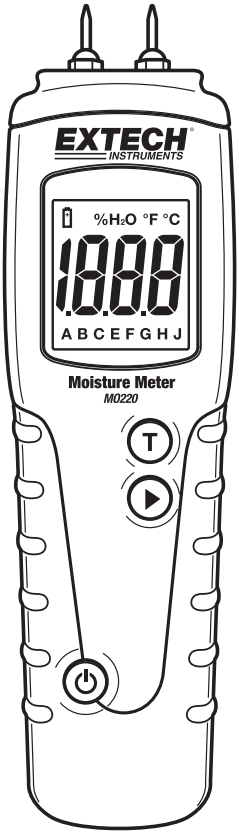
EXTECH INSTRUMENTS

USER GUIDE

Moisture Meter

Model MO220



Introduction

Congratulations on your purchase of the Extech MO220 Moisture Meter. This instrument is a conductivity moisture meter specifically designed for the wood industry.

The instrument has eight calibration scales, enabling the user to take accurate moisture measurements in 170 wood species. Moisture measurements can be taken using the integral pin electrodes, or using the heavy duty moisture probe.

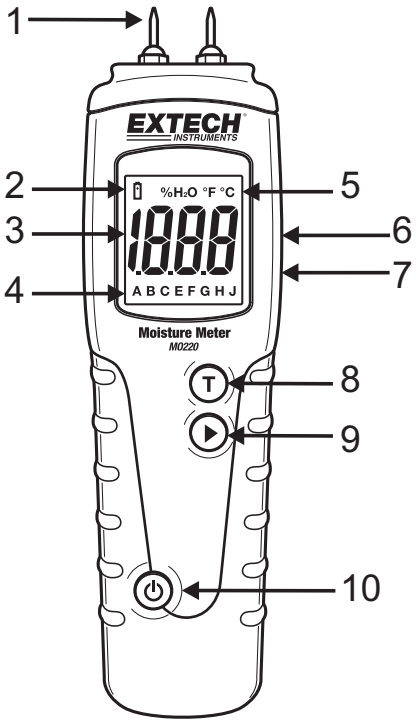
When used with the temperature probe, the moisture measurements are automatically corrected with respect to temperature. This meter is shipped fully tested and calibrated and, with proper use, will provide years of reliable service.

Description

Meter Description

1. Measurement pins
2. Low battery icon
3. LCD measurement reading
4. Wood group designators
5. Units of measure
6. External moisture sensor input
7. Remote temperature probe jack
8. Temperature units button
9. Wood group letter selector button
10. Power ON-OFF button

Note that the battery compartment is located on the rear of the instrument.



Operation

> **CAUTION**: The electrode measurement pins are extremely sharp. Use care when handling this instrument. Cover the pins with the protective cap when the instrument is not in use.

Basic Measurement Instructions

1. Remove the cap to expose the needle electrodes OR connect the heavy duty moisture probe socket on the right hand side of this instrument
2. Switch the meter ON by pressing the ⏻ button.
3. Select the appropriate wood calibration scale A, B, C, E, F, G, H or J (see the Wood Calibration Tables later in this guide) using the ▶ button.
4. Push the needle pins or the heavy duty moisture probe pins into the wood and observe the reading.
5. Press and hold the power button to shut the meter off.

Manual Temperature Correction (for use without the Temperature Probe)

The instrument is calibrated for wood at 68°F (20°C). In general, wood that is warmer than 68°F (20°C) will give higher readings and wood colder than 68°F (20°C) will give lower readings. An approximate manual correction of 0.5% moisture content per 9°F (5°C) may be subtracted from wood that is above 68°F (20°C). For wood that is below 68°F (20°C), a manual correction of 0.5% moisture content per 9°F (5°C) may be added to the measured value.

Automatic Temperature Correction ATC (for use with the Temperature Probe)

1. Switch the instrument on and select the appropriate wood calibration scale as detailed earlier.
2. Using a hammer and nail of a nominal 3 mm diameter, make a hole in the wood to be tested.
3. Remove the nail and push the Temperature Probe into the hole until the tip is at the required depth.
4. Connect the Temperature Probe into the instrument via the **Temp** socket.
5. Measure the wood as described earlier to obtain the automatically temperature corrected (ATC) moisture value.
6. To read the current temperature of the wood press the **T** button, the LCD will display the temperature.
7. Press the **T** button again to change the C/F unit of measure.
8. Press the ▶ button to display moisture value again.

