

**OFI**

**MODEL 60**

**ATMOSPHERIC**

**CONSISTOMETER**

**INSTRUCTIONAL**

**MANUAL**

# **OPERATING INSTRUCTIONS**

## **OFI MODEL 60 ATMOSPHERIC CONSISTOMETER**

### **GENERAL**

The Model 60 Atmospheric Consistometer is utilized to condition cement slurries as specified within API Specification 10. Determination of rheological properties, examination of free water content and evaluation of the API fluid loss test all require that the cement slurry be conditioned by an atmospheric consistometer. OFI's Model 60 was specifically developed to perform these duties.

### **METHOD OF OPERATION**

A cement slurry is prepared according to the procedures as outlined within API Specification 10 and then placed within the slurry containers of the Model 60 Atmospheric Consistometer. The slurry is stirred at 150 rpm by an API designed paddle and the temperature is increased to the desired temperature. The temperature is controlled by a microprocessor which displays the process temperature via a digital indicator. Consistency, measured in Beardon Units of Consistency, is determined by measuring the deflection of a calibrated spring. This deflection is created by the amount of torque that the cement slurry exerts upon the paddle and is a function of the consistency of the cement. The API defines 100 Bc as 2080 gm-cm of torque.

### **MODEL 60 FEATURES AND SPECIFICATIONS**

- Maximum Operating Temperature of 200 F.
- Unit is Operated at Atmospheric Pressure.
- Temperature is Maintained via a PID Controller.
- Process Temperature is Displayed Digitally.
- Heat Transfer Fluid is Continuously Circulated.
- Heater Wattage is 1500.
- Slurry Container Rotational Speed is 150 rpm.
- Dual Container Design.
- Cooling System Included.
- Stainless Steel Temperature Bath.
- Deadweight Calibration Unit

