

# MODEL T8

## Operation and Calibration Instructions

Part No. MRC006189

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# OPERATING INSTRUCTIONS

AND

# CALIBRATION CHARTS

## **MODEL T8**

REV	E.O.	DESCRIPTION	PART NUMBER	DATE
A	31673	MANUAL	MRC006189	9-96

# Table of Contents

Operating Instructions .....	1
Description of Instrument.....	1
Comparative Testing .....	2
Moisture Percentage Testing Using Calibration Curve .....	2
How to Make a Calibration Curve.....	3
How to Check For Calibration Accuracy.....	3
Recharging the Battery .....	4
Maintenance and Servicing .....	4
Warranty .....	4
Appendix 1 .....	5
Notes: .....	8

## **Operating Instructions**

Your Model "T" offers new flexibility and adaptability for the various problems of moisture testing. This instrument uses solid state circuitry for more reliable operation along with long battery life. It may be used either for comparative testing without calibrations, or as percent moisture determining instruments when used with calibration curves or charts. Four sensitivity settings provide a greater range of moisture testing ability than has previously been offered in a portable instrument. Built-in calibration standards insure the instrument accuracy at all times and also make possible suppressed zero operation. The three concentric brass rings of the electrodes provide an electrical penetration into the sample to a depth of 1/8 inch. Single unit design provides greater strength, lighter weight and easier handling. The Ni-Cad rechargeable battery virtually eliminates battery replacement.

## **Description of Instrument**

The plastic handle contains a spring-load switch bar. The instrument is turned ON merely by depressing the switch bar with thumb pressure, or by squeezing the handle when the instrument is picked up with either hand. The MOISTURE RANGE switch provides four sensitivity settings. Position #4 has the highest sensitivity, Position #1 the lowest. Thus range #4 will give the greatest dial spread between moistures, but has the lowest peak moisture percentage. The STANDARD switch inserts the calibration standards in the circuit. The OUT position is used for all moisture testing. The IN position is used only during instrument adjustment. The ADJUST knob is used to set the meter pointer to the correct "Standard In" reading before making tests.

It is also used when checking the instrument for calibration accuracy. Four trimmer adjustments are located underneath a cover plate on the side of the instrument. They are used to restore the calibration accuracy for the corresponding sensitivity ranges if required.

The numerical meter scale is NOT a percentage scale, but is used along with a chart or calibration curve. The colored scale is used when making comparative tests without calibrations. A special moisture percentage scale may be printed above the other two for any one type of material.

## Comparative Testing

### How to Determine Instrument Settings for New Materials

1. **Select Sample:** Carefully select or create a sample that is known to have the most desirable moisture condition. This sample must have the same physical characteristics (shape, thickness, temperature, etc.) as the production material.
2. **Test Sample – Adjust Reading:** Turn STANDARD switch OUT and MOISTURE RANGE switch to #4. Press the electrode of the instrument firmly against the “OK” sample. While holding a steady reading, rotate the adjust knob until the meter reads on the “OK” in the green zone. If the reading cannot be brought down to the correct position, the RANGE switch will have to be set to a lower number for the decreased sensitivity.
3. **Check Standard:** With the meter reading adjusted to “OK” keep the instrument ON but lift it at least 3” away from any object. Turn STANDARD switch IN and record the dial reading obtained on the material scale.
4. **Record “Comparator” Settings:** Record both the MOISTURE RANGE number and the standard IN readings for future use. At anytime in the future if the instrument is reset to these settings, it will again read properly on this particular material. An example of this recording would be “Material X Range #4 – Standard In – 35”.

### How to Make Comparative Tests

1. **Adjust Instrument to Comparative Settings:** Look up the comparator settings for the material to be evaluated. Turn the MOISTURE RANGE switch to the correct number. Turn STANDARDS switch IN. Depress the switch bar to turn instrument ON and hold the electrode at least 3” away from any object. Rotate the ADJUST knob until the meter pointer is set to the correct reading. Turn STANDARD switch OUT.
2. **Test Sample:** Press the electrode of the instrument firmly against the sample of material. Be sure that all of the electrode rings are in contact with the sample. Rock the instrument slightly to obtain the highest steady dial reading.
3. **Read the Meter:** The closer the meter reads to the center of the green “OK” zone, the closer the moisture content is to being correct. If the sample is too wet or too dry, the meter will be in the red zone so marked. Out-of-tolerance limits can be established anywhere in the red zones by use of the numbered zones in accordance with the job requirements. For extreme close control, limits can be set inside of the green zone or by using the 20-25-30 zone of the numerical scale.

