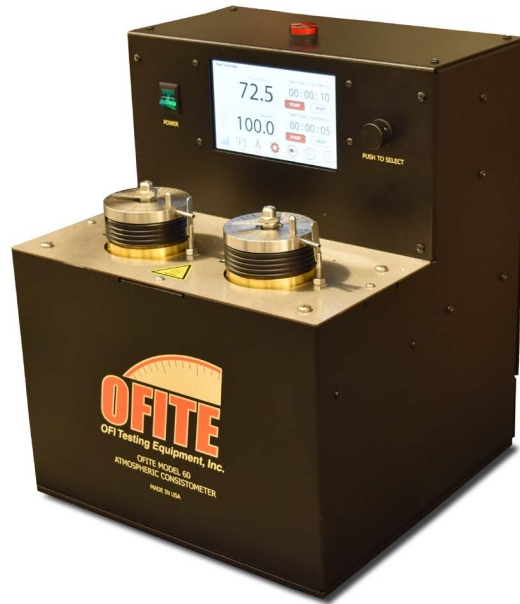




Dependable Products From People You Trust



Atmospheric Consistometer

#120-75 (115V)
#120-75-1 (220V)

Instruction Manual

Updated 9/20/2023
Ver. 10

OFI Testing Equipment, Inc.
11302 Steeplecrest Dr. · Houston, Texas · 77065 · U.S.A.
Tele: 832.320.7300 · Fax: 713.880.9886 · www.ofite.com

©Copyright OFITE 2015

Table of Contents

Intro.....	2
Description.....	2
Features.....	2
Requirements	2
Components	3
Setup.....	5
Loading the Test Cells	6
On-Screen Display	7
Operation.....	8
Calibration.....	9
<i>Torque Head</i>	<i>9</i>
<i>Temperature.....</i>	<i>10</i>
<i>Motor Speed</i>	<i>10</i>
<i>Timer.....</i>	<i>10</i>
Test Setup	11
Maintenance.....	13
Warranty and Return Policy	15

Intro

The Model 60 Atmospheric Consistometer is designed to condition cement slurries as specified within API Specification 10. Determination of rheological properties and examination of free water content require that the cement slurry be conditioned prior to testing. The OFITE Model 60 was specifically developed to perform these duties.

Description

A cement slurry is prepared according to the procedure outlined in the API Specification 10 and then placed in the slurry containers of the Model 60 Atmospheric Consistometer. The slurry is stirred at 150 RPM by an API-designed paddle assembly. The temperature is controlled by a microprocessor, which displays the process temperature via a digital indicator. Consistency, measured in Bearden Units of Consistency, is determined by measuring the deflection of a calibrated spring. The spring is connected to a pointer that rotates on a scale (numbered 1 through 10) on the slurry container lid. This deflection is created by the amount of torque that the cement slurry exerts on the paddle, which is a function of the consistency of the cement. The API defines 100 Bc as 2,080 g-cm of torque and each number on the lid is a multiple of 10 (1 equals 10 Bc, 5 equals 50 Bc, and 10 equals 100 Bc).

Features

- Redesigned frame and bearings reduces noise during operation
- Dual countdown timers that provide audible and visual notification for each container
- Program and control temperature with multiple profiles on the touch-screen display
- Process temperature displayed on the touch screen
- Cooling coil for low temperature conditioning (optional chiller available)
- Maximum operating temperature of 200°F
- Unit is operated at atmospheric pressure
- Heat transfer fluid is continuously circulated
- Heater wattage is 1,500
- Slurry container rotational speed is 150 RPM
- Dual container design
- Stainless steel temperature bath
- Optional deadweight calibration unit
- Size: 14.5" × 15.5" × 24.5" (37 × 39 × 62 cm)
- Weight: 95 lb (43.1 kg)
- Crated Size: 32" × 21" × 32" (81 × 53 × 81 cm)
- Crated Weight: 200 lb (90.7 kg)

Requirements

- Water Supply for Cooling
- Water Drain
- 220 Volt, 50/60 Hz, 2.2 KVA Power Source
- 120 Volt, 50/60 Hz, 4.4 KVA Power Source

