F-6/6-30

owners manual

DELMHORST®
INSTRUMENT CO.
WHEN ACCURACY IS THE POINT.™

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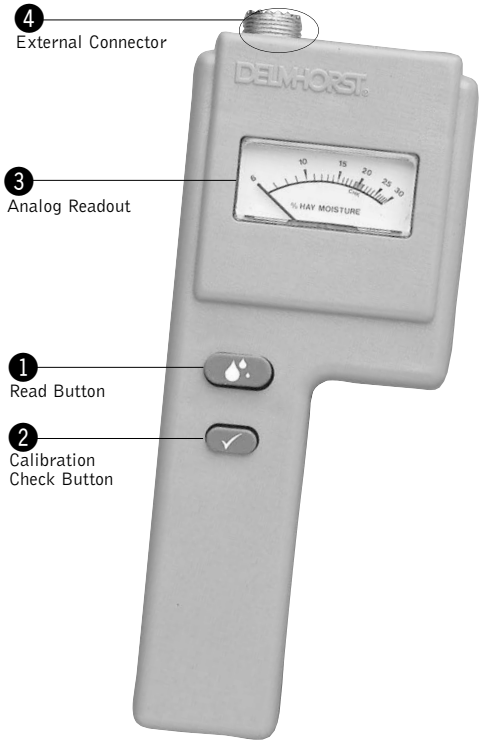

F-6/6-30 FEATURES

- ▶6% to 30% moisture range
- ▶Also available in 13-40% moisture range
- ▶Analog readout
- ▶Built-in calibration check
- ▶Temperature stable circuit
- ▶Ergonomic case design
- ▶Includes (1) 9-volt battery
- ▶One-year warranty
- ▶Over fifty years of proven quality, accuracy and service

BEFORE YOU BEGIN

Button Functions

❶ READ BUTTON - Reads the percent moisture content value %MC.

❷ CALIBRATION CHECK BUTTON - Checks the meter calibration.

CHECK CALIBRATION ✓

▶ **Remove the probe** from the top of the meter.

▶ **Press the calibration check button** ❷. Meter is in calibration if the needle pointer moves to "20" on the scale. Any reading within the green band on the dial is acceptable.

If you check the calibration and the display does not read "20," it is likely an indication of a low battery. If this occurs, change the battery immediately. Continued use with a low battery may cause the meter to go out of calibration. If you have a fresh battery and the instrument still does not indicate an acceptable calibration, return it to DELMHORST for service.

TAKING A READING

Testing Baled Hay

▶ **Connect the probe** to the external connector on the top of the meter.

▶ **Insert the probe into the bale.**

▶ **Press the read button** ❶ and read the moisture content on the scale.

Notes

▶ The hay prod is electrically insulated, except at the metal points near the tip. The moisture content measured represents the hay in contact with the tip of the prod only.

▶ Partially cured hay may have wide variations in moisture content throughout the bale. Readings should be taken in several different parts of the bale and the highest readings used as a guideline. The arrangement and compaction of hay fibers in a bale may have an effect on meter readings.

- If you are testing high density bales, we recommend using the H-3 handle with the 830-2 10" prod, 830-3 18" prod, or the 830-4 36" prod. Using the handle/prod combination eliminates excess stress on the instrument case that may occur when trying to insert the prod into a high density or large bale.
- When using the 36" prod, be sure to guide the prod into the bale with one hand while pushing on the H-3 handle.

Testing in the Windrow

When testing in the windrow, push down on the pressure button until the palm of your hand touches the screw that holds the button in place. The pressure button depresses a calibrated spring inside the handle. When the screw touches the palm of your hand, the pressure applied on the sample is 27 – 30 lbs., which closely simulates the pressure in a standard bale of hay.

There are three ways to test moisture content in the windrow:

Test A

- **Attach the #831** short pin prod to the H-3 handle and connect the handle to the external connector on top of the meter.
- **Prepare a representative sample** by collecting hay from various parts of the windrow.
- **Place hay in a non-conductive container** (such as a 5 to 10 gallon plastic pail) and apply the short pin prod to the hay.
- **Press down on the electrode** until the head of the screw which holds the pressure button, touches the palm of your hand.
- **Press the read button** ❶ and take a reading.
- **Mix the sample once again** and take at least two more readings. Use the highest readings.

Notes

- Whenever pressure is being applied on the electrode, be sure that the points of the electrode are touching nothing but the hay.
- Repeat the steps above if considerable variations are found in the meter readings. To reduce these variations, chop the hay, mix it thoroughly and take several readings by following the procedures above. This will make the moisture distribution in the sample more uniform.

Test B

- **Attach the #831 short pin prod** to the H-3 handle and connect the handle to the external connector on top of the meter.
- **Apply the prod** to the hay in the windrow and press down on the electrode handle until the head of the screw touches the palm of your hand.
- **Press the read button** ❶ and take a reading.
- **Make several tests** on the hay exposed to the sun, then turn the windrow over and make an equal number of tests on the hay that had been closer to the ground. Use the highest readings.

Notes

- Make sure that the points of the electrode are not touching the ground. The electrode points should make contact with the hay only.

Test C

- **Select up to five large, slower-drying stems** from a section of the windrow.
- **Place them one at a time** across two adjacent points on the # 831 short pin prod.
- **The average of these stem readings** should be about two to five points higher than the actual moisture content.

Notes

- Repeat these steps in different parts of the field and pay special attention to the areas where the hay is heaviest.
- The amount of variation found among windrow readings as well as the average stem moisture should be taken into consideration before the decision is made to start baling.

FACTORS AFFECTING YOUR READINGS

Because of the many variables that affect the electrical meter readings, the indicated moisture content should not be used as an absolute quantitative measurement. Meter readings are very useful guidelines for safe storability of hay.