## Moisture Percentage Testing Using Calibration Curve

1. **Adjust Instrument to Calibration Settings:** Look up the calibration settings on the calibration curve or chart for the material to be tested. Turn the MOISTURE RANGE switch to the correct number. Turn the STANDARD switch IN. Depress the switch bar to turn the instrument ON and hold the electrode at least 3” away from any object. Rotate the ADJUST knob until the meter pointer is set to the correct reading. Turn the STANDARD switch OUT. If the standard IN readings were less than “50”, the standard OUT reading will be below “0”. This is normal operation whenever suppression is being utilized.
2. **Test Sample:** Press the electrode of the instrument firmly against the sample of material. Be sure that all of the electrode rings are in contact with the sample. Rock the instrument slightly to obtain the highest steady dial reading. Read the meter dial.
3. **Convert to Percent Moisture Content:** Refer the dial reading against the calibration curve chart for material being tested. This will show the percent moisture content.

## How to Make a Calibration Curve

A calibration curve can be created by making readings on a prepared series of samples which cover the desired moisture range. These same samples are then tested by oven drying or other standard methods for moisture percentages. These dial readings and moisture percentages are then plotted on a graph and an average curve drawn through the points. Model "T" measures the moisture in a volume of material 3" square and 1/8" thick.

Approximately 10-12 samples of this size are required for a good curve. The various samples should either be exposed to different humidity, or wetted or dried until they reach different moistures. Sufficient time should then be allowed for them to stabilize at this condition.

- 1. Select Samples:** Best "Calibration Setting" for the instrument can be determined by making instrument readings on just the very wettest and the very driest samples.
- 2. Test Samples – Adjust Reading:** Turn STANDARD switch OUT and MOISTURE RANGE switch to #4. Press the electrode of the instrument firmly against each of the two samples in turn. Rotate the ADJUST knob until both samples will read on-scale and are well spaced on the meter dial. If both wet and dry samples cannot be read on scale with the same setting, then the MOISTURE RANGE switch will have to be set to a lower number for decreased sensitivity.
- 3. Check Standard In:** Without making changes from the above settings, hold the instrument so the electrode is at least 3" away from any object. Turn STANDARD switch IN and record the dial reading obtained on the numerical scale.
- 4. Record Calibration Setting:** Record both the MOISTURE RANGE number and the standard IN readings for future use. At anytime in the future, if the instrument is reset to these settings, it will again read properly on this particular material.

**NOTE:** Changing the standard IN reading will change the location of the curve on the graph without effecting the curve shape and hence can be used to move the curve to the best location on the graph. For example, if standard IN at "30" gives a curve between 20 and 45 on the dial, moving the standard IN reading down to "20" will move the curve down to between 10 and 35.

## How to Check For Calibration Accuracy

The calibration accuracy of the instrument can easily be checked at anytime. Normally once a month is sufficient, unless the temperature where the instrument is being used varies widely from the temperature where the previous check and/or adjustment were performed. It is best to check the calibration accuracy just prior to making any calibration curves.

- 1. To Check:** Turn the MOISTURE RANGE switch to #4 and the STANDARD switch to OUT. Turn instrument ON and hold the electrode at least 3" away from any object. Rotate the ADJUST knob until the meter reads exactly at "0". Rotate the STANDARD switch IN. The meter reading should now be "50" plus or minus 1 division. If not, the #4 trimmer will have to be adjusted.
- 2. To Adjust:** Remove one screw and swing aside the trimmer cover plate. Adjust trimmer #4 until standard IN reads exactly at "50". Now recheck standard OUT and IN readings. Repeat until reading is correct. The other three MOISTURE RANGE positions should be checked out by following the above procedures for each one.

## **Recharging the Battery**

All Model T instruments are equipped with a Ni-Cad rechargeable battery. A small connector plug is located on the back of the instrument just above the electrode. The power cord furnished with the instrument is connected between this plug and 110 volt electrical outlet.

