



Pressurized Fluid Density Scale

Part #: 100-70

Instruction Manual

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Ver. 5

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Introduction

Drilling fluids and cements often have a considerable amount of air entrained or trapped within the fluid that may give erroneous results when determining fluid density using conventional equipment. This air volume may be decreased to a negligible quantity by pressurizing the sample cup, which will then give more accurate density readings of the fluid itself.

Description

The OFITE Pressurized Fluid Density Scale is similar to a standard mud balance. A sample cup of known volume is balanced by a fixed counterweight at the opposite end of a balance beam. A sliding weight rider moves along the graduated scale and a level bubble on the beam indicates when the system is in balance. The position of the rider on the graduated scale indicates the density of the sample.

In the center of the lid is a check valve that allows a one-way flow of test fluid into the sample cup. A plunger attaches to the check valve and applies pressure to the sample cup. When the pressure in the sample cup increases, the check valve automatically closes, sealing off the pressure inside. A cap holds the lid in place.

The balance beam has four graduated scales:

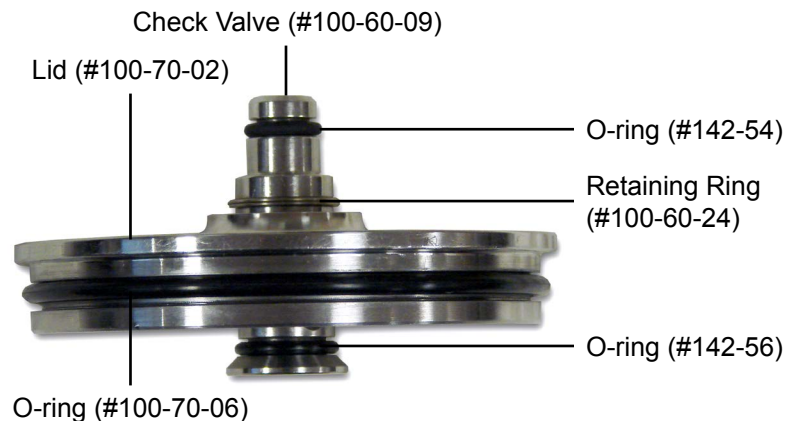
- 52 – 164 lb / ft³
- 6.9 – 21.9 ppg
- .83 – 2.63 specific gravity
- 360 – 1,130 PSI / 1,000 ft

Components

Part Number	Description
#100-29	Level Bubble Vial
#100-56	Steel Shot
#100-60-09	Check Valve
#100-60-24	Retaining Ring for Check Valve
#100-70-01	Sample Cup and Mud Arm Assembly
#100-70-02	Lid
#100-70-03	Cap
#100-70-04-01	Rider
#100-70-05	Shot Well
#100-70-06	O-ring for Lid
#100-70-07	Plunger Assembly
#100-60-13	Packing Cup, Plastic
#100-70-010	Knob
#100-70-11	Piston Rod
#100-70-13	Compression Cylinder
#100-70-14	Lower Plunger Cap
#100-70-15	Upper Plunger Cap
#170-07	O-ring
#100-70-08	Carrying Case
#100-70-24	Base
#100-70-25	Cover for Level Bubble Vial
#115-00-002	Set Screw for Knife Edge
#115-32	Knife Edge
#142-54	O-ring for Check Valve Nozzle
#142-56	O-ring for Check Valve

Optional:

#100-70-101	Calibration Fixture
#100-70-SP	Spare Parts Kit
#100-60-13	Packing Cup for Plunger Assembly, Qty: 3
#100-60-24	Retaining Ring, Qty: 2
#100-70-06	O-ring for Lid, Qty: 6
#142-54	O-ring for Check Valve Nozzle, Qty: 6
#142-56	O-ring for Check Valve, Qty: 4
#170-07	O-ring for Plunger Assembly, Qty: 4



