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Manual Humidity detector for building materials



FMC



FME



FMW-T / FMW-B



FMD

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1. Characteristics

In this chapter the unit density, the oven-dry method and the moisture measurement with the Micro-Electronics moisture meters are described.

1.1 Unit density

The formula for the unit density is:

$$\text{Unit density } Q \text{ [kg/m}^3\text{]} = \frac{\text{mass at moisture content } \dot{u} \text{ \% [kg]}}{\text{volume at moisture content } \dot{u} \text{ \% [m}^3\text{]}}$$

(1) Unit density

The unit density is used for moisture measurements with the FMW-B / FMW-T moisture meters.

- For wood, the FMW-B / FMW-T are set at the average unit density applicable for a moisture content of 0%.
- For building materials and paper, the FMW-B / FMW-T is set at the reference line.

1.2 Moisture content

The average moisture content of a sample is determined using the oven-dry method.

- For wood, a sample of approx. 100-200 gram is weighed and then dried at 102-105 °C, until the mass of the sample is constant.
- For building materials and paper, we refer to the manual for the relevant measuring equipment.

The formula for determining the moisture content according to the oven-dry method is:

$$\text{Moisture content } \dot{u} \text{ [\%]} = \frac{\text{mass}_{\text{wet}} \text{ [kg]} - \text{mass}_{\text{dry}} \text{ [kg]}}{\text{mass}_{\text{dry}} \text{ [kg]}} \times 100$$

(2) Moisture content according to the oven-dry method

The Micro-Electronics moisture meters calculate the actual moisture content, as determined by the oven-dry method.

1.3 CEN (European Committee for Standardization)

EN 13183-1 Round and sawn timber Method of measuring moisture content Part 1: Method for

determining moisture content of a piece of sawn timber (Oven-dry method)

EN 13183-2 Round and sawn timber Method of measuring moisture content Part 2: Method for estimating moisture content of a piece of sawn timber (Electrical resistance method)

EN 13556 Round and sawn timber Nomenclature of timbers used in Europa

1.4 In Practice

Wood building materials and paper have an inhomogeneous composition.

- Wood is constructed from various layers and often contains resin ducts, cavities, knots etc.
- Building materials and paper are different in composition and element size.

As a result, variations can occur in the electric characteristics and unit density of samples of the same type with similar moisture contents and temperature. The smaller these variations are, the greater the accuracy of the moisture measurement.

2. Electric moisture measurement

Micro-Electronics distinguishes the following two electrical measurement methods for determining the moisture content:

- Moisture measurement by measuring the electric conduction (FMC, FMD, FME).
- Moisture measurement by measuring the dielectric constant (FMW-B / FMW-T).

2.1 Outline

The following points are important for accurate moisture measurements with the Micro-Electronics moisture meters.

2.1.1 Wood species, building materials and paper	
FMC, FMD, FME	FMW-B / FMW-T
Every material has its own specific electric conduction.	Every material has its own specific unit density.
The correct reference values must therefore be set. In chapters "Wood species" and "Building materials" and "Paper", the reference values are indicated.	

2.1.2 Temperature	
FMC, FMD, FME	FMW-B / FMW-T

Wood: As the wood temperature influences conduction, the correct wood temperature must be set. There is a choice of two temperature corrections.	The temperature has virtually no influence on a correct moisture measurement
2.1.3 Accuracy	
FMC, FMD, FME, FMW-B / FMW-T	
The material to be measured and the number of measurements determine the final accuracy of the moisture measurement. The reasons for this include the inhomogeneous composition and the moisture distribution.	
As a rule, the greatest accuracy is obtained when a number of measurements are taken.	

2.1.4 Measuring depth
FMC, FMD, FME, FMW-B / FMW-T
Material that has been artificially dried, will have a higher moisture content at the core than at the edge.
Wood: The moisture content of a piece of wood is determined at about 1/3 of the thickness of the wood. The reference values are also based on this. If the moisture content of the core of a thick piece of wood must be determined, the wood can be sawn in two in order to measure the core more easily.

2.1.5 Measuring methods	
FMC, FMD, FME	FMW-B / FMW-T
Using insulated measuring pins, the moisture content is measured between the non insulated points of the measuring pins. The moisture content along the whole length of the measuring pin is measured using the non insulated measuring pins. It is typical that the highest moisture content is always measured between the non insulated parts of the measuring pins.	The sensor measures the average moisture content to a depth of 25 mm. Wood: For wood with a thickness of less than 10 mm, several sections can be laid on top of one another. As it is possible to measure through the material, notice should be taken of what is behind the wood.

2.1.6 Measuring direction	
FMC, FMD, FME	FMW-B / FMW-T
In general, it is of no consequence whether the measuring pins are placed lengthwise or crosswise. Wood: Preferably crosswise to the grain.	In general, it is of no consequence whether the sensor is placed lengthwise or crosswise. Wood: Preferably crosswise to the grain.