The Model T circuit is designed so the instrument cannot operate if the battery voltage falls too low. As the battery approaches this condition, the instrument will start to become slightly erratic and it will be difficult to hold a STANDARD reading. This is a sign that the battery should be recharged.

Normal usage from a fully charged battery can run about a week for extensive testing, up to several weeks more under more moderate testing.

It is recommended that the battery be plugged in and recharged overnight about every two weeks. The battery cannot be damaged by overcharging, but it is not recommended that it be charged for more than 24 hours at any one time. If caught unexpectedly with a discharged battery, you can get a considerable number of tests after a charging period of just one hour.

## **Maintenance and Servicing**

The meter pointer should always be exactly at "0" on the dial when the instrument is OFF. If necessary, reset it by turning the screw located on the meter cover at the pointer pivot.

Keep metal parts of the electrode clean at all times. Dirty contacts mean low readings. Use no solvent other than alcohol to clean the electrode.

Prolonged contact with moving samples will cause a heat build up in the electrode sufficient to distort the plastic casting. If tests are necessary on moving materials, confine tests to a series of short tests far enough apart to hold the heat down.

If the instrument cannot be reset to calibrations accuracy and this cannot be corrected after battery recharging or replacement, then the instrument should be returned to the factory for servicing. It is recommended that the instrument be returned to the factory once every 2 or 3 years for check-up.

## **Warranty**

Your Model "T" is under warranty for a period of 6 months from the date of shipment against defective materials and workmanship. Any damage to the instrument due to accident, neglect, or misuse is not covered under this warranty. The warranty is invalidated if anyone other than the factory servicemen attempt repairs or take the instrument apart, other than to replace the batteries.

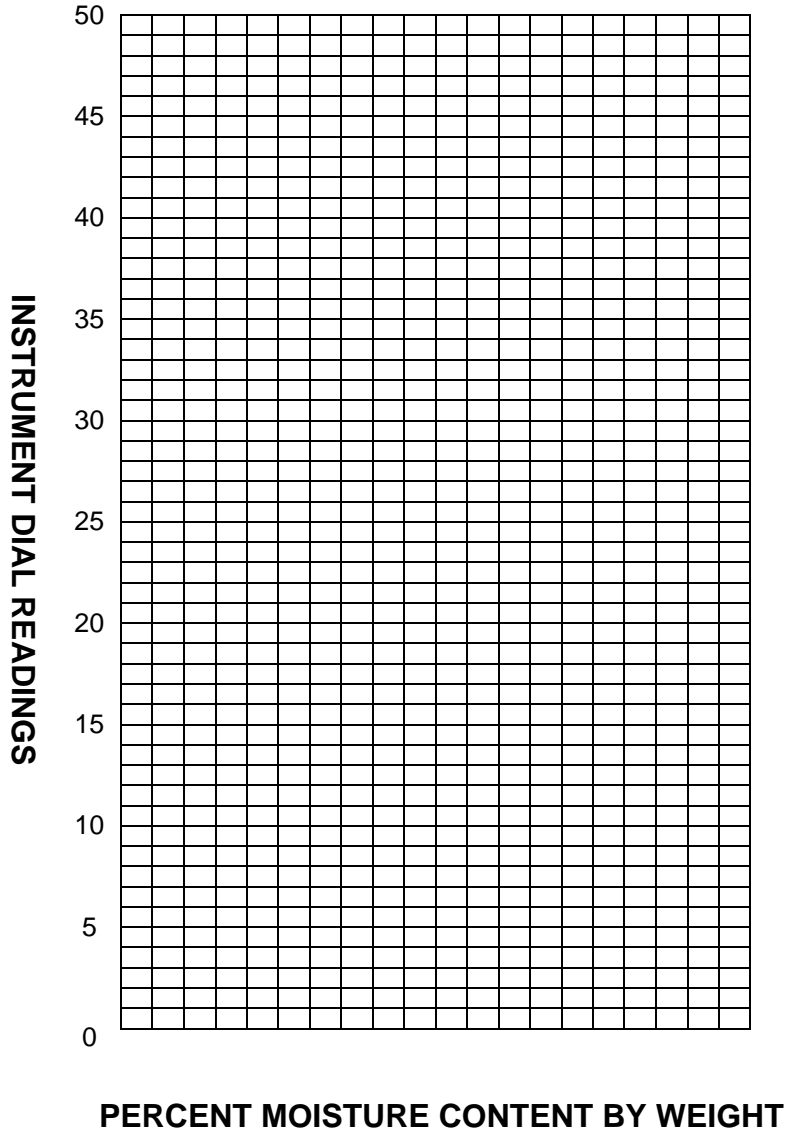
When returning the instrument for repair, please enclose purchase order authorizing service.