Components

#120-001	Mineral Oil, 1 Gallon, Qty: 3
#120-75-8	Motor Timing Pulley
#120-75-17	Drive Housing
#120-75-18	Potentiometer Assembly
#120-75-19	Paddle Assembly
#120-80-6	Motor
#120-511	Slurry Cup Shear Pin
#121-001	Container O-rings
#121-002	Retaining Ring
#121-007-3	Main Bearing
#121-008	Thermocouple
#121-009	Timing Belt
#121-013	Slurry Container
#121-014	Container Bottom
#172-24	Solid State Relay
#174-14	Motor Controller

For 115 VAC Only:

#120-75-2	Water Solenoid Valve
#121-010	Heater
#122-074-1	Fuse, 5 Amp, 5 mm × 20 mm
#122-078	Fuse, 15 Amp, 5 mm × 20 mm
#152-37-3	AC Power Cord

For 230 VAC Only:

#120-75-3	Water Solenoid Valve
#121-010-1	Heater
#122-073-1	Fuse, 3 Amp, 5 mm × 20 mm
#122-075	Fuse, 7 Amp, 5 mm × 20 mm
#220-15A-EURO	AC Power Cord

Optional:

#120-76 Spare Parts for #120-75:

#120-001 Mineral Oil, 1 Gallon, Qty: 3
#120-75-19 Paddle Assembly, Qty: 2
#120-511 Slurry Cup Shear Pin, Qty: 10
#121-001 Container O-rings, Qty: 8
#121-002 Retaining Ring, Qty: 2
#120-004 Calibration Spring, Qty: 2
#121-005 Cap Nut
#121-008 Thermocouple
#121-009 Timing Belt, Qty: 2
#121-010 Heater
#121-013 Slurry Container
#121-014 Container Bottom, Qty: 2
#122-074-1 Fuse, 5 Amp, 5 mm × 20 mm, Qty 6
#122-078 Fuse, 15 Amp, 5 mm × 20 mm, Qty: 3

#120-76-1 Spare Parts for #120-75-1:

#120-001 Mineral Oil, 1 Gallon, Qty: 3
#120-75-19 Paddle Assembly, Qty: 2
#120-511 Slurry Cup Shear Pin, Qty: 10
#121-001 Container O-rings, Qty: 8
#121-002 Retaining Ring, Qty: 2
#120-004 Calibration Spring, Qty: 2
#121-005 Cap Nut
#121-008 Thermocouple
#121-009 Timing Belt, Qty: 2
#121-010-1 Heater
#121-013 Slurry Container
#121-014 Container Bottom, Qty: 2
#122-073-1 Fuse, 3 Amp, 5 mm × 20 mm, Qty: 6
#122-077 Fuse, 10 Amp, 5 mm × 20 mm, Qty: 3

#120-75-30 Calibrator Assembly
#152-55 Bath/Circulator, Refrigerated and Heated, 115 VAC, 60 Hz
#152-55-1 Bath/Circulator, Refrigerated and Heated, 230 VAC, 50 Hz

Setup



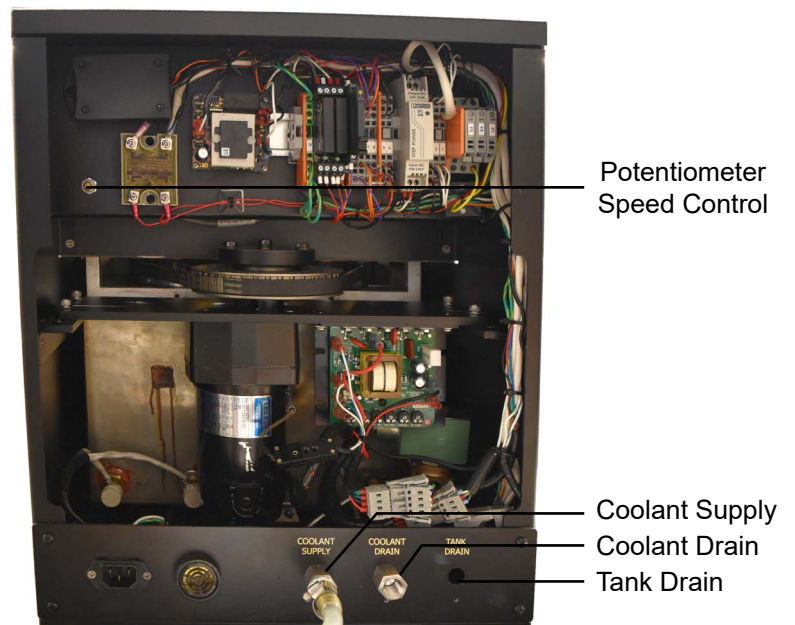
1. Carefully remove the unit from the crate and place it close to a water supply and drain.