### **INSTRUMENT 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

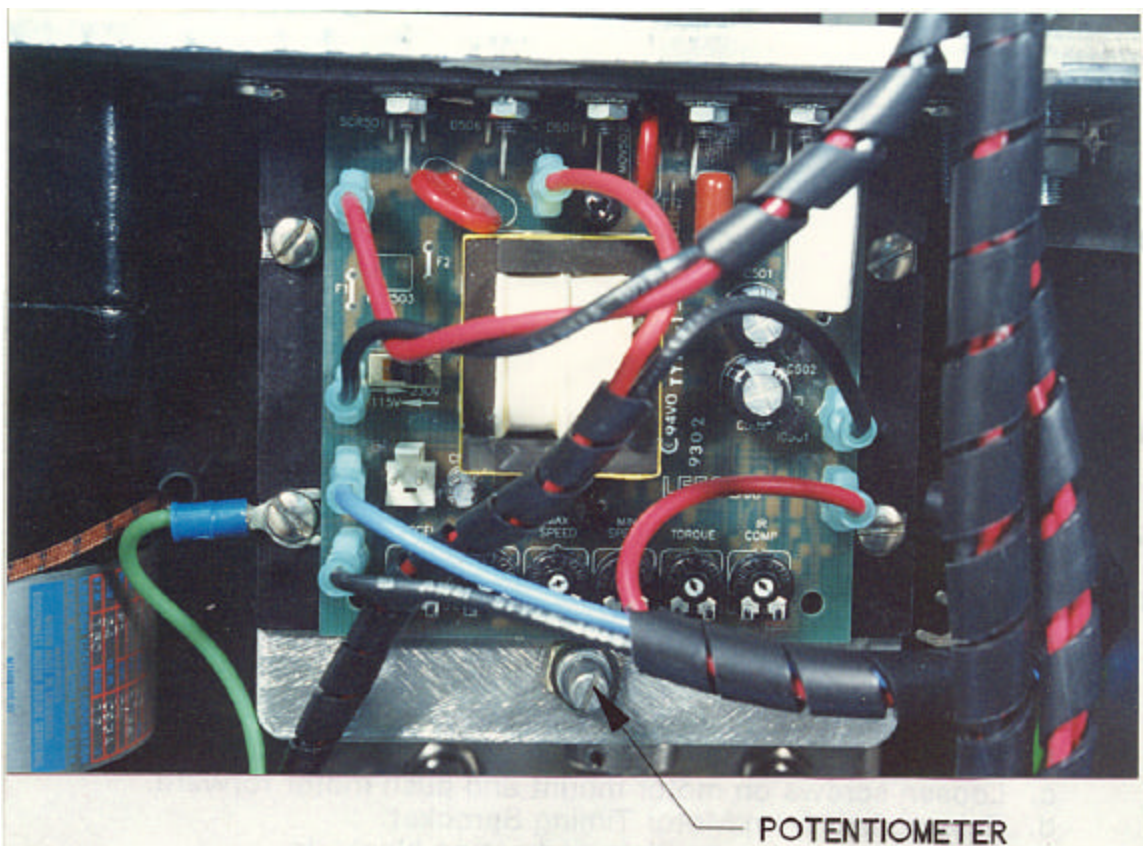
## BASIC INFORMATION

1. The atmospheric consistometer consists of a cabinet which houses the instrument, drive mechanism, water bath and cooling coils, with two sample containers for testing specimens of cement.
2. An instrument panel with components that allows the technician to control the bath temperature from ambient to 200 degrees F., and rotation of the two sample containers at 150 rpm. Units of consistency of the sample are directly indicated on the scale located on the top of the lid assembly.
3. The slurry containers are rotated by engaging the pins located on the lid assembly into the slots of the rotator.
4. The electric motor in the instrument should be turned off while engaging the slurry container.
5. Distilled water is recommended for the bath, but, many technicians like to use glycerin to reduce the steam exhaust from water when it is used.
6. A complete instructional manual, wiring schematics, instrument panel drawings and parts list are furnished with each instrument. The operator should study the above mentioned documentation before attempting to operate the unit.

## INSTALLATION INSTRUCTIONS

1. The unit should be carefully removed from the wooden crate and placed upon a Benchtap located close to a water supply and drain.
2. Water supply and drain lines are 1/4" tube connections and the water supply port should be connected to a suitable (40 psi) water source. The **water drain** is the port located near the **middle** of the lower back instrument panel.
3. The temperature bath should be filled with either water or glycerin. Enough liquid should be poured into the bath so that when the containers are placed in the unit they are submerged approximately half way. **Do not overfill the bath.**
4. The unit should be connected to a grounded and fused 10 amp electrical supply.

5. The rotational speed of the unit can be adjusted if necessary by performing the following:
  - 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 rpm + or - 15.
  - C. If adjustment is required loosen the three screws on the back panel of the unit. Open the door and directly to the right of the motor is the motor speed controller.
  - D. Rotational speed may be regulated as necessary by adjusting the speed control potentiometer (refer to the diagram below). Rotating the potentiometer clockwise increases the speed.



## CALIBRATION INSTRUCTIONS

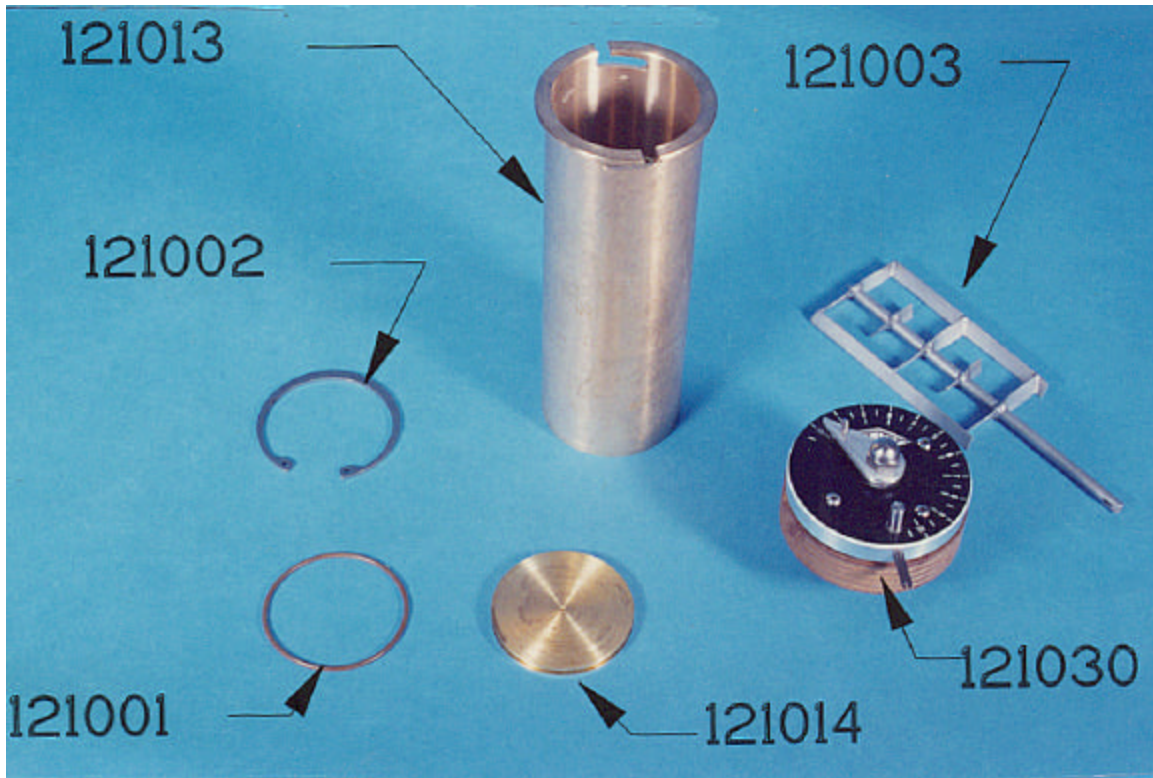
1. Before calibration of the torque head the container paddle should be tested for excessive friction by running the sample container without any cement slurry in it. If there is excessive friction caused by a bent paddle rubbing the side of the sample container the appreciable movement will be shown on the scale located on top of the torque head. As well as the paddle the bearings located inside the torque head caused excessive friction and the bearing should also be checked. Any defects should be corrected before calibration of the torque head.
2. Calibration instructions are described in API-RP-10-B. Your instrument is equipped with a instrument mounted calibration unit. The Calibrating Ring should be installed upon the torque head as this will increase diameter of head to 5.2 cm. Place the deadweight calibration cord counter clockwise around the Calibration ring, over roller and attach weigh hanger. Attach 250 grams on hanger, pull the weight down several times to obtain an average reading. The indicator should be set at 6 (60 Bc). The torque spring inside the head is adjustable by loosening a set screw. If the reading on the scale is above 60 Bc the spring should be moved to the right, if below 60 Bc move to left. After the torque spring is adjusted the indicator hand is set to "0" by loosening the top nut.
3. If Paratone is used to calibrate, the bath temperature should be allowed to reach approximately 120 degrees F. and the containers placed in the rotators allowing them to reach temperature before turning on the motor. Paratone at lower temperatures is very viscous and the excessive torque will cause motor over-load.
4. Follow the temperature controller guidelines as stated within the manufacture's manual.

