BD-10

owners manual

DELMHORST®
INSTRUMENT CO.

WHEN ACCURACY IS THE POINT.™

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TestEquipmentDepot.com

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BD-10 FEATURES

- Designed to check moisture levels in wood, concrete, EIFS, sheetrock, and other materials
- Resistance technology recognized around the world as the most accurate method for measuring moisture
- 6%-40% moisture range for wood
- 0 to 100 reference scale for non-wood materials
- Analog readout
- Built-in calibration check
- Temperature stable circuit
- Ergonomic case design
- Easy one-hand operation
- Includes (1) 9-Volt Battery
- Includes sturdy carrying case
- One-year warranty
- Over fifty years of proven quality, accuracy and service

BEFORE YOU BEGIN

The BD-10 features two scales — one marked "wood" and the other marked "reference". The wood scale ❸ is used when testing wood and the reading indicates the percentage moisture content.

The reference scale ❹ reads from 0-100 and is used when testing any building material such as plaster, concrete, brick, insulation, etc. Readings on the reference scale ❹ are to be taken as a qualitative indication of the moisture level. Readings in the low end of the scale indicate a "drier" condition; readings in the upper end of the scale indicate a higher moisture level in the material. The scale is color coded with green, yellow, and red areas. Readings may be interpreted as green (dry), yellow (borderline), red (wet).

When using the reference scale ❹, tests should be made on material samples that are known to be dry. Such readings can be used as standards or reference points against which subsequent readings should be compared.

CHECK CALIBRATION ✓

► **Press the calibration check button ❷.** Meter is in calibration if the needle pointer moves to "20" on the wood scale ❸. Any reading within the green band on the dial is acceptable. Make sure the contact pins ❺ are not in contact with anything when checking the calibration.

If you check the calibration and the needle does not read within the green band, it is likely an indication of a low battery. If this occurs, change the battery (9-Volt) 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 a proper calibration, return it to DELMHORST for service.

TAKING A READING

▶ **Remove the protective cover** to expose the pins. Check that the contact pins ❺ are firmly hand tightened.

USING 6-40% WOOD SCALE

▶ **Align contact pins** ❺ parallel to the grain pushing to their full penetration, if possible.

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

Delmhorst uses the USDA standard–Douglas Fir–as the basis for all calibrations. Because the electrical characteristics of different species vary, some species may read differently at the same moisture content. However, in most cases, the Douglas Fir reading can be taken at face value on construction-grade lumber.

Paint Failure and Moisture

Moisture is by far the most frequent cause of paint failure. The key to preventing paint failure is to make certain that moisture is not absorbed through the wood to the back of the paint film. So, in order to insure quality paint jobs, wood must remain dry after the application of paint.

Outdoor wood can be safely painted without danger of peeling if the %MC is 15% or less. In drier climates, the maximum reading should be 10% to 11%. Indoor wood should be between 7% to 8% prior to painting.

The following conditions may cause high moisture content in wood:

▶ Leaky gutters and down spouts

▶ Leaky pipes or condensation on cold water lines in attic or hollow walls

▶ Faulty flashing around windows, doors and where porch and dormer roofs meet sidings

▶ End-grain wood that is not sealed with paint at all joints around windows, corners, and butt joints

- ▶ Porch columns that do not have good drainage and ventilation where they rest on porch floors
- ▶ Siding or any other wood that is in contact with the ground
- ▶ Siding and shingles without sufficient lap so that water is forced up through cracks by wind pressure
- ▶ Ice dams
- ▶ Condensation of vapor within hollow walls

EIFS (Exterior Insulation & Finish Systems)*

Moisture intrusion problems in EIFS (also know as synthetic stucco) stem from leaking window frames, improper use of or lack of sealant, and faulty installation of flashing.

If you suspect a problem take a visual inspection. Look for gaps around windows, doors, air conditioning units, light fixtures, hose bibs, dryer vents and other areas of potential penetration. Also look for visible signs of water damage. If you feel a problem exists, use the **BD-10** with a **#21-E electrode**. This electrode includes the **#608 - (4") insulated pins**.