Coolant Supply and Coolant Drain lines are ¼" tube connections and the Coolant Supply port should be connected to a 40 PSI (275.8 kPa) water source. The Coolant Drain is the port located on the right of the lower back instrument panel.

2. Fill the bath with approximately 2 gallons of mineral oil to submerge the test cells at least half way. The oil must cover the thermocouple inside the bath.

Do not overfill the bath.

3. Connect the unit to a grounded and fused 10-amp electrical supply.
4. The rotational speed of the unit may need to be adjusted periodically.
 - a. Turn on the electrical power and start the motor.
 - b. Measure the rotational speed of the rotators with a hand held tachometer. The rotational speed should be $150 \text{ rpm} \pm 15$.
 - c. If adjustment is required, loosen the three screws on the back panel of the unit and open the door. Directly to the right of the motor is the motor speed potentiometer.
 - d. To increase the rotational speed, turn the potentiometer speed control clockwise. Turn it counterclockwise to reduce the speed.



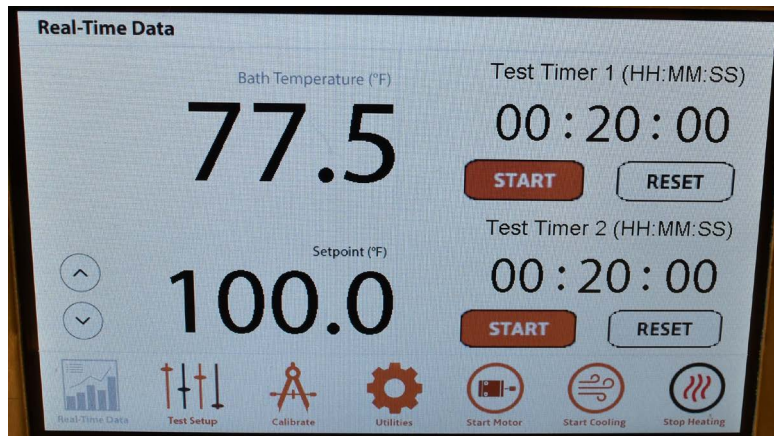
Loading the Test Cells

1. Prepare the cement slurry and pour it into the slurry container as specified in API Specification 10.
2. Insert the paddle into the test cell. Make sure the point on the end of the paddle is inserted into the hole in the bottom of the test cell.
3. Place the lid on the test cell by sliding the torque shaft over the end of the paddle. Turn the lid clockwise until the pin in the torque shaft engages with the slot in the paddle shaft.
4. Continue turning the lid to lock it in place on top of the test cell.
5. Lower the test cell into the bath and lock it in place with the locking pins.



On-Screen Display

The on-screen display controls the temperature, motor, and timer for the Atmospheric Consistometer. At the bottom of the screen is a series of buttons.



The **Real-Time Data** button returns you to the main screen, which shows the Bath Temperature, Temperature Setpoint, and the two timers.

The **Test Setup** button takes you to the Test Setup screen where you can create advanced temperature profiles. See page 11 for more information.

The **Calibrate** button takes you to the Calibration screen where you can calibrate the various instruments in the Consistometer. See page 9 for more information.

The **Utilities** button takes you to the Utilities screen where you can set the temperature units (°F or °C).

The **Start Motor** button starts the motor. Press the **Stop Motor** button to stop the motor.