Auto Power OFF

The meter can automatically turn itself off after several minutes. This is to conserve on battery energy. The user can select the period of time the meter must remain idle before turning itself off (1 through 9 minutes). The user can also elect to disable the automatic power off feature (select 00).

1. With the meter ON, simultaneously press the power and the right arrow buttons. The current time period will appear.
2. While continuing to hold the power button, use the right arrow button to select the desired time period. Select ‘00’ to disable this feature.
3. Release both buttons when the desired value is on the LCD.

Manual Accuracy Check

- There are two (2) sets of calibration poles located inside the meter's protective cover. One set is for the 18% calibration and the other is for the 26% calibration, as marked inside the cover.
- When checking the calibration, the A scale should be selected and the temperature probe must be disconnected.
- Touch the two measurement pins to the 18% calibration nodes and view the measurement on the meter display. Do the same for the 26% calibration.
- When correctly calibrated, the instrument will register %H2O values in the range of 17.7 to 18.3 (18% calibration) and in the range of 25.5 to 26.5 (26% calibration).
- If the tolerance exceeds ±1 the instrument must be recalibrated.

Care and Maintenance

When the instrument is not in use, keep it in its pouch together with its accessories. Store the kit in a stable, dust-free environment out of direct sunlight. Remove the batteries from the instrument if it is to be stored for periods of more than one month, or when the low battery power symbol appears on the display. Check the condition of accessories used with the instrument on a regular basis and replace them if they become worn or damaged.

Battery replacement

When the low battery icon appears on the display, replace the battery as soon as practical.

1. Remove the rear battery compartment screw.
2. Remove the battery compartment door
3. Replace the two (2) 'AAA' 1'5V batteries
4. Replace the compartment door and secure the screw before using the meter.
5.

You, as the end user, are legally bound (**EU Battery ordinance**) to return all used batteries, **disposal in the household garbage is prohibited!** You can hand over your used batteries / accumulators at collection points in your community or wherever batteries / accumulators are sold!

Disposal: Follow the valid legal stipulations in respect of the disposal of the device at the end of its lifecycle

Specifications

Display	Dual measurement scale LCD with bargraph metering
Measurement principle	Electrical resistance
Range	Wood: 6 to 44%
Electrode length	8mm (0.3")
Electrode pins	Integrated, replaceable
Auto Power OFF	After approx. 15 minutes
Power supply	Two (2) 'AAA' 1'5V batteries
Meter housing	Impact-proof plastic
Operating Temperature	0 to 40°C (32 to 104°F)
Operating Humidity	85% Relative Humidity maximum
Dimensions	130 x 40 x 25mm (5.1 x 1.6 x 1.0")
Weight	100g (3.5 oz)

Calibration Tables for Wood

Wood Species Group Tables

Common names of wood (BS-888 & 589:1973)

Wood Species				Group
Abura				E
Afara				A
Aformosa				G
Afzelia				E
Agba				J
Amboyna				G
Ash,	American			B
Ash,	European			A
Ash,	Japanese			A
Ayan				C
Baguacu,	Brazilian			F
Balsa				A
Banga	Wanga			A
Basswood				G
Beech,	European			C
Berlina				B
Binvang				E
Birch,	European			J
Birch,	Yellow			A
Bisselon				E
Bitterwood				F
Blackbutt				C
Bosquiea				A
Boxwood,	Maracaibo			A
Camphorwood,	E	African		C
Canarium,	African			B
Cedar,	Japanese			B
Cedar,	West	Indian		J
Cedar,	Western	Red		C
Cherry,	European			J
Chestnut				C
Coachwood				G
Cordia,	American	Light		F
Cypress,	E	African		A
Cypress,	Japanese	(8-18%mc)		J
Cypress,	Japanese	(18-28%mc)		C
Dahoma				A
Danta				C
Douglas	Fir			B
Elm,	Japanese	Grey	Bark	B
Elm,	English			E
Elm,	Rock			E
Elm,	White			E
Empress,	Tree			J
Erimado				F
Fir,	Douglas			B
Fir,	Grand			A
Fir,	Noble			J

