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Model 240 - Manually Operated Compressive Strength Tester

Part No. 120-29

Instruction Manual

**Updated 6/1/2009
Ver. 2.0**

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Intro

The OFITE Model 240 Manually Operated Compressive Strength Tester was designed to determine the compressive strength of a well cement. The most common means of determining the compressive strength of a cement involves applying a force to the sample at a constant rate until the sample fails. The maximum loading at which the cement fails is defined as the cement's compressive strength. Unfortunately, data obtained from this type of testing is typically inconsistent and widely varied. Manually operated hydraulic presses are normally used for testing purposes and maintaining a constant loading rate is very difficult. OFITE's Benchtop Compressive Strength Tester incorporates a micro-metering valve, which permits the operator to control the loading rate. Operator inconsistencies are significantly reduced in comparison to other manually operated hydraulic presses.

Description

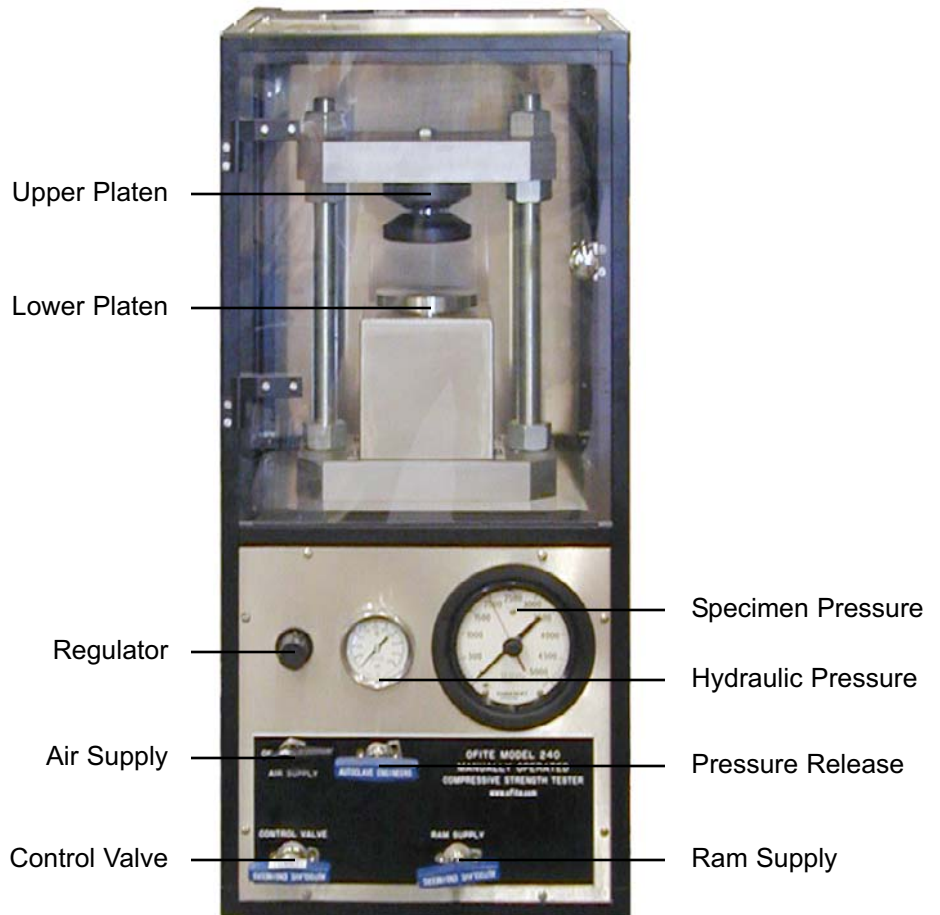
A cement slurry is prepared according to the guidelines outlined in API Specification 10 and placed into typical 2" x 2" x 2" cement molds. The molds are placed into a Curing Chamber (Autoclave) and allowed to cure at either simulated well conditions or at temperatures and pressures classified by a schedule within API Specification 10. The cement specimens are allowed to cure for a predetermined amount of time and then removed from the Curing Chamber. The sample is then placed onto the platen of the Compressive Strength Tester. Approximately 5,000 PSI (34,475 kPa) of hydraulic energy is obtained on the closed system with an air driven hydraulic pump. The micro-metering valve is then used to maintain the loading rate on the specimen until failure.

Specifications

- Maximum Press Capacity of 40,000 lbs.
- Micro-metering Valve Controls Loading Rate
- Infinitely Variable Loading Rates
- Compact Design
- Safety Shield Protects Operator

Installation

1. Carefully remove the instrument from the wooden crate.
2. Leveling legs are provided to level the instrument. Rotate the legs until the instrument is level.
3. Connect a Nitrogen air supply (100 - 200 PSI / 689.5 - 1,379 kPa) to the 1/4" NPT connection on the back of the instrument cabinet.
4. Remove the back cover of the instrument cabinet to expose the hydraulic reservoir. Remove the cap from the vent tube located on the hydraulic reservoir. Replace the back cover.
5. The unit is shipped with approximately 600 cc of hydraulic oil in the reservoir. Additional fluid is not needed.



Testing



1. Make sure that all the valves are in the off position (turned clockwise) except the “Control Valve”, which should be set to zero.

The “Control Valve” is a micro-metering valve designed to accurately meter fluids, not shut them off. A value of zero on the metering scale is the minimum setting. It should never be fully closed or tightened to a value of less than zero. Doing so may damage the device.

2. Rotate the air regulator fully counter-clockwise and turn the “Air Supply” valve on.
3. Adjust the air regulator clockwise until the hydraulic pressure measures approximately 5,000 PSI (34,475 kPa) on the Hydraulic Pressure gauge.
4. Place the cement specimen on the platen and close the door. Note that the hydraulic ram only has a travel distance of one inch and that the upper platen should be adjusted so that the cube has approximately ¼” clearance between the platens.
5. Open the “Control Valve” approximately one revolution.
6. Open the “Ram Supply” valve slightly. The hydraulic ram will start moving upwards at this point and the hydraulic pump will start to cycle to maintain the hydraulic pressure at approximately 5,000 PSI.
7. When the specimen comes in contact with the upper platen and pressure begins to register on the Specimen Pressure gauge, close the “Ram Supply” valve to stop the ram.
8. Return the “Control Valve” to the “Zero” position and open the “Ram Supply” valve approximately one turn. You can now control the ram with the micro-metering “Control Valve”.
9. Using a stop watch and by adjusting the “Control Valve” apply the desired loading rate to the specimen until the cube fails. Generally the “Control Valve” should not be opened more than 3 or 4 divisions. The crush pressure will be indicated by the red pointer on the Specimen Pressure gauge. To calculate the compressive strength of the specimen:

$$\text{Compressive Strength} = P_c \times 3.976 / A_c$$

Where:

P_c = Crush Pressure

A_c = Cross Sectional Area of the Cube

10. When the cube fails, close the “Ram Supply” valve to prevent further movement of the hydraulic ram.
11. To release pressure from the system, turn the air regulator fully counter-clockwise. Open the “Pressure Release” valve and the “Control Valve” until the hydraulic ram returns to its lowered position.

Maintenance

The oil from the reservoir should be drained and replaced yearly. Use clean, hydraulic-grade oil. A syringe and fill tube have been included with the unit.