**Appendix 1**  
**Calibration Curve for Moisture Register Model T**

Material:

Lot Number:

Date:

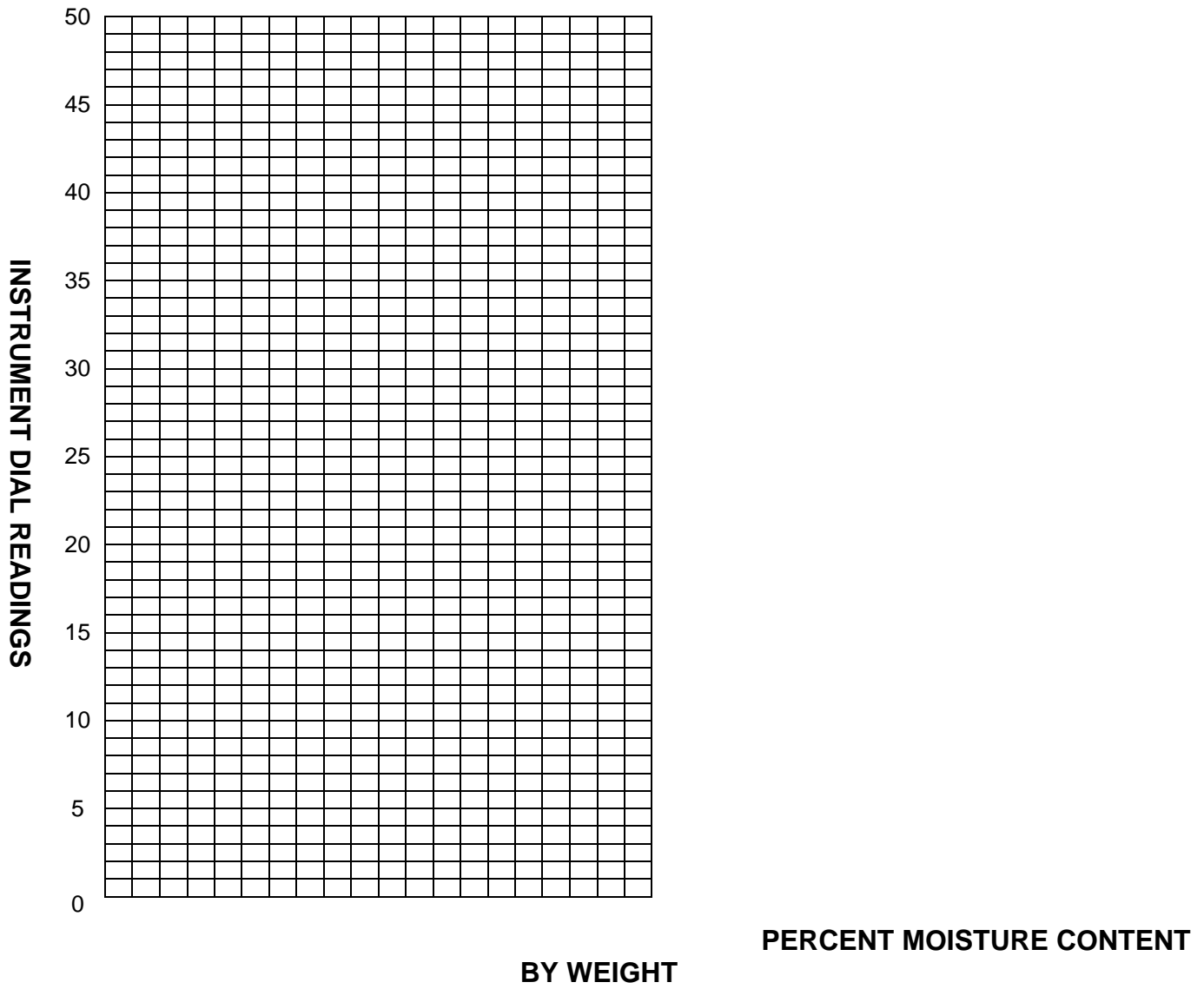


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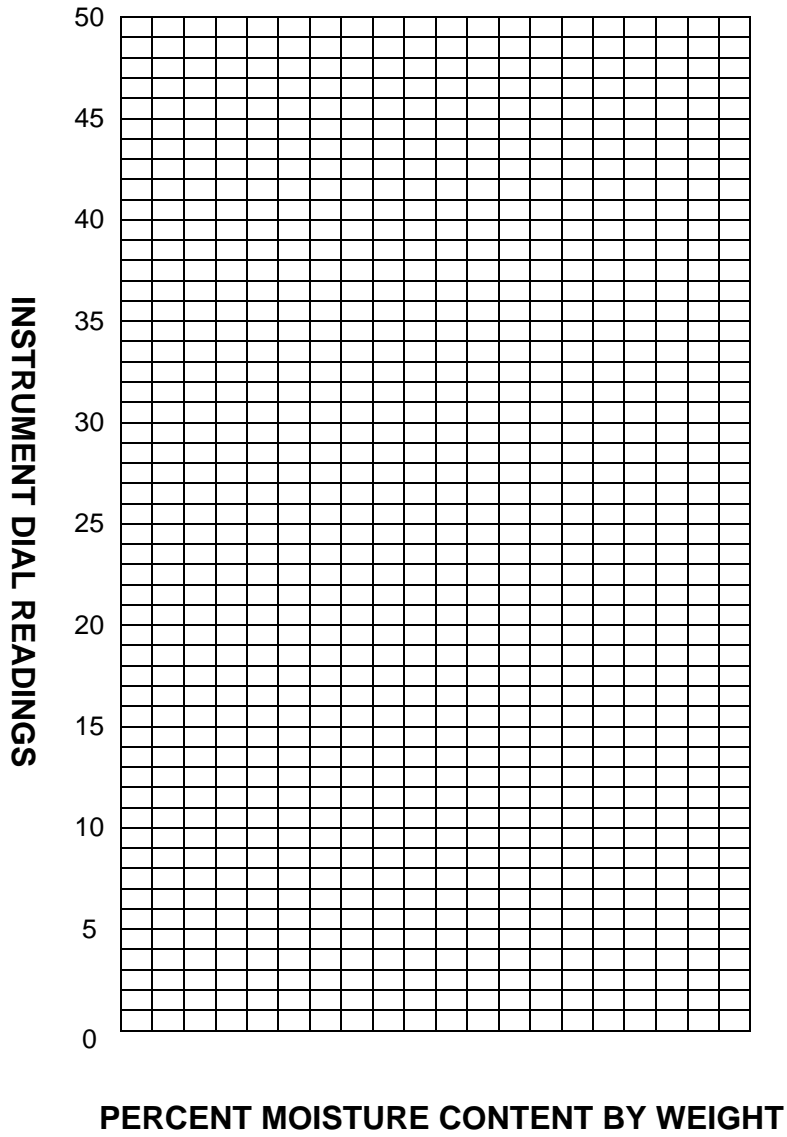


# Calibration Curve for Moisture Register Model T

Material:

Lot Number:

Date:



**Notes:**

Moisture Register Products manufacture Continuous On-Line Systems and Hand-Held Portable Meters that are designed for optimum performance, essential convenience and complete reliability to accomplish a multitude of applications in a wide range of industries.

Our Continuous On-Line Systems offer Near Infrared and Radio Frequency Sensors to constantly measure your process moisture. These systems assist you in analyzing, recording and controlling moisture on your product line.

Our Hand-Held Portable Moisture Meters offer on the spot measurement as well as flexibility for use on a variety of materials such as:

Moisture Register Products has portable moisture meters for use on a wide variety of materials, some of which are listed below.

**LUMBER  
PLASTER WALL  
GYPSUM BOARD  
NONWOVENS  
CORK**

**VENEER  
DRY WALL  
TEXTILES  
PAPER PRODUCTS  
AIRCRAFT RADOMES**

Moisture Register Products and AQUA Measure Instrument Company are fully committed in providing products and services at a quality level that continues to improve and that meets our customer's expectations.

**[www.MoistureRegisterProducts.com](http://www.MoistureRegisterProducts.com)**