Wood Species				Group
Gegu,	Nohor			H
Greenheart				C
Guarea,	Black			J
Guarea,	White			H
Gum,	American	Red		A
Gum,	Saligna			B
Gum,	Southern			B
Gum,	Spotted			A
Gurjun				A
Hemlock,	Western			C
Hiba				J
Hickory				F
Hyedunani				B
Iroko				F
Ironbank				B
Jarrah				C
Jelutong				C
Karpur				A
Karri				A
Kauri,	New	Zealand		E
Kauri,	Queensland			J
Keruing				F
Kuroka				A
Larch,	European			C
Larch,	Japanese			C
Larch,	Western			F
Lime				E
Loliondo				C
Mahogany,	African			J
Mahogany,	West	Indian		B
Makore				B
Mansoia				B
Maple,	Pacific			A
Maple,	Queensland			B
Maple,	Rock			A
Maple,	Sugar			A
Matai				E
Meranti,	Red	(dark/light)		B
Meranti,	White			B
Merbau				B
Missanda				C
Muhuhi				J
Muninga				G
Musine				J
Musizi				J
Myrtle,	Tasmanian			A
Naingon				C
Oak,	American	Red		A
Oak,	American	White		A
Oak,	European			A
Oak,	Japanese			A
Oak,	Tasmanian			C
Oak,	Turkey			E

Wood Species				Group
Obeche				G
Odoko				E
Okwen				B
Olive,	E	African		B
Olivillo				G
Opepe				H
Padang				A
Padauk,	African			F
Panga	Panga			A
Persimmon				G
Pillarwood				F
Pine,	American	long	leaf	C
Pine,	American	pitch		C
Pine,	Bunya			B
Pine,	Caribbean	Pitch		C
Pine,	Corsican			C
Pine,	Hoop			C
Pine,	Huon			B
Pine,	Japanese	Black		B
Pine,	Kauri			E
Pine,	Lodgepole			A
Pine,	Maritime			B
Pine,	New	Zealand	White	B
Pine,	Nicaraguan	Pitch		C
Pine,	Parana			B
Pine,	Ponderosa			C
Pine,	Radiata			C
Pine,	Red			B
Pine,	Scots			A
Pine,	Sugar			C
Pine,	Yellow			A
Poplar,	Black			A
Pterygota,	African			A
Pyinkado				E
Queensland	Kauri			J
Queensland	Walnut			C
Ramin				G
Redwood,	Baltic	(European)		A
Redwood,	Californian			B
Rosewood,	Indian			A
Rubberwood				H
Santa	Maria			H
Sapele				C
Sen				A
Seraya,	Red			C
Silky	Oak,	African		C
Silky	Oak,	Australian		C
Spruce,	Japanese	(8-18%mc)		J
Spruce,	Japanese	(18-28%mc)		C
Spruce,	Norway	(European)		C
Spruce,	Sitka			C
Stringybark,	Messmate			C
Stringybark,	Yellow			C

Wood Species				Group
Sterculia,	Brown			A
Sycamore				F
Tallowwood				A
Teak				F
Totara				E
Turpentine				C
Utile				J
Walnut,	African			J
Walnut,	American			A
Walnut,	European			C
Walnut,	New	Guinea		B
Walnut,	Queensland			C
Wawa				G
Wandoo				J
Whitewood				C
Yew				C