2.1.7 Measuring surface	
FMC, FMD, FME	FMW-B / FMW-T

In principle, a rough or smooth surface has no influence on the measurement. If the surface is wetter than the depth to be measured, insulated measuring pins are to be used.	The surface should be clean, flat and smooth for an accurate measurement. It is possible to measure through a coating or a so-called surface course.
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2.1.8 Measuring range

FMC, FMD, FME	FMW-B / FMW-T
Wood: Measurements below 7% and above the wood fibre saturation point are not accurate. For a precise determination beyond the measuring range, we recommend using the oven-dry method.	Wood: Measurements above the wood fibre saturation point are not accurate. For a precise determination beyond the measuring range, we recommend using the oven-dry method.

2.1.9 Preservatives

FMC, FMD, FME	FMW-B / FMW-T
Measurements of treated materials are, in general, not accurate. For a precise determination, we recommend using the oven-dry method.	In general, preservatives and salt solutions do not influence the moisture measurements.

3. Wood species

Reference values of wood species.

For the precise moisture meter software version, we refer to the relevant manual.

Trade name	Botanic	FMC	FMD FME	FMW-B / FMW-T
AB Reference	AB Reference	0	0	0.00
Abachi (Obeche)	Triplochiton scleroxylon	2	253	0.36
Abarco	Cariniana spp.	3	124	0.70
Abura	Hallea ciliata	2	162	0.52
Afara. White	Terminalia superba	3	246	0.52
Afrormosia	Pericopsis elata	2	195	0.65
Afzelia	Afzelia spp.	2	107	0.73
Agba	Gossweilerodendron balsamiferum	3	157	0.46
Albizia. New Guinea	Albizia falcatara	2	269	
Albizia. Solomon Island	Albizia falcatara	2	270	
Alder. Blush	Sloanea australis	2	532	
Alder. Brown	Caldcluvia paniculosa	2	302	0.50
Alder. Rose	Caldcluvia australiensis	2	301	0.50
Alerce	Fitzroya cupressoides	3	151	0.39
Amberoi	Pterocymbium beccarii	1	521	
Amoora. New Guinea	Amoora cucullata	3	276	
Antiaris. New Guinea	Antiaris toxicaria	3	279	0.43
Apple. Black	Planchonella australis	2	501	
AS/NZS 1080.1	AS/NZS 1080.1	5	5	

Ash. Bennet's	Flindersia bennettiana	2	430	
Ash. Crow's	Flindersia australis	2	429	
Ash. European	Fraxinus excelsior	3	153	0.65
Ash. Hickory	Flindersia ifflaiana	2	433	
Ash. Japanese	Fraxinus mandshurica	2	154	0.61
Ash. Mountain (Oak Tasmanian)	Eucalyptus regnans	3	148	0.65
Ash. Red	Alphitonia excelsa	2	273	
Ash. Scaly	Ganophyllum falcatum	3	439	
Ash. Silver (Northern)	Flindersia schottiana	2	436	
Ash. Silver (Queensland)	Flindersia bourjotiana	3	431	
Ash. Silver (Southern)	Flindersia schottiana	3	437	
Ash. Silver. New Guinea	Flindersia amboinensis	2	428	
Ash. Silvertop	Eucalyptus sieberi	2	417	
Ash. White	Fraxinus americana	2	152	0.64
Aspen. Hard	Acronychia laevis	2	265	
Azobé	Lophira alata	3	177	1.04
Balau	Shorea laevis	2	231	0.90
Balau. Red	Shorea guiso	3	229	0.83
Balsa	Ochroma pyramidale	2	188	0.13
Basralocus	Dicorynia guianensis	2	134	0.70
Basswood (Lime). American	Tilia americana	2	250	0.40
Basswood (Lime). European	Tilia vulgaris	2	251	0.49
Basswood. Fijian	Endospermum macrophyllum	1	371	0.45

Trade name	Botanic	FMC	FMD FME	FMW-B / FMW-T
Basswood. Malaysian	Endospermum malacense	4	372	
Basswood. New Guinea	Endospermum medullosum	2	373	
Basswood. Silver	Polyscias elegans	2	510	
Basswood. Solomon Island	Polyscias elegans	1	511	
Bean. Black	Castanospermum australe	3	322	
Beech	Fagus sylvatica	3	149	0.66
Beech. Myrtle	Nothofagus cunninghamii	2	472	0.67
Beech. New Zealand Red (Hearted Untreated)	Nothofagus fusca	3	473	
Beech. New Zealand Red (Sapwood Boron)	Nothofagus fusca	2	474	
Beech. New Zealand Red (Sapwood Untreated)	Nothofagus fusca	2	475	
Beech. Silky	Citronella moorei	2	333	
Beech. Silver	Nothofagus menziesii	2	476	
Beech. Silver (Sapwood Tanalith)	Nothofagus menziesii	2	477	
Beech. Silver (Sapwood Untreated)	Nothofagus menziesii	2	478	
Beech. Steamed	Fagus sylvatica	2	150	0.66
Beech. Wau	Elmerrillia papuana	4	367	
Beech. White (Fiji)	Gmelina vitiensis	2	445	