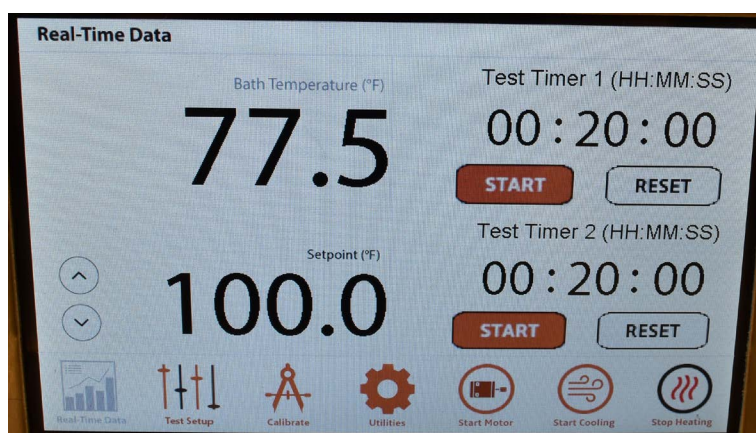
The **Start Cooling** button opens the cooling valve and allows cooling water to circulate through the bath. Press **Stop Cooling** to close the valve and stop the flow of water.

The **Start Heating** button turns on the heater. Press the **Stop Heating** button to turn the heater off.

Operation

The OFITE Atmospheric Consistometer performs two functions. It can be used to condition a cement slurry or to perform a thickening time test as detailed in API Specification 10.

1. Turn the “Power” switch on.
2. On the display, touch the temperature setpoint and enter the test temperature or use the up and down arrows to set the test temperature.



3. Load one or both test cells. Refer to “Setup - Loading the Test Cells” on page 6 for details.



It is very important that you begin the test within one minute of mixing the cement slurry.

4. Touch the “Start Motor” button to start the motor.
5. Touch the “Start Heating” button to start the heater.
6. On the “Test Timer 1” or “Test Timer 2” touch the hours, minutes, or seconds and enter the appropriate value to set the timer. When the timer counts down to zero, an alarm will sound.
7. Touch the “Start” button to start the timer.
8. When the test or conditioning is complete, touch the “Stop Motor”, “Stop Heating”, and “Start Cooling” buttons.
9. When the slurry containers are cool enough to handle, remove them from the unit and pour the cement slurry into the container for the intended test. Thoroughly clean the containers with soap and water. Be sure to remove any residual cement.

Calibration

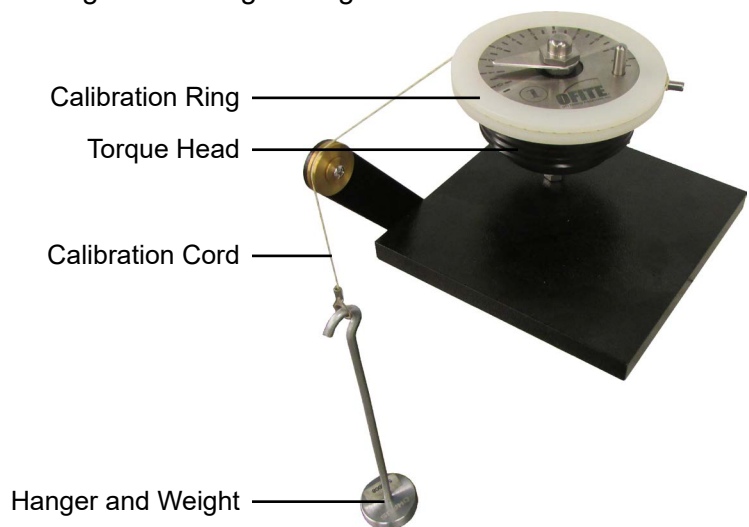
Torque Head

Calibrating the torque head provides a reference point for interpreting test results. The optional Calibrator Assembly (#120-75-30) uses dead weight to simulate resistance on the torque head. To calibrate, three different weights are applied and the corresponding torque head readings are recorded. During operation, compare the torque head reading to those recorded during calibration to determine the amount of resistance being put on the torque head.

Before calibrating the torque head, test the container paddle for excessive friction by running the sample container without any cement slurry in it. If the paddle is bent and rubbing on the side of the slurry container or if the bearings are damaged, excessive friction will show on the dial (refer to the maintenance section on page 13 for more information). Correct any defects before calibrating the torque head.

Calibration instructions are described in API-RP-10-B. Your instrument is equipped with an instrument-mounted calibration unit.

1. Place the torque head onto the calibration stand.
2. Place the calibration ring around the torque head.
3. Wrap the deadweight calibration cord counterclockwise around the calibration ring and over the roller.
4. Place 400 g on the weight hanger and attach it to the calibration cord.



