



**UK**

**Measuring MC with  
Brookhuis Moisture Meters for Wood  
and Building Materials**

**MOISTURE METERS**

**FEUCHTEMESSGERÄTE**

**HUMIDIMÈTRES**

**MEDIDORES DE HUMEDAD**

**MEDIDORES DE HUMIDADE**

**VOCHTMETERS**



## Notice

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## Foreword

In this manual, the settings and reference values for all Brookhuis Applied Technologies moisture meters for wood, building materials and paper are given.

The reference values determine the course of the calibration lines programmed in the moisture meters. These reference values originate from scientific research conducted by Brookhuis Applied Technologies and the following institutions.

- Building Technology (VTT) - Finland
- Bundesforschungsanstalt für Forst- und Holzwirtschaft (BFH) – Germany
- Danish Technological Institute (DTI) – Denmark
- Forest Research Institute Malaysia (FRIM) – Malaysia
- Forest Research Institute - New Zealand
- Forestry and Forest Products (CSIRO) – Australia
- Forintek Canada Corporation – Canada
- Norwegian Institute of Technology (NTI) – Norway
- Stichting Keuringsbureau Hout (SKH) - The Netherlands
- SHR Hout Research - The Netherlands
- Swedish Institute for Wood Technology Research (Träteknik) – Sweden
- TNO Building and Construction Research (TNO Bouw) - The Netherlands
- United States Department of Agriculture (USDA) - USA

As all of Brookhuis Applied Technologies instruments are microprocessor- controlled and the reference value data is stored in a memory, future expansion can take place using updates. As a result, Brookhuis Applied Technologies instruments are always up-to-date!

Enschede, 11 March 2015

Ing. P. Rozema

## Revision

This manual is written for the following instruments: S FMC from version 5.0

- FMD from version 5.0
- FME from version 5.0
- FMW from version 2.0
- FMI from version 3.0
- version 1.3 - Values FMW changed.

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## 1 Characteristics

In this chapter the unit density, the oven-dry method and the moisture measurement with the Brookhuis Applied Technologies moisture meters are described.

### 1.1 Unit density

The formula for the unit density is:

$$\text{Unit density } Q \text{ [kg/m}^3\text{]} = \frac{\text{mass at moisture content at 0\% [kg]}}{\text{volume at moisture content at 0\% [m}^3\text{]}}$$

**(1)** Unit density

The unit density is used for moisture measurements with the FMI and FMW moisture meters.

- *For wood, the FMI and FMW are set at the average unit density applicable for a moisture content of 0%.*
- *For building materials and paper, the FMW 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:

$$\text{Moister content in [\%]} = 100 \times \frac{(\text{mass}_{\text{wet}} [\text{kg}] - \text{mass}_{\text{dry}} [\text{kg}])}{(\text{mass}_{\text{dry}} [\text{kg}])}$$

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

The Brookhuis Applied Technologies 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

Brookhuis Applied Technologies 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 (FMI<sup>1</sup>, FMW).*

### 2.1 Outline

The following points are important for accurate moisture measurements with the Brookhuis Applied Technologies moisture meters.

2.1.1 Wood species, building materials and paper		
FMC, FMD, FME	FMW	FMI
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	FMI
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	

<sup>1</sup> The FMI cannot be used to determine the moisture content of building materials and paper.

<b>2.1.3 Accuracy</b>		
<b>FMC, FMD, FME</b>	<b>FMW</b>	<b>FMI</b>
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.		See manual FMI.

<b>2.1.4 Measuring depth</b>		
<b>FMC, FMD, FME</b>	<b>FMW</b>	<b>FMI</b>
Material that has been artificially dried will have 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.		Wood: The measurement is calibrated on the material to be measured.

<b>2.1.5 Measuring methods</b>		
<b>FMC, FMD, FME</b>	<b>FMW</b>	<b>FMI</b>
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 part 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	See FMI manual.

<b>2.1.6 Measuring direction</b>		
<b>FMC, FMD, FME</b>	<b>FMW</b>	<b>FMI</b>
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.	See FMI manual

<b>2.1.7 Measuring surface</b>		
<b>FMC, FMD, FME</b>	<b>FMW</b>	<b>FMI</b>
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..	In principle, a rough or smooth surface has no influence on the measurement. It is possible to measure through a coating or a so-called surface course.

<b>2.1.8 Measuring range</b>		
<b>FMC, FMD, FME</b>	<b>FMW</b>	<b>FMI</b>
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.	See FMI manual.

<b>2.1.9 Preservatives</b>		
<b>FMC, FMD, FME</b>	<b>FMW</b>	<b>FMI</b>
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.