Beech. White (Queensland)	Gmelina leichardtii	2	444	
Birch. European	Betula pubescens	3	118	0.61
Birch. White	Schizomeria ovata	2	527	
Birch. Yellow	Betula lutea	2	117	0.65
Bishop Wood (Fiji)	Bischofia javanica	2	295	0.71
Blackbutt	Eucalyptus pilularis	3	413	
Blackbutt. Western Australia	Eucalyptus patens	3	412	
Blackwood	Acacia melanoxylon	2	261	
Bloodwood. Red	Corymbia gunmifera	3	336	
Bollywood	Litsea reticulata	2	452	
Box. Black	Eucalyptus largiflorens	3	403	
Box. Brush (N.S.W.)	Lophostemon confertus	1	455	
Box. Brush (Queensland)	Lophostemon confertus	1	456	
Box. Brush (Source Unknown)	Lophostemon confertus	1	454	
Box. Grey	Eucalyptus moluccana	3	407	
Box. Grey. Coast	Eucalyptus bosistoana	2	378	
Box. Kanuka	Tristania laurina	2	548	
Boxwood. New Guinea	Xanthophyllum papuanum	2	552	
Boxwood. Yellow	Planchonella pohlmaniana	2	503	
Brachychiton	Brachychiton carrthersii	1	297	
Bridelia	Bridelia minutiflora	3	298	
Brigalow	Acacia harpophylla	2	259	
Brownbarrel	Eucalyptus fastigata	2	396	
Bubinga	Guibourtia demeusii	4	161	0.85
Buchanania	Buchanania arborescens	2	299	
Burckella. Solomon Island	Burckella obovata	1	300	
Butternut. Rose	Blepharocarya involucrigera	1	296	
Calophyllum (Bintangor). Fijian	Calophyllum leucocarpum	2	309	
Calophyllum (Bintangor).	Calophyllum curtisii	2	307	

Trade name	Botanic	FMC	FMD FME	FMW-B / FMW-T
Malaysian				
Calophyllum (Bintangor). New Guinea	Calophyllum papuanum	3	310	
Calophyllum (Bintangor). Philippines	Calophyllum inophyllum	2	308	0.59
Calophyllum (Bintangor). Solomon Island	Calophyllum kajewskii	4	120	0.65
Camphorwood. New Guinea	Cinnamomum spp.	2	332	
Camptosperma	Camptosperma brevipetiolata	2	121	0.38
Camptosperma (Malaysia)	Camptosperma curtisii	4	311	
Camptosperma (Solomon Island)	Camptosperma kajewskii	1	312	
Cananga (Philippines)	Canagium odoratum	2	313	

Canarium. African	Canarium schweinfurthii	3	122	0.46
Canarium. Fijian	Canarium oleosum	2	316	
Canarium. New Guinea	Canarium vitiense	2	318	
Canarium. Solomon Island	Canarium salomonese	1	317	
Candlenut	Aleurites moluccana	4	271	0.26
Carabeen. Yellow	Sloanea woollsii	2	534	
Cathormion. New Guinea	Cathormion umbellatum	1	326	
Cedar. Incence	Calocedrus decurrens	3	119	0.36
Cedar. Red	Toona ciliata	4	252	0.48
Cedar. South American	Cedrela odorata	4	126	0.44
Cedar. Western Red	Thuja plicata	2	249	0.34
Cedar. White	Melia azedarach	3	463	0.55
Cedar. Yellow	Chamaecyparis nootkatensis	3	128	0.44
Celtis. New Guinea	Celtis spp.	1	328	
Celtis. Solomon Island	Celtis philippinensis	1	327	
Cheesewood. White (Queensland)	Alstonia scholaris	2	275	0.42
Chengal (Malaysia)	Neobalanocarpus heimii	2	469	
Cherry. American	Prunus serotina	3	218	0.58
Cherry. European	Prunus avium	4	217	0.54
Cleistocalyx	Cleistocalyx mirtoides	2	334	
Coachwood	Ceratopetalum apetalum	2	329	
Coondoo. Blush	Planchonella laurifolia	1	502	
Cordia. New Guinea	Cordia dichotoma	1	335	
Corkwood. Grey	Erythrina vespertilio	2	374	
Courbaril	Hymenaea courbaril	3	165	0.83
Crabwood	Carapa guianensis	2	123	0.59
Cudgerie. Brown	Canarium australasicum	2	314	
Curupixia	Macropholis	2	179	
Cypress	Cupressus spp.	3	131	0.45
Cypress. Northern	Callitris intratropica	2	304	
Cypress. Rottnest Island	Callitris preissii	3	305	
Cypress. White	Callitris glaucophylla	3	303	
Dakua. Salusalu (Fiji)	Decussocarpus vitiensis	3	352	0.38
Dibetou (Walnut African)	Lovoa trichilioides	4	178	0.50
Dillenia (Solomon Island)	Dillenia salomonese	1	357	
Doi (Fiji)	Alphitonia zizphoides	2	274	0.55
Douka	Thieghemella africana	4	247	0.66
Drypetes. New Guinea	Drypetes spp.	2	141	0.74