Procedure:

- ▶ **Drill two 1/4" holes** about 3/4" apart at an upward 45° angle.
- ▶ **Push the #21-E Electrode into the holes** through the polystyrene and into the substrate.
- ▶ **Press read button** ❶ and read the scale.

*Refer to the wood scale ❸ if the sheathing is plywood. If gypsum sheathing is used, refer to the reference scale ❹.

USING THE 0-100 REFERENCE SCALE

Testing Concrete Slabs for Flooring Applications

Moisture meters are an effective tool to check moisture in concrete. They can tell you where there may be excess moisture and help determine if you need to conduct further testing.

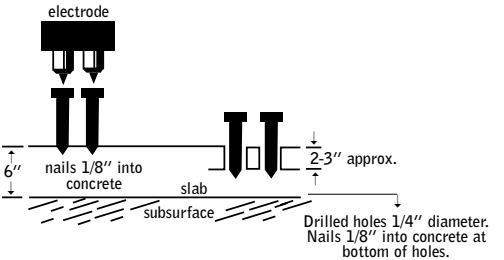
It is important to test both the surface and mid-section of the slab, especially if the slab is on or below grade. This will help determine if there is continuous moisture migration toward the surface. If this condition exists, the moisture movement may be so slow that once it reaches the surface, moisture evaporates and causes a "dry" reading when a surface test is made. However, if a sub-surface test is made, the meter may read "wet" indicating the presence of moisture. When the slab is covered and the upward movement of moisture continues, moisture will move into a hygroscopic (wood) floor, or build-up pressure under a non-breathing synthetic floor, causing delamination.

Taking a Surface Reading:

- **Drive two hardened-steel masonry** nails about 3/4" apart into the finish coat of concrete floor. Drive them about 1/8" deep so they make firm contact with the concrete and do not move when touched.
- **Touch the nails** with the contact pins ❺ .
- **Press read button** ❶ and read the reference scale ❹. If the meter reads in the red or "wet" area, it shows the floor is not satisfactory for covering. If meter reads in the green or "dry" area, the surface is dry. However, subsurface tests should be made to verify if the slab is dry throughout.

Subsurface Test:

- **Drill two 1/4" holes,** 3/4" apart and 1/2" to 2" deep.
- **Drive the masonry nails** into the bottom of the holes and make the tests as described above. Nails must not touch sides of drilled holes.



If the meter still indicates green or "dry" the floor is ready for covering. Tests should be made at several points, especially when the slab is thick and air circulation is poor. Tests should only be made in newly drilled holes, since the inside surface of the holes can dry out while the rest of the slab is still wet.

Even readings in the red or "wet" area can indicate relatively low moisture content in concrete. For example, readings in the 85-95 range on the reference scale ❹ indicate approximately 2% to 4% moisture content.

If more testing is required, the calcium chloride test is recommended, which measures the moisture vapor emission rate of concrete. The National Wood Flooring Association offers the following guidelines when evaluating the results of the calcium chloride test***.

Results →	Indicate
0-3 lbs. →	Dry
over 3 lbs. →	Moisture barrier required
over 7 lbs. →	Too wet

Key Factors to Consider:

- **The age of the slab.** National Wood Flooring Association guidelines specify to wait at least 30 days after the slab is laid before checking moisture content. ***
- **Is the slab on grade or suspended?** If the slab is on grade, is there an effective vapor barrier under the slab?
- **How thick is the slab?**
- **What is the drainage condition of the ground?**
- **History of other structures in the area**

***Taken from Section V Appendix AA "Moisture Testing Procedures for Concrete Slabs" — NWFA

Testing Brick or Concrete for Paint Application

Brick, stucco, or concrete surfaces must be dry at the time of application and must remain dry after paint is applied or failure of the paint film may occur. These materials are frequently exposed to unusual moisture conditions that allow them to absorb moisture through some exposed surface or some structural defect. This is why it is important to check the moisture content of the brick or concrete when it has been exposed to conditions that permit it to absorb moisture.

