



INMOTION ENERGY (OPC) PRIVATE LIMITED

20 ml Mud Retort Kit

*Field & Laboratory Retort for Determining Oil, Water, and Solids Content of Drilling Fluids —
Complete with Distillation Cup, Condensation Body, and Graduated Cylinder*

Model No: IM-RT-20ML

Compliant with API RP 13B-2 (Invert Muds)

INSTRUCTION MANUAL

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<i>Introduction</i>	A drilling fluid's oil, water, and solids balance rarely holds still for long — solids load up, temperatures climb, and a single spot check can miss a hole-cleaning problem or an unexpected influx before it shows up anywhere else on the rig floor. The retort test described in API RP 13B-2 checks that balance directly instead of estimating it. The Inmotion 20 ml Mud Retort Kit puts that direct check within reach at the rig site or the mud lab. A measured sample is heated until every drop of liquid vaporizes, condensed and collected in a graduated cylinder, and the solids fraction is found by difference — the complete oil, water, and solids picture from a single sample, read straight off a graduated scale with no external lab equipment required.
<i>Description</i>	The IM-RT-20ML is a direct-recovery mud retort. A digitally controlled heating element drives a sealed stainless-steel distillation cup from outside the sample chamber, vaporizing the liquid phase — oil and water — without an internal element, which reduces the risk of scorching or parching the solids left behind. Vapor rising from the distillation cup passes into an insulated condensation body, where it cools back to liquid and drips into a 20 ml graduated cylinder. Because the sample cup and cylinder are both fixed-volume components, the combined oil-and-water reading converts directly to percent by volume, and the solids fraction is found by difference against the original 20 ml charge. One instrument, one heat cycle — the complete oil, water, and solids data set: ● Fixed 20 ml sample volume, per API RP 13B-2 ● External heating jacket, digitally controlled to 500 °C ± 40 °C ● Direct-recovery graduated cylinder, read straight off the scale ● Removable, corrosion-resistant stainless steel distillation cup and condensation body



The IM-RT-20ML interior: distillation cup, condensation body, digital temperature controller, and heating chamber

Components	Part Number	Description
	IM-RT-20ML-01	Retort Heating Unit — stainless enclosure with digital temperature controller and heating element
	IM-RT-20ML-02	Distillation Cup — 20 ml capacity, threaded sealing sleeve
	IM-RT-20ML-03	Condensation Body — insulated draft tube and drain spout assembly
	IM-RT-20ML-04	Graduated Measuring Cylinder — 20 ml capacity, glass
	IM-RT-20ML-05	Scraper — sized to the distillation cup bore
	IM-RT-20ML-06	Cleaning Brush
	IM-RT-20ML-07	Sealing Grease
	IM-RT-20ML-08	Power Cord & Plug
	IM-RT-20ML-09	Stainless Steel Carrying Case with hinged door
	 <i>Complete kit: heating unit, distillation cup, condensation body, graduated cylinder, and cleaning accessories</i>	

Features

- Digital Temperature Control — an integrated process controller drives the heating element up to $500\text{ }^{\circ}\text{C} \pm 40\text{ }^{\circ}\text{C}$, holding the sample above the liquid evaporation point while limiting the risk of boiling the solid phase out with it.
- External Heating Jacket — heat is applied to the distillation cup from outside the sample chamber, reducing the scorching and parching that skew results on internally heated retorts.
- Corrosion-Resistant Construction — distillation cup, condensation body, and outer enclosure are stainless steel throughout, built for rig-floor and laboratory duty.
- High Liquid Recovery — engineered for greater than 98% recovery of the liquid phase, so oil and water readings reflect the sample's true composition.
- Compact Benchtop Footprint — a self-contained heating chamber and controller mount on a rigid stainless base for stable testing on a rig-site bench or lab counter.
- Two Voltage Builds Available — AC220V 50Hz (standard) or AC120V 60Hz (USA), $\pm 10\%$. Specify the build required at the time of order.



The IM-RT-20ML retort kit — front view, closed

Specifications

Inmotion Model Number	IM-RT-20ML
Sample Volume	20 ml (fixed distillation cup capacity)
Power Supply	AC220V 50Hz (standard) or AC120V 60Hz (USA), $\pm 10\%$
Heating Power	800 W

	Maximum Operating Temperature	500 °C ± 40 °C (digitally controlled)
	Liquid Recovery Rate	> 98%
	Measurement Basis	Oil, water, and solids by volume, calculated against the original 20 ml sample
	Material of Construction	Stainless steel distillation cup, condensation body, and outer enclosure; graduated glass cylinder
	Applicable Standard	API RP 13B-2 (Invert Muds) — retort method
	Case	Lockable stainless-steel enclosure with hinged access door (included)