Trade name	Botanic	FMC	FMD FME	FMW-B / FMW-T
Duabanga. New Guinea	Duabanga moluccana	2	359	
Ebony. New Guinea Indian	Diospyros spp.	1	136	1.09
Elm. American	Ulmus americana	2	256	0.60
Elm. European	Ulmus spp.	2	257	0.61
Erima	Octomeles sumatrana	2	480	
Evodia. White	Melicope micrococca	1	464	

Figwood (Moreton Bay)	<i>Ficus macrophylla</i>	2	426	
Fir. Alpine	<i>Abies lasiocarpa</i>	3	104	0.32
Fir. Amabilis	<i>Abies amabilis</i>	3	102	0.43
Fir. Douglas	<i>Pseudotsuga menziesii</i>	3	219	0.50
Fir. Douglas (New Zealand) (Sapwood Treated)	<i>Pseudotsuga menziesii</i>	2	515	0.50
Fir. Douglas (New Zealand) (Sapwood Untreated)	<i>Pseudotsuga menziesii</i>	3	516	0.50
Fir. Douglas (New Zealand) (Truewood Untreated)	<i>Pseudotsuga menziesii</i>	2	517	0.50
Fir. Grand	<i>Abies grandis</i>	3	103	0.37
Fir. Red	<i>Abies magnifica</i>	3	100	0.38
Fir. White	<i>Abies alba</i>	3	101	0.43
Galip	<i>Canarium indicum</i>	2	315	
Garo-Garo	<i>Matixiodendron pschyclados</i>	1	462	
Garuga	<i>Garuga floribunda</i>	1	441	
Gonçalo Alves	<i>Astronium spp.</i>	1	114	0.95
Greenheart	<i>Ocotea rodiaei</i>	3	189	0.95
Greenheart. Queensland	<i>Endiandra compressa</i>	3	368	
Group 1	Group 1	1	1	
Group 2	Group 2	2	2	
Group 3	Group 3	3	3	
Group 4	Group 4	4	4	
Guarea. Scented (Black)	<i>Guarea cedrata</i>	4	159	0.57
Guarea. Scented (White)	<i>Guarea cedrata</i>	3	160	0.57
Guariuba	<i>Clarisia racemosa</i>	3	130	0.69
Gum. Black	<i>Nyssa sylvatica</i>	3	187	0.50
Gum. Blue. Southern	<i>Eucalyptus globulus</i>	2	398	
Gum. Blue. Sydney	<i>Eucalyptus saligna</i>	3	415	
Gum. Grey	<i>Eucalyptus punctata</i>	3	414	
Gum. Grey. Mountain	<i>Eucalyptus cypellocarpa</i>	2	388	
Gum. Maiden's	<i>Eucalyptus maidenii</i>	3	405	0.90
Gum. Manna	<i>Eucalyptus viminalis</i>	2	420	
Gum. Mountain	<i>Eucalyptus dalrympleana</i>	2	389	
Gum. Pink	<i>Eucalyptus fasciculosa</i>	3	395	
Gum. Red	<i>Liquidambar styraciflua</i>	3	175	0.51
Gum. Red. Forest	<i>Eucalyptus tereticornis</i>	3	418	0.90
Gum. Red. River	<i>Eucalyptus camaldulensis</i>	4	382	
Gum. Rose	<i>Eucalyptus grandis</i>	3	400	
Gum. Shining	<i>Eucalyptus nitens</i>	2	409	0.63
Gum. Spotted (Victoria) (Lemon-Scented)	<i>Corymbia spp.</i>	2	337	
Gum. Sugar	<i>Eucalyptus cladocalyx</i>	3	384	
Gum. White Dunn's	<i>Eucalyptus dunnii</i>	1	394	
Gum. Yellow	<i>Eucalyptus leucoxydon</i>	2	404	
Handlewood. Grey	<i>Aphanante philippinensis</i>	2	280	

