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| **STANDARD OPERATING PROCEDURE** | | | |
| **LAB NAME** | Drilling Fluids and Cementing | **LAB NUMBER:** | 104 |
| **EQUIPMENT NAME:** | Retort | **PREPARED BY:** | Mobeen Murtaza |

1. **EQUIPMENT SPECIFICATION**

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| **Model** | **Electrical** | **Specifications** | Retort Kit, 20 mL |
| **#871** | 220V | Maximum Temperature: 1000°F; Cell Capacity: 10 mL Heating; Capacity: 350 Watts |

**Definition:** The retort provides a means for separating and measuring the volumes of water, oil, and solids contained in a sample of drilling fluid.

1. **OPERATION**

* Before start of each test, wear proper PPEs required.
* Connect the retort to an electrical outlet and let it start heating up.
* Pour the test sample through a Marsh Funnel screen to remove large particles.
* Mix the sample thoroughly, ending up with a slow speed for 2 - 3 minutes to remove any trapped air.
* Record the sample temperature and ensure it is within 10 degrees of the sample when density was measured.
* Use the T-handle drill to clear the spout of any obstructions.
* Pack steel wool into the expansion chamber.
* Slowly fill the retort mud cup to the top.
* Place the lid on the mud cup. Some of the liquid should extrude from the hole in the lid.
* Wipe away any excess liquid from the cup and the threads.
* Lubricate the mud cup threads with thread lubricant.
* Hand tighten the mud cup onto the expansion chamber.
* Attach the expansion chamber tube to the condenser.
* Carefully place the retort chamber inside the heater block taking care to not get burned.
* Place a drop of wetting agent inside the glass receiver tube.
* Attach the glass receiver tube to the clip on the condenser and let it hang off the side of the table.
* Observe the liquid exiting the condenser and continue heating for ten minutes after the flow stops.
* Remove the glass receiver and allow it to cool. Record the amount of water, oil, and solids.
* Unplug the retort.
* Remove the retort chamber and condenser and allow them to air cool.
* Using the corkscrew, remove the steel wool from the expansion chamber as soon as it is cool enough to handle.
* Use the T-handle drill to clear the spout of any obstructions.

1. **RISKS INVOLVED USING THE EQUIPMENT**

* High temperature can cause burn
* Smoke
* Electric shock

1. **SAFETY PRECAUTIONS**

The following guidelines should be followed to ensure safe operation of retorts. It is imperative that the laboratory technician be thoroughly familiar with the proper operation and potential hazards of operating a retort. Improper or negligent operation can result in severe burns and other

injuries.

* The retort case will get very hot during the test and can cause severe burns.
* The retort chamber and tube will get very hot and can cause severe burns.
* Clean and dry the retort chamber and condenser, especially the inside of the mud sample cup, lid, and the condenser passage (spout). Clean the sample cup threads with a wire brush. The spatula, corkscrew tip, or a knife may be used to dislodge solids inside the sample cup. Make sure the spout and the hole in the lid of the mud sample chamber are absolutely free of obstructions.
* The assembly should be cooled to below 100°F (37.8°C).
* Visually inspect the threads on the retort for any sign of damage before use.
* Change out the steel wool after every test to prevent solids from building up.
* Retorts used offshore should be changed out every 6 months for examination and cleaning.
* Make sure the electrical source is fused and grounded. Ensure the power cord is in good condition and the connector has a proper ground connection.
* Pipe cleaners should be used to scrape out any residue out of the spout leading to the condenser. An optional T-handle drill (#165-14-13) may be used to scrape any carbon deposits that may build up inside the tube. If the retort is used daily, the T-handle drill should be used at least once a week.