Note

When adding weights, remember that the hook weighs 50 grams. Therefore, to test the potentiometer at 200 g, you only need to add 150 g to the hook.

Calibration

Temperature

5. Pull the weight down several times to obtain an average reading.
6. Repeat this process with 50 g and 200 g. Record each weight and the corresponding reading. These values will help you interpret the potentiometer readings.

1. Place one slurry container in the Consistometer and leave the other one out.
2. Place a reference thermometer in the open hole as close as possible to the thermocouple.
3. Heat the Consistometer to at least three different temperatures from ambient to 190°F (88°C) to verify it is in calibration.

Calibration

Motor Speed

1. Remove the slurry containers.
2. Place a strip of reflective tape on the rotor.
3. Start the motor and use a laser tachometer to measure the speed of the rotor.
4. If the rotational speed is not 150 rpm \pm 15, refer to page 5 to adjust the speed.

Calibration

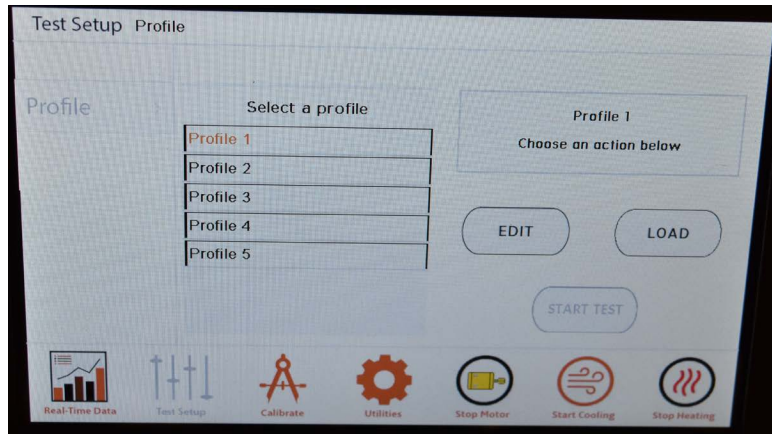
Timer

The timer should be accurate to within one second per 12 minutes. To verify the timer, start the timer at the same time as a certified timer and compare the two readings after 12 minutes.

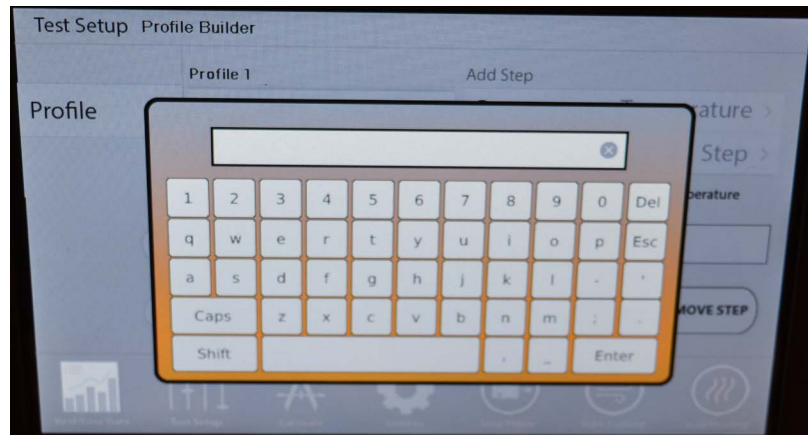
Test Setup

The Atmospheric Consistometer can be programmed with different temperature profiles.

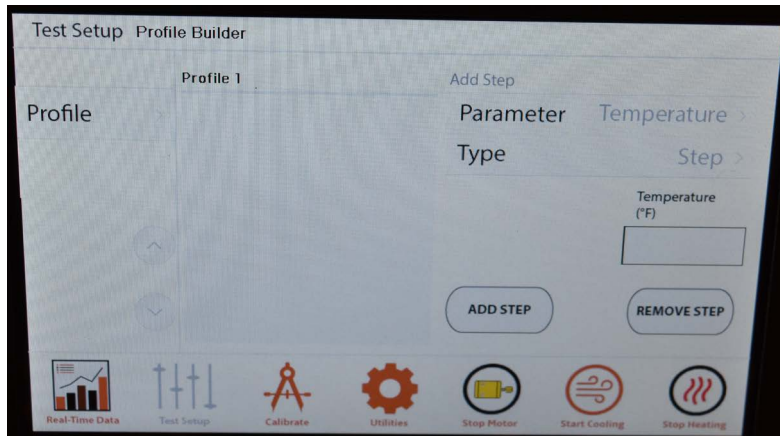
1. Touch the “Test Setup” button.
2. Choose a profile and touch the “Edit” button.