Trade name	Botanic	FMC	FMD FME	FMW-B / FMW-T
Handlewood. White	Streblus pendulinus	2	538	
Hardwood. Johnstone River	Bakhouisia bancroftii	3	288	
Hemlock	Tsuga heterophylla	3	255	0.46
Hemlock. Chinese	Tsuga chinensis	3	254	
Heritiera (Menkulang). New Guinea	Heritiera spp.	2	163	0.63
Hevea	Hevea Brasiliensis	2	554	0.49
Hickory	Carya spp.	2	125	0.76
Hollywood. Yellow	Premna lignum-vitae	2	512	
Horizontal	Anodopetalum biglandulosum	3	277	
Incensewood	Pseudocarapa nitidula	2	514	
Iroko	Chlorophora excesla	2	129	0.63
Ironbark. Grey	Eucalyptus drephanophylla	3	393	
Ironbark. Grey	Eucalyptus paniculata	3	411	
Ironbark. Red	Eucalyptus sideroxylon	3	416	
Ironbark. Red. Broad-Leaved	Eucalyptus fibrosa	3	397	
Ironbark. Red. Narrow-Leaved	Eucalyptus crebra	3	387	
Jarrah	Eucalyptus marginata	3	147	0.76
Jelutong	Dyera costulata	2	142	0.41
Kahikatea (New Zealand) (Boron)	Dacrycarpus docrydioides	2	343	
Kahikatea (New Zealand) (Thanalith)	Dacrycarpus docrydioides	2	344	
Kahikatea (New Zealand) (Untreated)	Dacrycarpus docrydioides	2	345	
Kamarere (Fiji)	Eucalyptus deglupta	1	390	
Kamarere (New Guinea)	Eucalyptus deglupta	2	391	
Kapur	Dryobalanops spp.	4	140	0.61
Karri	Eucalyptus diversicolor	2	146	0.85
Kauceti	Kermadecia vitiensis	1	450	
Kauri	Agathis australis. borneensis	2	108	0.46
Keledang	Artocarpus lanceifolius	3	113	0.55
Kempas	Koompassia excelsa	2	171	0.82
KerANJI (Malaysia)	Dialium platysepalum	2	355	
Keruing	Dipterocarpus spp.	3	137	0.73
Kiso	Chisocheton schumannii	1	331	
Kopie	Goupia glabra	2	158	0.81
Lacewood. Yellow	Polyalthia oblongifolia	2	509	0.53
Laran	Anthocephalus chinensis	2	278	0.50
Larch. European	Larix decidua	3	172	0.55
Larch. Japanese	Larix kaempferi	3	173	0.53
Larch. Western	Larix occidentalis	3	174	0.55
Leatherwood	Eucryphia lucida	3	423	
Lightwood	Acacia implexa	2	260	
Macadamia	Floydia praealta	2	438	
Magnolia	Magnolia acuminata/grandiflora	3	180	0.52

Mahogany. (New Guinea)	Dysoxylum spp.	2	363	
Mahogany. African	Khaya spp.	4	170	0.50
Mahogany. Brush	Geissos benthamii	2	443	
Mahogany. Honduras (American)	Swietenia spp.	3	242	0.51
Trade name	Botanic	FMC	FMD FME	FMW-B / FMW-T
Mahogany. Miva	Dysoxylum muelleri	3	361	
Mahogany. Philippine	Shorea almon	1	227	0.48
Mahogany. Philippine. Light Red	Parashorea plicata	3	193	0.51
Mahogany. Philippine. Red	Shorea negrosensis	3	234	0.46
Mahogany. Red	Eucalyptus botryoides	3	379	
Mahogany. Rose	Dysoxylum fraseranum	2	360	
Mahogany. Sapelli (Sapele)	Entandrophragma cylindricum	3	144	0.63
Mahogany. Sipo (Utile)	Entandrophragma utile	4	145	0.60
Mahogany. Southern	Eucalyptus botryoides	2	380	
Mahogany. Tiama (Gedu Nohor)	Entandrophragma angolense	3	143	0.53
Mahogany. White	Eucalyptus acmenoides	3	375	
Mako	Trischospermum richii	1	547	
Makore	Thieghemella heckelii	3	248	0.62
Malas	Homalium foetidum	2	448	
Malletwood	Rhodamnia argentea	2	523	
Malletwood. Brown	Rhodamnia rubescens	2	524	
Manggachapui	Hopea acuminata	3	449	
Mango	Mangifera minor	2	459	
Mango. Philippines	Mangifera altissima	4	458	
Mangosteen (Fiji)	Garcinia myrtifolia	2	440	
Mangrove. Cedar	Xylocarpus australasicus	3	553	
Manilkara (Massaranduba)	Manilkara kanosiensis	1	181	0.96
Maniltoa (Fiji)	Maniltoa grandiflora	1	460	
Maniltoa (New Guinea)	Maniltoa pimenteliana	1	461	
Mansonia	Mansonia altissima	3	182	0.60
Maple. New Guinea	Flindersia pimentelianan	3	435	0.55
Maple. Queensland	Flindersia brayleyana	4	432	
Maple. Rose	Cryptocarya erythroxylon	2	340	
Maple. Scented	Flindersia laeviscarpa	3	434	
Maple. Sugar	Acer saccharum	3	106	0.68
Mararie	Pseudoweinwanna lachnocarpa	3	518	
Marri	Eucalyptus calophylla	2	381	
Masiratu	Degeneria vitiensis	2	354	
Matai	Podocarpus spicatus	2	507	0.51
Meranti. Bukit Frim 1999	Shorea platicladus	2	236	
Meranti. Dark Red	Shorea spp.	3	237	0.63
Meranti. Nemesu Frim 1996	Shorea pauciflora	4	235	
Meranti. Seraya Frim 1999	Shorea curtisii	3	228	
Meranti. SKH 2000	Shorea spp.	3	238	

Meranti. Tembaga Frim 1999	<i>Shorea leprosula</i>	3	232	0.53
Meranti. White	<i>Shorea hypochra</i>	3	230	0.55
Meranti. Yellow	<i>Shorea multiflora</i>	1	233	0.53
Merawan	<i>Hopea sulcala</i>	2	164	0.71
Merbau (Kwila)	<i>Intsia spp.</i>	3	167	0.77
Mersawa	<i>Anisoptera laevis</i>	3	109	0.60
Messmate	<i>Eucalyptus obliqua</i>	3	410	0.78
Moabi	<i>Baillonella toxisperma</i>	4	116	0.81
Mora	<i>Mora excelsa</i>	2	185	0.97
Moustiquaire	<i>Cryptocarya spp.</i>	2	342	