Operation



Tip



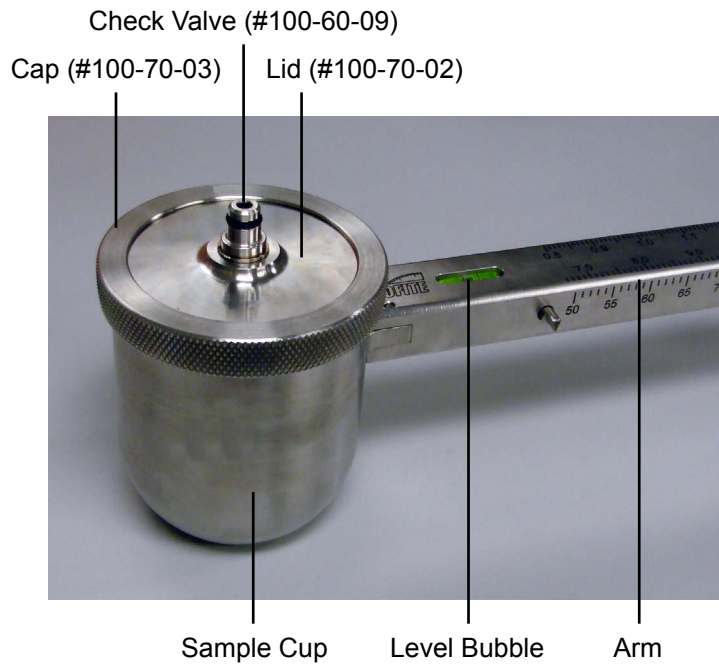
Important

1. Fill the sample cup to within ¼" of the top with fluid to be tested.
2. Push the check valve down to open it.
3. Place the lid on the sample cup and press it down slowly.

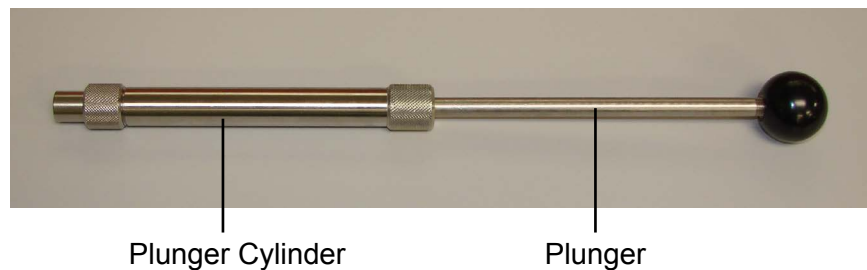
As you press the lid into the sample cup, fluid should leak out of the check valve. If no fluid leaks from the check valve, remove the lid and add more fluid.

Be careful when pressing the lid into the sample cup. Test fluid may spray out of the check valve. Always press the lid slowly and remember to wear protective eyewear.

4. Place the cap over the lid and screw it in place.



5. Push the plunger all the way into the plunger cylinder.



6. Place the end of the plunger cylinder into the test fluid and pull the plunger all the way out. This will draw test fluid into the plunger cylinder.
7. Place the end of the plunger cylinder over the top of the check valve.
8. With one hand, press down on the plunger cylinder to keep the check valve open. With the other hand, press down on the plunger to apply approximately 50 lb. of force.



Check Valve Open

Plunger

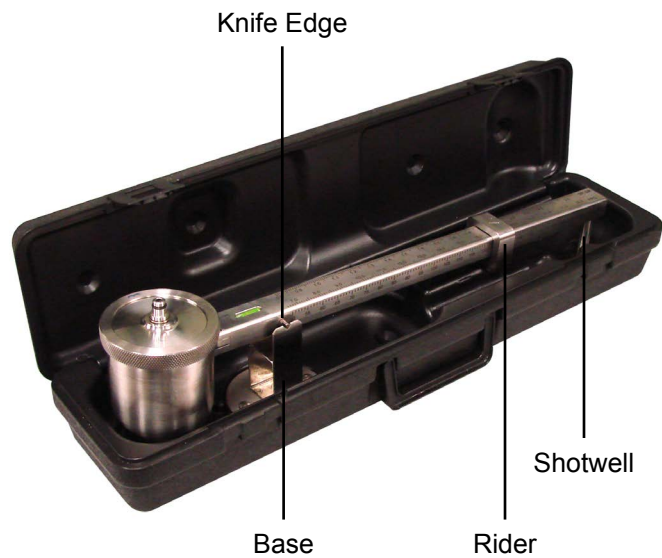
Check Valve



Check Valve Closed

9. While continuing to apply 50 lb. of force to the plunger, slowly raise the plunger. This will allow the check valve to pop up, sealing off the pressure inside the sample cup.
10. When the check valve has risen about 1/4", stop applying force to the plunger and remove it from the valve.

11. Clean and dry the outside of the sample cup and balance arm.
12. Balance the instrument with the knife edge resting on the base.
13. Move the rider back and forth until the arm is balanced. When the arm is balanced, the bubble in the level will be between the two lines.
14. Read the density from the scale printed on the arm.



Calibration

Basic Calibration

The Pressurized Fluid Density Scales are calibrated at the factory prior to shipment. Use the following procedure to confirm the unit is still in calibration.

1. Clean the entire instrument.
2. Fill the sample cup with deionized water and pressurize it.
3. Balance the instrument with the knife edge resting on the base.
4. Move the rider to 1.00 on the specific gravity scale.
5. Observe the level bubble. If the bubble is off center, the instrument is out of balance.



Tip

The rider can be moved .01 sg in either direction to achieve balance.

6. Unscrew and remove the shotwell.
7. If the bubble is closer to the sample cup, remove steel shot from the shotwell. If the bubble is closer to the shotwell, add steel shot.
8. Screw the shotwell back into the arm.
9. Repeat steps 3 through 8 until the level bubble is centered.