3. To change the name of the profile, touch the profile name above the step list. A keyboard will appear. Type the profile name and touch “Enter”.



4. Touch “Type” to choose between Step and Dwell:
 - **Step:** Change the temperature of the bath as fast as possible.
 - **Dwell:** Hold the current temperature for a specified period of time.



5. Touch “Profile” to go back.
6. Touch “Load” to load the test profile into memory.
7. Touch “Start Test” to run the temperature profile. The display will return to the “Real-Time Data” screen.



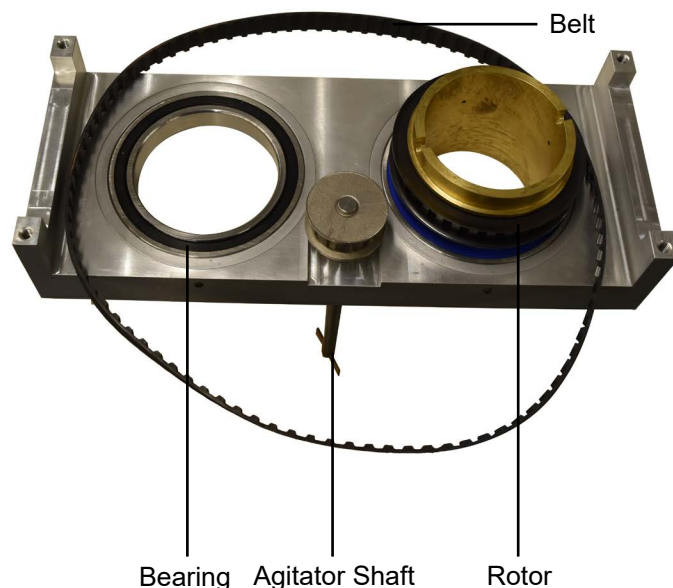
Note

The timers on the “Real-Time Data” screen will be disabled while a test is running.

8. To stop the test, touch “Test Setup” and then “Stop Test”.

Maintenance

1. The belt and bearings that drive the rotators should be inspected annually. Disassemble the unit to access the bearings and belt:
 - a. Disconnect the unit from all electrical power.
 - b. Unscrew and remove the back protective cover plate.
 - c. Loosen the screws on the motor mount and push the motor forward.
 - d. Remove the belt from the motor timing sprocket.
 - e. Remove the drive belt out of the motor pulley by loosening the four set screws on the motor plate.
 - f. Remove the three small screws on the upper cover at the edges of the frame. Then, set it on blocks or on a bucket to prevent damage to the agitator shaft.
 - g. Pull out the rotator and examine the main bearings for damage and wear. Annually clean the bearings by lightly spraying them with WD-40. If they do not turn freely and smoothly, replace them with new bearings.
 - h. Inspect the belt for damage or wear. If necessary, replace it with a new belt.
 - i. Re-assemble the unit, pushing the belt through the bath slot.
 - j. Pull the motor back only enough to prevent belt slippage. Allow approximately $\frac{3}{4}$ " to 1" slack in the timing belt to prevent excessive side load to the bearings.



2. The bath should be checked and cleaned annually.
 - a. Access the bath housing as described in steps a through f on the previous page.
 - b. Visually inspect the mineral oil in the bath. If it contains any foreign material, pour out the entire contents and refill with clean mineral oil.
3. Slurry containers and paddles should be kept as clean as possible. The lid should be thoroughly cleaned and any build up of cement should be removed.
4. The unit has four fuses, located on the front panel beneath the four power switches. If any of the switches stop working, check the corresponding fuse. To remove a fuse, twist and pull the knob. After replacing the fuse, reinsert it into the slot and twist it to secure it in place.
5. To replace the main bearings:
 - a. Remove all of the set screws in the front and rear side of the drive housing.
 - b. Push the bearing up and out from below.

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.