Trade name	Botanic	FMC	FMD FME	FMW-B / FMW-T
Movingui (Ayan)	<i>Distemonanthus benthamianus</i>	3	138	0.68
Musizi	<i>Maesopsis eminii</i>	4	457	
Neuburgia	<i>Neuburgia collina</i>	3	471	
Nutmeg (Fiji)	<i>Myristica spp.</i>	2	468	
Nutmeg (New Guinea)	<i>Myristica buchneriana</i>	2	467	0.45
Oak. American Red	<i>Quercus spp.</i>	3	222	0.66
Oak. American White	<i>Quercus spp.</i>	2	223	0.67
Oak. European	<i>Quercus petraea</i>	3	221	0.63
Oak. Japanese	<i>Quercus spp.</i>	2	224	0.63
Oak. New Guinea	<i>Castanopsis acuminatissima</i>	2	321	0.60
Oak. Silky. Fishtail	<i>Neorites kevediana</i>	1	470	
Oak. Silky. Northern	<i>Cardwellia sublimia</i>	2	319	0.53
Oak. Silky. Red	<i>Stenocarpus salignus</i>	2	536	
Oak. Silky. Southern	<i>Grevillea robusta</i>	1	446	
Oak. Silky. White	<i>Stenocarpus sinuatus</i>	2	537	
Oak. Tulip. Blush	<i>Argyrodendron actinophyllum</i>	2	283	
Oak. Tulip. Brown	<i>Argyrodendron trifoliolatum</i>	3	285	
Oak. Tulip. Red	<i>Argyrodendron peralatum</i>	4	284	
Oak. Tulip. White	<i>Pterygota horsfieldii</i>	2	522	0.69
Obah	<i>Eugenia spp.</i>	2	424	
Odoko	<i>Scottellia coriacea</i>	2	530	
Olive. East African	<i>Olea hochstetteri</i>	3	191	0.85
Olivillo	<i>Aextoxicon punctatum</i>	2	266	
Opepe	<i>Nauclea diderrichii</i>	4	186	0.71
Padouk. African	<i>Pterocarpus soyauxii</i>	2	220	0.70
Palaquium. Solomon Island	<i>Palaquium spp.</i>	1	192	0.58
Panga Panga	<i>Millettia stuhlmannii</i>	2	184	0.76
Papuacedrus	<i>Papuacedrus papuana</i>	3	481	
Para Angelim	<i>Hymenolobium excelsum</i>	3	166	0.75
Parinari. Fijian	<i>Parinari insularum</i>	2	482	
Penarahan	<i>Myristica iners</i>	3	466	
Peppermint. Broad-Leaved	<i>Eucalyptus dives</i>	3	392	0.76
Peppermint. Narrow-Leaved	<i>Eucalyptus australiana</i>	3	377	
Peroba De Campos	<i>Paratecoma peroba</i>	3	194	0.69

Persimmon	Diospyros pentamera	2	135	0.78
Perupok (Malaysia)	Kokoona spp.	3	451	
Perupok (Malaysia)	Lophopetalum subovatum	4	453	
Pillarwood	Cassipourea malosano	2	320	
Pine. Aleppo	Pinus halepensis	3	488	
Pine. Benguet	Pinus kesiya	4	489	
Pine. Black	Prumnopitys amarus	2	513	
Pine. Bunya	Pinus bidwillii	3	485	
Pine. Canary Island	Pinus canariensis	3	486	
Pine. Caribbean	Pinus caribaea	3	198	0.63
Pine. Celery-Top	Phyllocladus aspenifolius	2	484	
Pine. Corsican	Pinus nigra	4	204	0.56
Pine. Hoop	Araucaria cunninghamii	3	281	0.56
Pine. Huon	Dacrydium franklinii	2	350	
Pine. King William	Athrotaxis selaginoides	3	287	
Pine. Klinki	Araucaria hunsteinii	2	282	
Pine. Loblolly	Pinus taeda	3	211	0.51
Pine. Lodgepole	Pinus contorta	3	199	0.41

