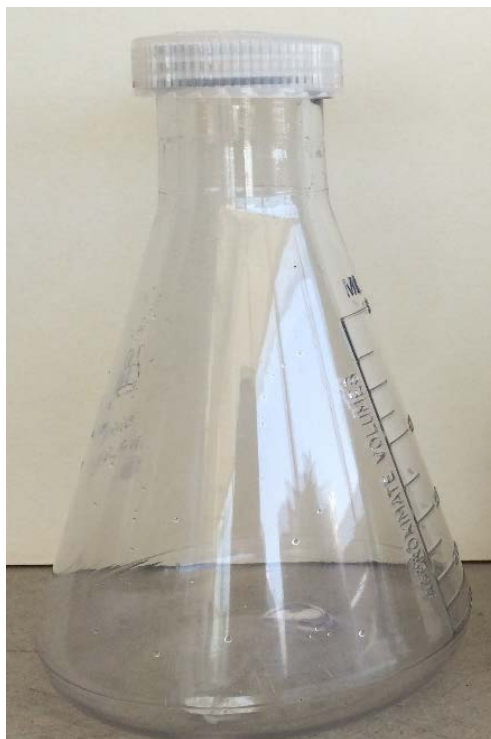


Image 3: Hach 2100 N turbidity meter



Image 4: Burrell Wrist Action Shaker