Sample Cup

Rider

Shotwell

Re-qualification Calibration:

If the balance is ever damaged or any non-consumable parts are replaced (lid, cap, check valve, rider, or shot well), a more thorough calibration will be necessary.

1. Perform the basic calibration described on page 7.
2. Remove the water from the sample cup and thoroughly clean and dry the instrument.
3. Place the lid and cap back on the sample cup.
4. Attach the calibration fixture (#100-70-101) to the sample cup.



Calibration Fixture

5. Adjust the weights on the fixture until the unit balances at 1.00 specific gravity. Lock the weights so they do not move.

If the weights are too close to the cup, it may be necessary to remove some of the weights in order to achieve balance.

6. Fill the sample cup with deionized water and pressurize it.
7. Perform another basic calibration as described on page 7. The unit should balance at 2.00 specific gravity.

The rider can be moved .01 sg in either direction to achieve balance.



Note



Tip

Maintenance

1. Before every test, inspect the o-ring on the lid and the two o-rings on the check valve. Make sure they are not brittle, chipped, torn, or stretched. If any o-ring shows signs of wear, replace it with a new o-ring.
2. After each test, thoroughly clean the instrument, including the plunger, with water and an appropriate solvent. Make sure no test fluid (especially cement) remains on any surfaces. Repeatedly fill and purge the plunger assembly to remove any test fluid.
3. Always store the instrument clean and dry in the provided carrying case.

Warranty and Return Policy

Warranty:

OFI Testing Equipment, Inc. (OFITE) warrants that the products shall be free from liens and defects in title, and shall conform in all respects to the terms of the sales order and the specifications applicable to the products. All products shall be furnished subject to OFITE's standard manufacturing variations and practices. Unless the warranty period is otherwise extended in writing, the following warranty shall apply: if, at any time prior to twelve (12) months from the date of invoice, the products, or any part thereof, do not conform to these warranties or to the specifications applicable thereto, and OFITE is so notified in writing upon discovery, OFITE shall promptly repair or replace the defective products. Notwithstanding the foregoing, OFITE's warranty obligations shall not extend to any use by the buyer of the products in conditions more severe than OFITE's recommendations, nor to any defects which were visually observable by the buyer but which are not promptly brought to OFITE's attention.

In the event that the buyer has purchased installation and commissioning services on applicable products, the above warranty shall extend for an additional period of twelve (12) months from the date of the original warranty expiration for such products.

In the event that OFITE is requested to provide customized research and development for the buyer, OFITE shall use its best efforts but makes no guarantees to the buyer that any products will be provided.

OFITE makes no other warranties or guarantees to the buyer, either express or implied, and the warranties provided in this clause shall be exclusive of any other warranties including ANY IMPLIED OR STATUTORY WARRANTIES OF FITNESS FOR PURPOSE, MERCHANTABILITY, AND OTHER STATUTORY REMEDIES WHICH ARE WAIVED.

This limited warranty does not cover any losses or damages that occur as a result of:

- Improper installation or maintenance of the products
- Misuse
- Neglect
- Adjustment by non-authorized sources
- Improper environment
- Excessive or inadequate heating or air conditioning or electrical power failures, surges, or other irregularities
- Equipment, products, or material not manufactured by OFITE
- Firmware or hardware that have been modified or altered by a third party
- Consumable parts (bearings, accessories, etc.)

Returns and Repairs:

Items being returned must be carefully packaged to prevent damage in shipment and insured against possible damage or loss. OFITE will not be responsible for equipment damaged due to insufficient packaging.

Any non-defective items returned to OFITE within ninety (90) days of invoice are subject to a 15% restocking fee. Items returned must be received by OFITE in original condition for it to be accepted. Reagents and special order items will not be accepted for return or refund.

OFITE employs experienced personnel to service and repair equipment manufactured by us, as well as other companies. To help expedite the repair process, please include a repair form with all equipment sent to OFITE for repair. Be sure to include your name, company name, phone number, email address, detailed description of work to be done, purchase order number, and a shipping address for returning the equipment. All repairs performed as "repair as needed" are subject to the ninety (90) day limited warranty. All "Certified Repairs" are subject to the twelve (12) month limited warranty.

Returns and potential warranty repairs require a Return Material Authorization (RMA) number. An RMA form is available from your sales or service representative.

Please ship all equipment (with the RMA number for returns or warranty repairs) to the following address:

OFI Testing Equipment, Inc.
Attn: Repair Department
11302 Steeplecrest Dr.
Houston, TX 77065
USA

OFITE also offers competitive service contracts for repairing and/or maintaining your lab equipment, including equipment from other manufacturers. For more information about our technical support and repair services, please contact techservice@ofite.com.