Trade name	Botanic	FMC	FMD FME	FMW-B / FMW-T
Pine. Maritime	Pinus pinaster	3	206	0.50
Pine. Parana Red	Araucaria angustifolia	1	110	0.50
Pine. Parana White	Araucaria angustifolia	2	111	0.50
Pine. Pitch	Pinus palustris	3	205	0.59
Pine. Ponderosa	Pinus ponderosa	3	208	0.44
Pine. Radiata	Pinus radiata	3	209	0.48
Pine. Radiata (New Zealand) (Sapwood Aac)	Pinus radiata	3	490	0.47
Pine. Radiata (New Zealand) (Sapwood Boliden)	Pinus radiata	3	491	0.47
Pine. Radiata (New Zealand) (Sapwood Boron)	Pinus radiata	2	492	0.47
Pine. Radiata (New Zealand) (Sapwood Tanalith)	Pinus radiata	2	493	0.47
Pine. Radiata (New Zealand) (Sapwood Untreated)	Pinus radiata	3	494	0.47
Pine. Red	Pinus resinosa	2	495	0.46
Pine. Scots	Pinus sylvestris	3	210	0.48
Pine. Shortleaf	Pinus echinata	3	200	0.51
Pine. Slash (Queensland)	Pinus elliottii	3	487	0.59
Pine. Southern	Pinus echinata	3	201	0.51
Pine. Stone	Pinus pinea	3	207	
Pine. Sugar	Pinus lambertiana	3	202	0.36
Pine. White	Pinus monticola	3	203	0.39
Pittosporum (Tasmania)	Pittosporum bicolor	2	496	
Planchonella. Fijian	Planchonella vitiensis	1	500	
Planchonella. New Guinea	Planchonella kaernbachiana	1	497	
Planchonella. New	Planchonella	1	499	

Guinea	torricellensis			
Planchonella. Solomon Island	Planchonella thyrsoidea	1	498	
Planchonia	Planchonia papuana	2	504	0.64
Pleiogynium	Pleiogynium timorensis	2	505	
Podocarp. Fijian	Podocarpus neriifolia	3	506	
Podocarp. Red	Decussocarpus vitiensis	3	353	0.38
Poplar. Black	Populus nigra	2	216	0.43
Poplar. Pink	Euroschinus falcata	2	425	
Poplar. Yellow (Whitewood American)	Liriodendron tulipifera	3	176	0.44
Quandong. Brown	Eleacarpus coorangooloo	2	366	
Quandong. Silver	Elaecarpus angustifolius	2	364	
Quandong. Solomon Island	Elaecarpus spaericus	1	365	
Qumu	Acacia Richii	2	263	
Raintree (Fiji)	Samanea saman	1	526	0.51
Ramin	Gonystylus spp.	2	156	0.58
Red Louro	Ocotea rubra	3	190	0.57
Redwood	Sequoia sempervirens	2	226	0.37
Rengas	Gluta spp.	2	155	0.59
Resak (Malaysia)	Cotylelobium melanoxydon	2	338	
Rimu - Non-Truewood Boron	Dacrydium cupressinum	2	346	0.52
Rimu - Non-Truewood Tanalith	Dacrydium cupressinum	2	347	0.52
Rimu - Non-Truewood Untreated	Dacrydium cupressinum	2	348	0.52
Rimu - Truewood Untreated	Dacrydium cupressinum	1	349	0.52

Trade name	Botanic	FMC	FMD FME	FMW-B / FMW-T
Robinia	Robinia pseudoacacia	2	225	0.69
Roble Pellin	Nothofagus obliqua	2	479	
Rosewood. Brasil	Dalbergia nigra	2	133	0.83
Rosewood. Indian	Dalbergia latifolia	3	132	0.83
Rosewood. New Guinea	Pterocarpus indicus	2	519	0.56
Rosewood. Philippine	Pterocarpus indicus	2	520	0.56
Sasauria (Fiji)	Dysoxylum quercifolium	2	362	
Sassafras	Doryphora sassafras	2	358	0.53
Sassafras. Southern	Atherosperma moschatum	3	286	
Satinash. Blush	Acmena hemilampra	2	264	
Satinash. Grey	Syzygium gustavioides	2	544	
Satinash. New Guinea	Syzygium buettnerianum	2	541	
Satinash. Rose	Syzygium francisii	1	543	
Satinay	Syncarpia hillebrandii	3	540	
Satinbox	Phebalium squameum	3	483	
Satinheart. Green	Geijera salicifolia	2	442	
Satinwood. Tulip	Rhodosphaera rhodanthema	3	525	

Scentbark	Eucalyptus aromaphloia	2	376	
Schizomeria. New Guinea	Schizomeria serrata	2	528	
Schizomeria. Solomon Island	Schizomeria serrata	1	529	
Sepetir	Sindora coriaceae	1	239	0.55
Sheoak. Fijian Beach	Casuarina nodiflora	2	324	
Sheoak. River	Casuarina cunninghamiana	2	323	
Sheoak. Rose	Casuarina torulosa	2	325	
Sheoak. Western Australia	Allocasuarina fraserana	2	272	
Silkwood. Bolly	Cryptocarya ablata	2	339	
Silkwood. Silver	Flindersia acuminata	2	427	
Simpoh (Philippines)	Dillenia philippinensis	3	356	
Sirus. White	Ailainthus peekelii	2	267	
Sirus. White	Ailainthus triphysa	2	268	
Sloanea	Sloanea spp.	2	533	
Spondias	Spondias mariana	2	535	
Spruce	Picea abies	3	196	0.43
Spruce. Sitka	Picea sitchensis	3	197	0.41
Spruce-Pine-Fir	Softwood	4	240	0.50
Sterculia	Sterculia spp.	2	241	0.80
Stringybark. Brown	Eucalyptus capitellata	3	383	
Stringybark. Darwin	Eucalyptus tetrodonta	2	419	
Stringybark. Yellow	Eucalyptus muelleriana	3	408	
Sycamore	Acer pseudoplatanus	3	105	0.57
Sycamore. Satin	Ceratopetalum succirubrum	2	330	
Tallowwood	Eucalyptus microcoris	3	406	
Tatajuba	Bagassa guianensis	2	115	0.76
Taun (Malaysia)	Pometia pinnata	2	212	0.70
Taun (New Guinea)	Pometia pinnata	3	213	0.70
Taun (Philippines)	Pometia pinnata	4	214	0.70
Taun (Solomon Island)	Pometia pinnata	2	215	0.70
Tawa	Beilschmiedia tawa	2	292	
Tawa - Sap & Heart Boron	Beilschmiedia tawa	2	293	
Tawa - Sap & Heart Untreated	Beilschmiedia tawa	2	294	
Teak	Tectona grandis	2	243	0.63
Terap	Artocarpus elasticus	4	112	0.55