Procedure:

- **Drive two hardened steel masonry nails** about 3/4" apart into the brick or concrete. Drive them about 1/4" deep so they make firm contact and do not move when touched.
- **Touch the nails** with the contact pins ❺.
- **Press read button** ❶ and read the reference scale ❹.

Normally, dry concrete or brick will read in the green or "dry" portion of scale, indicating a safe condition to apply paint. Meter readings should be evaluated in relation to other factors — knowledge of the structure, type of paint used, expected weather conditions in the near future, etc. Paint should not be applied if readings are in the red or "wet" portion of the scale.

Do not be misled by surface appearance of masonry materials. Short exposure to rain may thoroughly wet the surface while the interior is still dry. In this instance, we recommend repeating the test on the masonry **below the surface** as mentioned above.

Key Areas to Check:

- **The rear side of brick parapet walls** — generally are not waterproof above the flashing line and frequently absorb moisture during rains.
- **Painted concrete floors on ground** — subject to peeling as they absorb moisture from the earth, unless an effective vapor barrier has been installed.

Tests on these materials should be made a day or so after they have been exposed to rain or other high moisture conditions to verify to what extent they absorb moisture.

Testing Plaster Walls, Sheetrock (Gypsum)

Under normal drying conditions and proper application of plaster (sufficient drying time between coats), surface readings give accurate results. However, if rapid drying occurs, the surface of the plaster may be dry, but moisture is still present below the surface and will eventually affect the paint or wallpaper. This condition occurs when there is high temperature or exceptionally good air circulation, or where brown scratch and white coats are applied within a few days.

Take several readings on each wall. Pay special attention near the base, around doorjambs, electrical and plumbing fixtures, and other places where the plaster is thicker than normal.

Taking a Surface Reading:

- **Drive the contact pins** 5 into the plaster to their full penetration, if possible.
- **Press read button** 1 and read the reference scale 4.

Taking a Reading Below the Surface:

- **Drive a pair of nails into the plaster** at least 1/3 of the total thickness of the plaster. If you are applying plaster to a material of doubtful dryness, such as brick or concrete, drive the nails through the plaster and into the brick or concrete.
- **Touch the heads of the nails** with the contact pins 5 and read the meter.

The following guidelines may be used to interpret the meter readings on plaster or sheetrock prior to painting or applying adhesives:

Green or "dry" — < 4% moisture
Red or "wet" — approximately 5%
Yellow — Borderline

Tracing Leaks

The BD-10 can help trace leaks in masonry material. Normally, dry plaster, brick, or concrete will contain so little moisture it cannot be detected by the meter. If the meter indicates the presence of moisture you can trace the moisture to its origin.

To trace the origin of a leak:

- **Drive a nail into an area that is known to be wet** and attach an insulated wire between the nail and one of the contact pins 5

► **Apply the other pin to various parts of the wall** where you suspect the leak originates. If the meter indicates red or "wet", the material is wet between the points of contact. If the meter reads green or "dry", the material along this line is not in the path of a leak.

To confirm if a brick wall is waterproof:

Perform the following procedure after storms to verify if a brick wall is waterproof, or if waterproofing repairs have been properly performed:

► **Drive pairs of nails into the brick** wherever it is necessary to make the tests and leave them in place until after all the tests are completed.

► **Take readings after each storm,** and record the readings. The pattern of these readings will indicate if the brick is gradually drying out or is moistened again by each storm.

Detecting Moisture in Insulation:

Use the **BD-10** with the **#21-E Electrode** and **#608 insulated pins** to detect moisture in insulation. These pins are insulated, except at the tips. Only the uninsulated tips make contact with the material, providing information as to the depth at which moisture is present.