Botanical Names of Wood

Wood Type			Grp
Abies	alba		B
Abies	grandis		A
Abies	procera		J
Acanthopanex	ricinifolius		A
Acer	macrophyllum		A
Acer	pseudoplatanus		F
Acer	saccharum		A
Aetoxicon	punctatum		G
Aformosia	elata		G
Afaelia	spp		E
Agathis	australis		E
Agathis	palmerstoni		J
Agathis	robusta		J
Amblygonocarpus	andgensis		A
Amblygonocarpus	obtusungulis		A
Araucaria	angustifolia		B
Araucaria	bidwilli		B
Araucaria	cunninghamii		
Berlinia	grandiflora		B
Berlinia	spp		B
Betula	alba		J
Betula	alleghaniensis		J
Betula	pendula		J
Betula	spp		J
Bosquiera	phoberos		A
Brachylaena	hutchinsii		J
Brachylaena	spp		B
Calophyllum	brasiliense		H
Canarium	schweinfurthii		B
Cardwellia	sublimes		C
Carya	glabra		F
Cassipourea	elliotii		F
Cassipourea	melanosana		F
Castanea	sutiva		C
Cedrea	odorata		J
Ceratopetalum	apetala		G
Chamaecyparis	spp	(8-18%mc)	G
Chamaecyparis	spp	(18-28%mc)	C
Chlorophora	excelsa		F
Cordial	alliodora		F
Corton	megalocarpus		J
Cryptomelia	japonica		B
Cupressus	spp		A
Dacryium	franklinii		B
Dalbergia	latifolia		A
Diospyros	virginiana		G
Dipterocarpus	(Keruing)		F
Dipterocarpus	zeylanicus		A
Distemonanthus	benthamianus		C
Dracontomelium	mangiferum		B
Dryobanalops	spp		A
Dyera	costulata		C

Wood Type			Grp
Entandrophragma	angolense		H
Entandrophragma	cylindricum		C
Entandrophragma	utile		J
Endiandra	palmerstoni		C
Erythrophleum	spp		C
Eucalyptus	acmenicides		C
Eucalyptus	crebra		B
Eucalyptus	diversicolor		A
Eucalyptus	globules		B
Eucalyptus	maculate		A
Eucalyptus	marginata		C
Eucalyptus	microcorys		A
Eucalyptus	obliqua		C
Eucalyptus	pilularis		C
Eucalyptus	saligna		B
Eucalyptus	wandoo		J
Fagus	sylvatica		C
Flindersia	brayleyana		B
Fraxinus	Americana		B
Fraxinus	excelsior		A
Fraxinus	japonicus		A
Fraxinus	mardshurica		A
Gonystylus	macrophyllum		G
Gossweilodendron	balsamiferum		J
Gossypiospermum	proerox		A
Grevillea	robusta		C
Guarea	cedrata		H
Guarea	thomsonii		J
Guibortia	ehie		B
Hevea	barsilensis		H
Intsia	bijuga		B
Juglans	nigra		A
Juglans	regia		C
Khaya	senegalensis		E
Khaya	ivorensis		J
Larix	deciduas		C
Larix	kaempferi		C
Larix	leptolepis		C
Larix	occidentalis		F
Liquidamper	styraciflua		A
Lovoa	klaineana		J
Lovoa	trichiloides		J
Maesopsis	eminii		J
Mansonia	altissima		B
Millettia	stuhimannii		A
Mimusops	heckelii		B
Mitragyna	ciliate		E
Nauclea	diderrichii		H
Nesogordonia	papaverifera		C
Nothofagus	cunninghamii		A
Ochroma	lagopus		A
Ochroma	pyramidalis		A
Ocotea	rodiaei		C

Wood Type			Grp
Ocotea	usambarensis		C
Octomeles	sumatrana		E
Olea	hochstetteri		B
Olea	welwitschii		C
Palaquium	spp		A
Paulownia	tomentosa		J
Pericopsis	elata		G
Picea	abies		C
Picea	jezoensis	(8-18%mc)	J
Picea	jezoensis	(18-28%mc)	C
Picea	sitchensis		C
Picaenia	excelsa		C
Pinus	caribaea		C
Pinus	contorta		A
Pinus	lampertiana		C
Pinus	nigra		C
Pinus	palustris		C
Pinus	pinaster		B
Pinus	ponderosa		C
Pinus	radiate		C
Pinus	spp		B
Pinus	strobus		A
Pinus	sylvestris		A
Pinus	thunbergii		B
Pipadeniastrum	africanum		A
Piptadenia	africana		A
Podocarpus	dacrydiodes		B
Podocarpus	spicatus		C
Podocarpus	totara		E
Populus	spp		A
Pruns	avium		J
Pseudotsuga	menzesii		B
Pterocarpus	angolensis		G
Pterocarpus	indicus		G
Pterocarpus	soyauxii		F
Pterygota	bequaertii		A
Quercus	cerris		E
Quercus	delegatensis		C
Quercus	gigantean		C
Quercus	robur		A
Quercus	spp		A
Ricinodendron	heudelotti		F
Sarcocepalus	diderrichii		H
Scottellia	coriacea		E
Sequoia	sempervirens		B
Shorea	smithiana		G
Shorea	spp		B
Sterculia	rhinopetala		A
Swietenia	candollei		A
Swietenia	mahogani		B
Syncarpia	glomulifera		C
Syncarpia	laurifolia		C
Tarrietia	utillis		C