Operation

1. Place the instrument on a firm, level bench, close to a power outlet and away from drafts that could cool the condensation body unevenly.
2. Collect a fresh mud sample and cool it to approximately 26 °C (80 °F). Pass it through a 12-mesh sieve on the marsh funnel to remove cuttings or debris, then mix thoroughly and work out any entrained air.
3. With the distillation cup held level, use a clean syringe to inject the sample directly into the cup, taking care not to trap air.
4. Fit the measuring cover carefully, letting the small excess overflow through the vent holes so the cup holds exactly the specified 20 ml sample volume. Wipe away any overflow from the cup and cover, then set the cover aside.
5. Wipe the threads of the distillation cup clean, apply a light film of the supplied sealing grease, and thread the condensation body's retaining sleeve onto the cup until snug.
6. Swing the handle over, seat the distillation body's draft tube fully into the condensation body's insulating collar, and tighten the handle to lock the assembly together.
7. Open the heating chamber door, lower the assembled distillation/condensation unit onto its bracket, and close the door.
8. Stand the graduated cylinder upright directly beneath the condensation body's drain spout.



Carrying handle and the door latches on top of the enclosure, viewed from above



Retort kit — open door showing the heating chamber and digital temperature controller

9. Connect the power supply and switch on the heater. Set the controller to the required test temperature (maximum 500 °C) and start the test.



Omron digital temperature controller, mounted inside the cabinet door



Main power switch and circuit breaker panel

⚠️ IMPORTANT

Invert (oil-based) mud samples can foam or spit as emulsified water flashes to steam. Never leave a running test unattended — violent bumping can force sample out through the vent and skew the reading. If sample is expelled, switch off, let the unit cool fully, and repeat with a fresh sample.

10. Watch the cylinder as condensed liquid drips in. Once dripping stops, continue heating for a further 10 minutes, then switch off the power.

⚠️ IMPORTANT

The distillation cup, condensation body, and heating chamber reach temperatures up to 500 °C during operation. Keep the chamber door closed while heating, and never touch the distillation cup, condensation body, or drain spout until the unit has fully cooled. Operate the kit in a well-ventilated area, as vapours from oil-based fluids at high temperature can be irritating, and wear heat-resistant gloves and eye protection when handling hot parts.

11. Let the collected liquid cool to room temperature and read the total liquid volume, along with the separate oil and water volumes, from the cylinder scale. If the oil-water interface is hard to see, add one or two drops of demulsifier. Read each level at the lowest point of the meniscus.
12. Record the readings and calculate the water, oil, and solids percentages (see Reporting Results below).
13. Let the unit cool fully before removing the distillation/condensation assembly. Brush out the distillation cup, clean the condensation body's draft tube and drain spout, and dry everything before returning it to the case.

✓ TIP

Run the full heating cycle in one sitting. Interrupting a test partway through and restarting can leave residual moisture trapped in the solids and skew the final reading.

Reporting Results

Report water and oil content as percent by volume, read directly from the cylinder scale; solids content is the remainder after subtracting the combined liquid volume from the original 20 ml sample. Round to the nearest 0.5%, or as your mud report specifies.

For invert (oil-based) systems, the oil/water ratio (OWR) is usually the number engineers actually want: divide the oil percentage by the sum of oil and water percentages, e.g. an 80/20 split reads as an OWR of 80:20.

NOTE

An invert mud's water phase normally carries dissolved calcium chloride or other brine salt. Salt does not distil over: it stays in the retort and is counted as solids, so the retort water reading is lower than the true brine volume. For a salt-corrected water/oil/solids breakdown, apply the correction in API RP 13B-2 using the mud's chloride titration. An uncorrected reading is fine for a quick rig-floor check but shouldn't be reported as the final analysis on a high-salinity system.

Calibration

Recovery Check

There is no field adjustment for the distillation cup, the graduated cylinder, or the temperature controller. The recovery check below confirms the assembly is still delivering its rated liquid recovery and is good practice before any critical test run.

1. Measure a known volume of water — 20 ml is convenient — using a calibrated pipette or graduated cylinder.
2. Charge the cool, dry distillation cup with that volume and run a complete retort cycle as described under Operation.
3. Confirm the recovered liquid volume in the graduated cylinder reads within the kit's stated recovery rate (>98%) of the volume charged (at least 19.6 ml for a 20 ml charge).
4. Separately, check the controller's displayed process value against an independent reference thermometer or thermocouple at a known set point.

A water-only check confirms the cylinder graduations and heating profile, but water and oil don't vaporize and condense identically. For invert-mud duty, also repeat the check periodically with a known volume of light mineral or base oil to confirm the oil phase is recovered as efficiently as water.

Out-of-Tolerance Units

If the recovered volume falls outside the stated recovery rate, check that the distillation cup threads are properly sealed and the condensation body is seated fully in its collar, then repeat the check. If the shortfall persists, the heating element, controller, or a seal has likely failed, and the unit should be returned to Inmotion Energy for service.

When to Re-check

- Before any critical or disputed test run.
- After the heating element, controller, or condensation body has been serviced or replaced.
- If oil, water, or solids readings no longer track with a known reference sample or a second kit.
- On whatever routine schedule your facility's QA/QC program calls for.

⚠️ IMPORTANT

Never force the cup threads or disassemble the heating element or controller in the field. These are factory-set components; disturbing them can affect liquid recovery and void the unit's calibration.