Procedure:

► **Drill two 3/16" diameter holes,** one inch apart through the siding.

► **Using the #21-E,** insert the #608 contact pins into the holes so that you make contact with the insulation.

► **Press the read button** ❶ and read the reference scale ❹. Take readings at various depths of penetration to determine the location of moisture.

► **Fill holes with putty** at the conclusion of the test.

Meters are not calibrated to read the percentage of moisture content in the insulation. Instead, meter readings provide a qualitative indication of the presence of moisture. The meter may also help identify the pattern of distribution to help you determine if moisture is due to condensation or leakage.

The presence of moisture in insulating material greatly reduces its insulating properties. If the insulating material absorbs moisture, water will displace the air in the material. Water also transmits heat at a faster rate than air, thus reducing the efficiency of the insulation.

Side walls and roof insulation pick up moisture because of leaks in the roof or structural defects in the side walls which allow storm water to be forced in during high wind. During periods of cold weather, vapor will condense as it approaches the colder area near the outside walls, and resulting moisture will remain trapped in the insulation.

Cork, wood fiber boards, and other cellulose material read lower than glass wool and other inorganic types of insulation.

CARE OF YOUR METER

To keep your meter in good working order:

- Store your meter in a clean, dry place. The protective carrying case provided 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.
- Change contact pins 5 as needed. Keep pin retainers hand tightened.
- Clean the meter and contact pins with any biodegradable cleaner. Use the cleaner sparingly and on external parts only. Keep cleaner out of the external connector 6.
- 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 BD-10 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 or contact pins. If the meter or any optional electrodes have been tam-pered 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 the innovative KIL-MO-TROL® in-kiln monitoring system, and Loadmaster®, a fully automated weight-based kiln control system for the ultimate in accuracy. We also offer a complete line of portable moisture meters for woodworking/lumber, agriculture, construction and paper.