Wood Type			Grp
Taxus	baccata		C
Tectona	grandis		F
Terminalia	superba		A
Thuja	plicata		C
Tujopsis	dolabrat		J
Tieghamella	heckelii		B
Tilia	americana		G
Tilia	vulgaris		E
Triploehiton	scleroxylon		G
Tsuga	heterophylia		C
Ulmus	amercana		E
Ulmus	procea		E
Ulmus	thomasii		E
Xylia	dolabriformis		E
Zelkova	serrata		B

NOTES:

- The calibration data in this table are based on standard tests by oven-drying of commercial samples of the various wood species, between 7% and fibre saturation. Above the fibre saturation point (25%-30%) readings are approximate and generally apply to wood that has been dried and re-wetted.
- The instrument is calibrated for wood at 68°F (20°C). If the temperature of wood varies by more than 5°C, the meter reading can be corrected approximately by adding 1/2% for every 9F (5°C) below 68°F (20°C) or subtracting 1/2% for every 9F (5°C) above 68°F (20°C).
- Readings higher by 1%-2% may be obtained where wood has been impregnated with a water-borne preservative.
- High readings obtained with some ply-woods of peculiar composition must be treated with caution.
- Building material measurements: Select the ‘A’ scale to measure building materials. Refer to the following conversion table to obtain the building material moisture value.

- Building material and chip-board measurements: Select the 'A' scale to measure building materials and chip-board. Refer to the following conversion table to obtain the building material and chip-board moisture value equivalents.

Std Scale A	Bldg Mat'l	Species Group							Chip-board
		B	C	E	F	G	H	J	
%H2O									
6	3								
7	4.8	9.2	9.4	8.6	6.8	6.7	11.0	10.1	
8	7.0	10.0	10.3	9.3	7.4	7.4	11.5	11.0	
9	8.7	10.8	10.9	9.7	7.9	8.1	12.1	11.6	8.5
10	10.5	11.7	11.5	10.4	8.6	8.8	12.7	12.2	9.4
11	12.2	12.7	12.6	11.3	9.5	9.7	13.4	13.4	10.5
12	13.3	13.6	13.7	12.1	10.5	10.5	14.0	14.3	11.5
13	14.8	14.5	14.5	12.7	11.2	11.2	14.5	15.1	12.5
14	16.2	15.3	15.5	13.4	11.8	11.8	15.0	16.0	13.5
15	16.6	16.3	16.7	14.1	12.5	12.6	15.6	17.0	14.4
16	17.2	16.9	17.5	14.8	13.0	13.2	16.0	17.7	14.9
17	18.8	17.7	18.8	15.7	14.3	13.9	16.6	18.5	15.3
18	19.6	18.2	19.7	16.3	15.0	14.5	17.0	19.1	16.1
19	20.2	19.0	21.0	16.9	15.9	15.2	17.6	20.0	16.7
20	20.6	20.0	22.6	17.8	16.9	16.1	18.4	21.3	17.2
21	20.9	20.8	23.5	18.5	17.6	16.8	19.1	22.3	18.3
22	21.5	21.5	24.5	29.3	18.3	17.4	19.7	23.2	19.1
23	22.1	22.9	26.4	20.2	19.8	18.6	21.2	24.5	19.9
24	22.7	23.5	27.4	20.8	20.4	19.0	22.0	25.8	20.5
25	23.2	24.2	27.8	21.2	21.0	19.4	22.7	26.3	23
26	23.6	25.3	29.0	22.4	22.3	20.1	23.9	27.3	
27	24.0	26.6	30.0	23.3	23.5	20.8	24.9	28.2	
28	24.2	27.9	31.2	24.2	24.6	21.6	25.7	29.2	
29	24.4	29.3	32.5	25.6	26.0	22.9	26.9	30.2	
30	24.6	30.8	33.7	26.8	27.5	24.1	28.2	31.1	
32	25.0								
37	25.8								
39	26.1								
40	27.2								
46.5	33.0								