Maintenance

1. Inspect the distillation cup, condensation body, and cylinder before each test — the cup threads should be clean and undamaged, and the cylinder free of chips or cracks.
2. Clean the distillation cup and scrape out retained solids after every test; material left to bake onto the cup wall is far harder to remove and can affect later readings.
3. Wipe down the condensation body's draft tube and drain spout, and dry all components fully before returning them to the case.
4. Re-grease the distillation cup threads lightly before each test to maintain a good seal.
5. Store the instrument upright in its carrying case between uses, and keep the graduated cylinder protected from impact.
6. Re-run the recovery check (page 11) any time a component is serviced, replaced, or readings start to look inconsistent.

NOTE

Never use a wire brush, metal pick, or sharp tool to clean the distillation cup — use the supplied scraper and a soft brush only. Scoring the cup's interior surface, even slightly, can trap solids and throw off every reading afterward.

Troubleshooting

Symptom	Possible Cause	Recommended Action
Heating element does not warm up when powered on	Heating element has failed	With power disconnected and the unit cool, test the element with an ohmmeter; an open circuit between the leads confirms failure. Contact Inmotion Energy to arrange replacement.
Heating element does not warm up when powered on	Power plug not seated properly	Check the plug and seat it firmly in the socket.
Heating element does not warm up when powered on	Fuse has blown	Check the fuse and, if blown, replace it with one of the same type and rating.
Recovered liquid volume reads low	Distillation cup or condensation body not sealed	Re-check the threaded seal and grease; repeat the test.
Oil/water interface hard to read	Emulsified sample, no demulsifier added	Add one or two drops of demulsifier and allow the sample to settle before reading.
Sample spits or foams out through the vent	Emulsified water flashing to steam, or air trapped in the sample	Switch off and let the unit cool fully, clean the assembly, and repeat with a fresh, de-aerated sample.

Still stuck after trying the above? Set the kit aside and get in touch with Inmotion Energy (see Company & Contact Information, page 15).

Warranty and Return Policy

Warranty

Inmotion Energy (OPC) Private Limited stands behind the materials and workmanship of every kit it ships. For eighteen (18) months from the invoice date, if a product turns out not to meet its stated specifications through no fault of the buyer, and we're notified in writing once the issue is found, we'll repair or replace it at our discretion, subject to the exclusions below.

This coverage assumes normal use, in line with the operating conditions described in this manual. It does not stretch to cover use outside those conditions, nor to flaws that were plainly visible on arrival but went unreported.

Beyond what's stated here, Inmotion Energy doesn't offer any other express or implied warranty — including, to the extent the law allows, implied warranties of merchantability or fitness for a particular purpose.

Coverage does not extend to damage or loss caused by:

- Installation, operation, or upkeep that doesn't follow this manual
- Misuse, carelessness, or accidental damage
- Adjustment, disassembly, or repair carried out by anyone other than Inmotion Energy or an authorized service provider
- Storage conditions or exposure beyond what normal field use implies
- Parts or components sourced from outside Inmotion Energy
- Ordinary wear items — the heating element and glass cylinder, for example

Returns and Repairs

Pack anything you're sending back carefully — Inmotion Energy can't take responsibility for damage caused by inadequate packaging in transit.

If you're returning a unit that isn't defective, do so within thirty (30) days of your invoice; a restocking charge may apply, and the item needs to arrive in its original condition to qualify for a refund.

Before shipping anything back, reach out to us with your invoice number, a description of the issue, and your contact details so we can set expectations. Send equipment to:

Inmotion Energy (OPC) Private Limited

Attn: Service & Repair

186, 1st Main Road, Vijaya Bank Layout, Bilekahalli

Bangalore, Karnataka – 560076, India

Questions before then? Reach our support team at info@inmotionenergy.in.

Ordering & Replacement Parts	Send the Inmotion Energy sales team a note about what you're working on, and we'll get back with a recommendation and a quote. Spares, including replacement cylinders, heating elements, sealing grease, and power cords, are available on request. Have this ready when you reach out: • Model / catalog number (IM-RT-20ML) • The part number and description you need (see Components, page 5) • How many you need • Your company name, shipping address, and a contact point
Company & Contact Information	Inmotion Energy has spent years supplying precision testing instruments and drilling tools to operators working with drilling fluids, cements, and completion fluids. Working out of our Bangalore facility, we serve customers across India and the Middle East. Being an independent manufacturer means our customers come first, not a parent company's agenda. Industries We Serve • Onshore & offshore drilling contractors • National & independent oil companies • Mud engineering & testing laboratories • Well completion & workover operations Why Choose Us • Every kit goes through rigorous checks before it ships • Spares and replacements move fast, so downtime doesn't stack up • Designs proven in the field, built to keep working Contact Details Inmotion Energy (OPC) Private Limited 186, 1st Main Road, Vijaya Bank Layout, Bilekahalli, Bangalore, Karnataka – 560076 Phone: +91 96637 44619 Email: info@inmotionenergy.in Website: inmotionenergy.in