Trade name	Botanic	FMC	FMD FME	FMW-B / FMW-T
Terminalia. Red Brown	Terminalia microcarpa	1	245	
Terminalia. Yellow	Terminalia complanata	2	244	0.48
Tetrameles	Tetrameles nudiflora	2	546	
Tingle. Red	Eucalyptus jacksonii	4	402	
Tingle. Yellow	Eucalyptus guilfoylei	4	401	
Tornillo	Cedrelinga catenaeformis	3	127	0.50
Totara	Podocarpus totara	2	508	
Touriga. Red	Calophyllum costatum	3	306	
Tristiropsis. New Guinea	Tristiropsis canarioides	2	549	

Tuart	Eucalyptus gomphocephala	2	399	
Tulipwood	Harpullia pendula	3	447	
Turpentine	Syncarpia glomulifera	3	539	0.76
Vaivai-Ni-Veikau	Serianthes myriadenia	1	531	0.45
Vatica. Philippine	Vatica. manggachapoi	2	550	
Vitex. New Guinea	Vitex cofassus	2	551	0.71
Vuga	Metrosideros collina	1	465	
Vutu	Barringtonia edulis	1	289	
Walnut (Paldao). New Guinea	Dracontomelum dao	2	139	0.63
Walnut. Black	Juglans nigra	3	168	0.58
Walnut. Blush	Beilschmiedia obtusifolia	2	291	
Walnut. European	Juglans regia	3	169	0.61
Walnut. Queensland	Endiandra palmerstonii	3	370	
Walnut. Rose	Endiandra muelleri	1	369	
Walnut. White	Cryptocarya obovata	2	341	
Walnut. Yellow	Beilschmiedia bancroftii	1	290	
Wandoo	Eucalyptus wandoo	3	421	
Wattle. Hickory	Acacia penninervis	2	262	
Wattle. Silver	Acacia dealbata	2	258	
Wenge	Millettia laurentii	2	183	0.79
Woolybutt	Eucalyptus longifolia	3	422	
Yaka	Dacrydium nausoriensis/nidilum	2	351	0.56
Yasi-Yasi I (Fiji)	Syzygium effusum	2	542	
Yasi-Yasi li (Fiji)	Syzygium spp.	2	545	
Yate	Eucalyptus cornuta	2	386	
Yertschuk	Eucalyptus considenia	3	385	

4. Building materials

Reference values of building materials.

For the precise moisture meter software version, we refer you to the relevant manual.

Material	FMC	FMD FME	FMW-B / FMW-T
Aerated Concrete	18	18	0.00
Brick	13	13	0.00
Cardboard	25	25	0.00
Concrete 200 kg/m ³	14	14	0.00
Concrete 350 kg/m ³	15	15	0.00
Concrete 500 kg/m ³	16	16	0.00
Floor. Anhydrite	10	10	0.00
Floor. Arduparid	11	11	0.00
Floor. Cement	27	27	0.00
Floor. Elastic	17	17	0.00
Floor. Gypsum	19	19	0.00
Floor. Wood-Cement	22	22	0.00
Gypsum	21	21	0.00
Gypsum. Synthetic	20	20	0.00
Lime Mortar	23	23	0.00
MDF	28	28	0.00

Sand-Lime Brick	24	24	0.00
Slab. Asbestos-Cement	12	12	0.00
Wood-Granite	26	26	0.00

5. Paper

Reference values of paper.

For the precise moisture meter software version, we refer you to the relevant manual.

Material	FMC	FMD FME	FMW-B / FMW-T
150 g/m2 Kraft	49	49	0.00
150 g/m2 S.C.	48	48	0.00
440 g/m2 Kraft	50	50	0.00
Ancore	51	51	0.00
Assi	41	41	0.00
Billerud	42	42	0.00
Kemi	43	43	0.00
Modo	44	44	0.00
Paper	40	40	0.00
PWA	45	45	0.00
Rieger	46	46	0.00
Roermond	47	47	0.00

In this direction will find a vision of the measurement technique:
<http://www.industrial-needs.com/measuring-instruments.htm>

NOTE: "This instrument doesn't have ATEX protection, so it should not be used in potentially explosive atmospheres (powder, flammable gases)."