Meter readings become more significant when they are considered in the light of the density of the bales, anticipated handling and storage, and prevailing climate conditions.

Range of Moisture Content

The F-6 is designed to test moisture in hay over a range of 6%-30% or 13-40%, depending on model. Readings over 30% should be used only as a qualitative indication of high moisture content. Delmhorst moisture meters use the relationship existing between electrical conductivity and moisture content in hay. As moisture content increases, so does the conductivity.

Tests on hay at high moisture content, over 25%, are less accurate. This is mostly due to the variability in moisture distribution. The reduced level of accuracy in the high range does not significantly affect the usefulness of the meter, as a few high readings indicate that some action be taken to dry the hay to avoid spoilage or even self-combustion.

While it is important to note the average of several readings, it is even more important to note the high readings and the frequency at which they occur.

Hay Temperature

The F-6 has been calibrated at 80°F on various samples of different types of hay, mostly alfalfa, and on different cuttings and mixtures. The higher the temperature of the sample, the higher the meter readings will be. Temperatures lower than 80°F cause lower meter readings. The correction is approximately 1% point for every 20° difference. Refer to chart below:

Hay temperature	Add to reading	Subtract from reading
20°F/-7°C	3	--
40°F/ 5°C	2	--
60°F/15°C	1	--
80°F/30°C	0	0
100°F/40°C	--	1
120°F/50°C	--	2
140°F/60°C	--	3

Example

Meter reading: 22%
Temperature: 40°F/5°C
Moisture Content: 24% (22 + 2)

Curing

Before proper curing has taken place, wide variations in moisture content should be expected in both recently baled hay and hay in the windrow. These variations will be exposed by meter readings taken on different parts of the windrow or bale. **The higher the moisture range, the wider are the variations. The more curing has been allowed to take place, the greater uniformity in moisture distribution can be expected.**

The validity of the meter readings is closely related to the care spent in sampling the hay to be tested. Whether hay in the windrow or baled hay is tested, the number of tests made should be increased whenever the initial readings show considerable variations.

Density

The calibration of the moisture testers applies to bales of normal "average' density. Generally:

- ▶ Denser bales may yield readings 1-2% points higher.
- ▶ Looser bales tend to yield 1-2% point lower.
- ▶ Tests in stacks usually yield readings 2%-3% lower.
- ▶ Tests on grass hay may yield readings about 3% lower.

Baling should be done according to the lower meter reading.

When testing baled hay, drive the prod across the slices of the bale, not between them. This will ensure firmer and more uniform contact.

When using the short pin prod, uniformity of pressure from one sample to the other is achieved by applying pressure to the "pressure button" at the end of the H-3 handle as described on page 4.

Use of Preservatives

Hay preservative or stabilizers may also have an affect on meter readings. Normally a bale of hay treated with preservative will read higher than a bale of the same hay that had not been treated. The readings typically increase by 2-4% points, and 24-48 hours after treatment, the readings between the bales tend to equalize.

Occasional higher readings may occur if, in addition to the effect of the increased conductivity due to the stabilizer, the bales tested also show an increase in temperature and "sweating." As the stabilizer becomes more thoroughly absorbed and the sweating subsides, the meter readings recede to the initial level and will continue to decrease, assuming that the bale becomes progressively dryer.

Sample Size

When testing baled hay, it is essential to take readings at several different points in the bale. Hay moisture may vary a great deal in the same bale. For example, at one point bale moisture may be 20% and at another over 35%.

More tests must be made whenever the variations among readings are greater. If there is a possibility of high moisture areas, samples from these locations should be taken. Areas of high moisture content will spoil, resulting in loss.

It is extremely important to note the high readings and the frequency at which they occur.

CARE OF YOUR METER

To keep your meter in good working order:

- Store your meter in a clean, dry place. The optional protective carrying case is an ideal storage place when the meter is not in use.
- Change the 9-Volt battery as needed. Continued use with a low battery may cause the meter to go out of calibration.
- Clean the meter and probe with any biodegradable cleaner. Use the cleaner sparingly and on external parts only. **Do not immerse the meter or any prod in water.**
- Remove the battery if the meter will not be used for one month or longer.

WARRANTY

Delmhorst Instrument Co., referred to hereafter as Delmhorst, guarantees its F-6 meter for one year from date of purchase and any optional electrodes against defects in material or workmanship for 90 days. This limited warranty does not cover abuse, alteration, misuse, damage during shipment, improper service, unauthorized or unreasonable use of the meter or electrodes. This warranty does not cover batteries, pin assemblies, or pins. If the meter or any optional electrodes have been tampered with, the warranty shall be void. At our option we may replace or repair the meter.

Delmhorst shall not be liable for incidental or consequential damages for the breach of any express or implied warranty with respect to this product or its calibration. With proper care and maintenance the meter should stay in calibration; follow the instructions in the **Care of Your Meter** section.

Under no circumstances shall Delmhorst be liable for any incidental, indirect, special, or consequential damages of any type whatsoever, including, but not limited to, lost profits or downtime arising out of or related in any respect to its meters or electrodes and no other warranty, written, oral or implied applies. Delmhorst shall in no event be liable for any breach of warranty or defect in this product that exceeds the amount of purchase of this product.

The express warranty set forth above constitutes the entire warranty with respect to Delmhorst meters and electrodes and no other warranty, written, oral, or implied applies. This warranty is personal to the customer purchasing the product and is not transferable.

For over 50 years, Delmhorst has been the leading manufacturer of high-quality resistance moisture meters. Today we offer a complete line of portable moisture meters for a variety of applications includilng woodworking/lumber, agriculture, construction and paper.

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