## MAINTENANCE INSTRUCTIONS

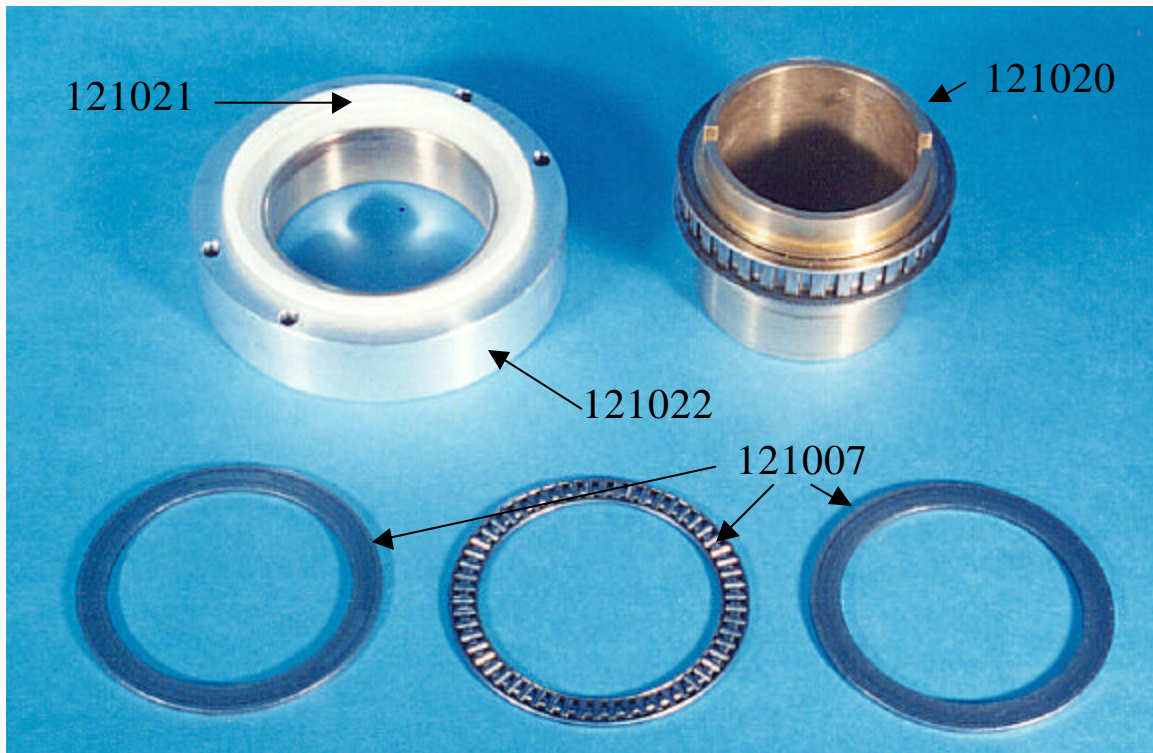
1. The rotators are driven in trust bearings. It is recommended that the thrust bearings be lubricated periodically (a few drops of oil before every other test is sufficient) with a light lubricating oil. The bearings can be examined and lubricated as follows:
  - a. Remove electrical power from the instrument.
  - b. Remove back protective cover plate.
  - c. Loosen screws on motor mount and push motor forward.
  - d. Release belt from Motor Timing Sprocket.
  - e. Remove Upper Cover Plate and set on blocks to prevent damage to agitator shaft.
  - f. Loosen four (4) screws allowing top plate to be removed from bearing housing.
  - g. Pull rotator and apply grease generously at bearings.
  - h. Re-assemble, pushing belt through water bath slot.
  - i. Pull motor back **only enough to prevent belt slippage**, allow