DELMHORST® INSTRUMENT CO.™

METER READINGS WITH NON-INSULATED PINS

SPECIES	7	8	9	10	12	14	16	18	20	22	24
ALDER	**8**	**9**	**10**	**11**	**13**	**15**	**17.5**	**19.5**	**21.5**	**24**	**27**
APITONG	8	9	10	11	13	15	17	20	22	24	27
ASPEN	**7**	**8**	**9**	**10**	**11.5**	**13**	**15**	**16.5**	**18**	**20**	**21**
ASH, WHITE	6.5	7.5	8	9	11	13	14.5	16	18	19.5	21
BASSWOOD	**7**	**8**	**8**	**9**	**10.5**	**13**	**15**	**17**	**19**	**20.5**	**22**
BIRCH	8	9	10	11	13	15	17	19	21.5	23.5	25.5
CEDAR, EAST. RED	**8**	**9.5**	**10.5**	**12**	**14**	**17**	**19**	**21**	**23**	**25**	**26**
CEDAR, INCENSE	7	8	9.5	10.5	12.5	15	17	19	21	23	25
CHERRY	**8**	**9**	**10**	**11**	**13.5**	**15.5**	**18**	**20**	**22**	**24**	**26**
COTTONWOOD	6	7.5	8.5	9.5	12	14	15	17	19.5	21	23
CYPRESS	**7**	**8**	**9**	**10**	**12**	**14**	**16**	**18**	**19.5**	**21.5**	**23.5**
ELM, AMERICAN	7	7.5	8	8.5	10	11.5	13	15	16	18	19
FIR, DOUGLAS	**7**	**8**	**9**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**
FIR,RED	7	8	9	10	12.5	15	17	19	21	23	25
FIR, WHITE	**8**	**9**	**9.5**	**10.5**	**12.5**	**15**	**17**	**19**	**21**	**23**	**25**
GUM, BLACK	7.5	9	10	11	13	15	16	18	19	20.5	22
GUM, RED	**7**	**8**	**9**	**10**	**12.5**	**14.5**	**16.5**	**19**	**20.5**	**22.5**	**24**
HEMLOCK, WESTERN	7	8	9	10.5	13	15	17	19	20.5	22	23.5
HACKBERRY	**7**	**8.5**	**9**	**9.5**	**12**	**13**	**15**	**17**	**18.5**	**20**	**22**
HICKORY	8	8.5	9	10	11	12.5	14	15.5	17	19	20.5
KERUING	**8**	**9**	**10**	**11**	**13**	**15**	**17**	**20**	**22**	**24**	**27**
LARCH	7.5	9	10	11	13	15	17	19	21	23	25.5
MAGNOLIA	**7.5**	**9**	**10**	**11.5**	**14**	**16**	**17.5**	**19**	**21**	**22.5**	**24.5**
MAHOGANY, AFRICAN (ALSO KHAYA)	8	9.5	10.5	12	15	17	19.5	22	24	26	28
MAHOGANY, HOND.	**7**	**8**	**9**	**10.5**	**12.5**	**14.5**	**16**	**18**	**19.5**	**21.5**	**22.5**
MAHOGANY, PHIL.	6	7	7.5	8	9.5	11	13	14	15.5	17	18
MAPLE, HARD/SOFT	**8**	**9**	**9.5**	**10**	**12**	**14**	**16**	**18**	**20**	**22.5**	**25**
MERANTI, DARK RED	8.5	9.5	10.5	11.5	12.5	16	18	20.5	22.5	24.5	26.5
OAK, RED	**7**	**8**	**9**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**
OAK, WHITE	7	8	8.5	9.5	11.5	13.5	15	17	18.5	20	22
PECAN	**6.5**	**8**	**9.5**	**11**	**12.5**	**14**	**16**	**17.5**	**19**	**22**	**24**
PINE, LONGLEAF	8	8.5	10	11	13	15.5	17.5	19.5	21	23	25
PINE, PONDEROSA	**7.5**	**8.5**	**10**	**11**	**13.5**	**15.5**	**17.5**	**19.5**	**21**	**23**	**25.5**
PINE, SHORTLEAF	7.5	9	10	11	13	15.5	17.5	19.5	21.5	23.5	25
PINE, SO. YELLOW*	**8**	**9.5**	**10.5**	**12**	**14.5**	**16.5**	**19**	**21**	**23**	**25**	**28**
PINE, SUGAR	7	8	9	10	12	15	17	19	21	23	25
PINE, WHITE	**7**	**8**	**9**	**10**	**13**	**15**	**17**	**19**	**21**	**23**	**25.5**
POPLAR, YELLOW	8	8.5	10	11	13	15.5	17.5	19.5	22	24	26
RAMIN	**7**	**8**	**9**	**10**	**11**	**13**	**15**	**16**	**18**	**20**	**21**
RADIATA PINE	10	11	11	12	14	16	18	20	23	25	27
REDWOOD	**7**	**8**	**9**	**10**	**12**	**13.5**	**15**	**17**	**19**	**22**	**24**
SPRUCE, SITKA	7	8	9	10	12.5	14.5	17	19	21	23.5	26
SPF**	**9**	**10**	**11.5**	**13**	**15.5**	**18**	**20.5**	**23**	**25**	**28**	**30**
SPF/COFI	8	9	10	11	13	15	17	19	21	23	25
TEAK	**7**	**8**	**8.5**	**9**	**11**	**12**	**14**	**15**	**17**	**18.5**	**20**
VIROLA	6.5	7	8	9	11	12.5	14	16	18	18.5	20.5
WALNUT, BLACK	**7.5**	**8.5**	**9.5**	**10.5**	**12.5**	**14.5**	**16**	**18**	**20**	**22**	**23.5**

*Meter readings taken with 26-E 2-pin electrode. Do not apply 2-pin correction.

**SPF correction based on 2-pin 26-E reading with insulated pins. It is based on USDA/Forintek data and can be used for the following species:

Lodgepole Pine

Alpine Fir