approximately 3/4 to 1" slack in timing belt to prevent excessive side thrust to bearings.

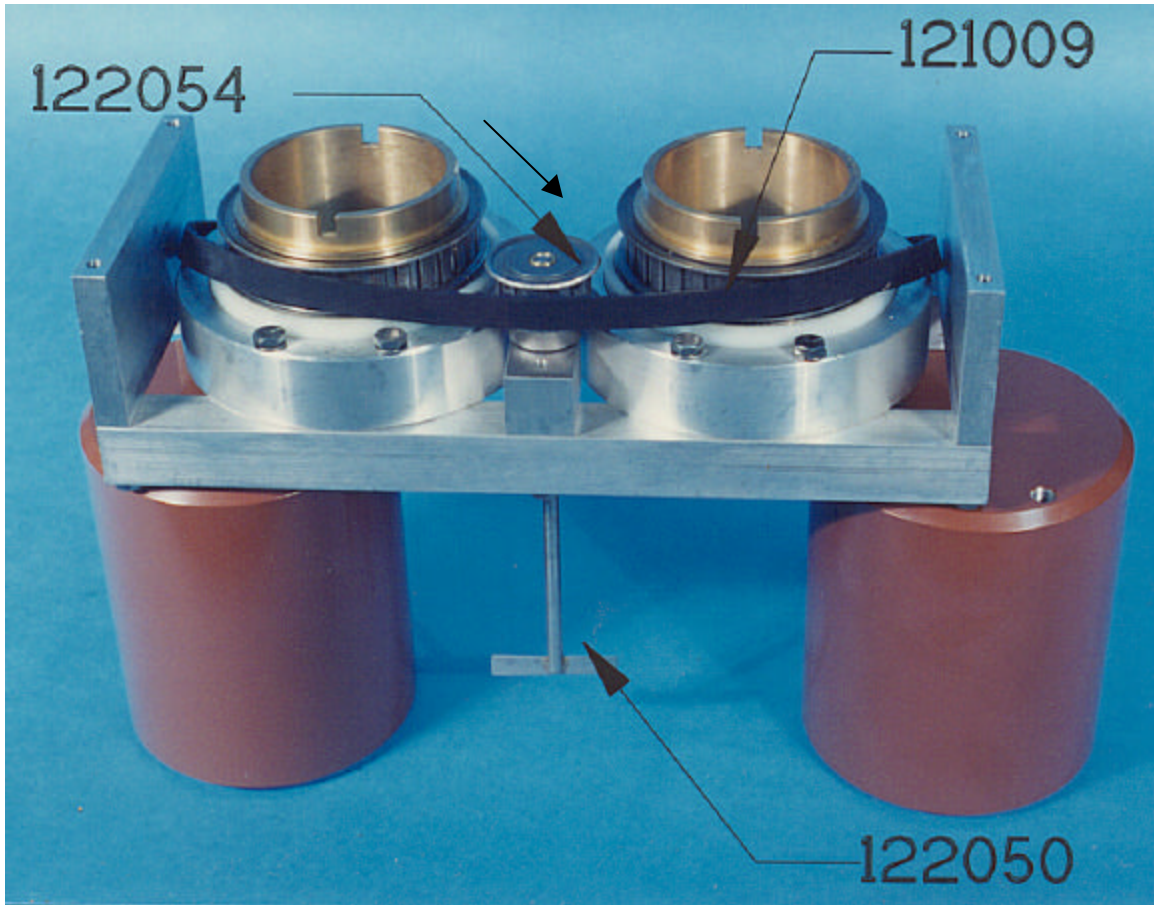
2. The gear train of the motor is submerged in oil. The motor should be removed semi-annually, or as required, and the oil level checked. Use SAE 40 oil or equivalent in the gear train.
3. The water bath should be periodically checked and cleaned annually.
4. Containers and paddles should be kept clean as possible and a light coating of grease on these components will facilitate cement removal.



*Slurry Cup Components*



*Drive Assembly With Thrust Bearings*



*Drive Belt and Impellar Shaft Assembly*

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