<i>Trade name</i>	<i>Botanic</i>	<i>FMC</i>	<i>FMD, FME</i>	<i>FMW</i>	<i>FMI</i>
AB Reference	AB Reference				
Abachi (Obeche)	Triplochiton scleroxylon	2	253	0,36	360
Abarco	Cariniana spp.	3	124	0,70	700
Abura	Hallea ciliata	2	162	0,52	520
Afara, White	Terminalia superba	3	246	0,52	520
Afrormosia	Pericopsis elata	2	195	0,65	650
Afzelia	Afzelia spp.	2	107	0,73	730
Agba	Gossweilerodendron balsamiferum	3	157	0,46	460
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	500
Alder, Common	Alnus glutinosa	3	556	0,49	490
Alder, Rose	Caldcluvia australiensis	2	301	0,50	500
Alerce	Fitzroya cupressoides	3	151	0,39	390
Amberoi	Pterocymbium beccarii	1	521		
Amoora, New Guinea	Amoora cucullata	3	276		
Antiaris, New Guinea	Antiaris toxicaria	3	279	0,43	430
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	650
Ash, Hickory	Flindersia ifflaiana	2	433		
Ash, Japanese	Fraxinus mandshurica	2	154	0,61	610
Ash, Mountain (Oak Tasmanian)	Eucalyptus regnans	3	148	0,65	650
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	640
Aspen, Hard	Acronychia laevis	2	265		
Azobé	Lophira alata	3	177	1,04	1040
Balau	Shorea laevis	2	231	0,90	900
Balau, Red	Shorea guiso	3	229	0,83	830

<b>Trade name</b>	<b>Botanic</b>	<b>FMC</b>	<b>FMD, FME</b>	<b>FMW</b>	<b>FMI</b>
Balsa	Ochroma pyramidale	2	188		130
Basralocus	Dicorynia guianensis	2	134	0,70	700
Basswood (Lime), American	Tilia americana	2	250	0,40	400
Basswood (Lime), European	Tilia vulgaris	2	251	0,49	490
Basswood, Fijian	Endospermum macrophyllum	1	371	0,45	450
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	660
Beech, Myrtle	Nothofagus cunninghamii	2	472	0,67	670
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	660
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	610
Birch, White	Schizomeria ovata	2	527		
Birch, Yellow	Betula lutea	2	117	0,65	650
Bishop Wood (Fiji)	Bischofia javanica	2	295	0,71	710
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		

<i>Trade name</i>	<i>Botanic</i>	<i>FMC</i>	<i>FMD, FME</i>	<i>FMW</i>	<i>FMI</i>
Bubinga	Guibourtia demeusii	4	161	0,85	850
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), Malaysian	Calophyllum curtisii	2	307		
Calophyllum (Bintangor), New Guinea	Calophyllum papuanum	3	310		
Calophyllum (Bintangor), Philippines	Calophyllum inophyllum	2	308	0,59	590
Calophyllum (Bintangor), Solomon Island	Calophyllum kajewskii	4	120	0,65	650
Camphorwood, New Guinea	Cinnamomum spp.	2	332		
Camptosperma	Camptosperma brevipetiolata	2	121	0,38	380
Camptosperma (Malaysia)	Camptosperma curtisii	4	311		
Camptosperma (Solomon Island)	Camptosperma kajewskii	1	312		
Cananga (Philippines)	Canarium odoratum	2	313		
Canarium, African	Canarium schweinfurthii	3	122	0,46	460
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	260
Carabeen, Yellow	Sloanea woollsii	2	534		
Cathormion, New Guinea	Cathormion umbellatum	1	326		
Cedar, Incence	Calocedrus decurrens	3	119	0,36	360
Cedar, Red	Toona ciliata	4	252	0,48	480
Cedar, South American	Cedrela odorata	4	126	0,44	440
Cedar, Western Red	Thuja plicata	2	249	0,34	340
Cedar, White	Melia azedarach	3	463	0,55	550
Cedar, Yellow	Chamaecyparis nootkatensis	3	128	0,44	440
Celtis, New Guinea	Celtis spp.	1	328		
Celtis, Solomon Island	Celtis philippinensis	1	327		
Cheesewood, White (Queensland)	Alstonia scholaris	2	275	0,42	420
Chengal (Malaysia)	Neobalanocarpus heimii	2	469		
Cherry, American	Prunus serotina	3	218	0,58	580
Cherry, European	Prunus avium	4	217	0,54	540
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	830
Crabwood	Carapa guianensis	2	123	0,59	590
Cudgerie, Brown	Canarium australasicum	2	314		
Curupixia	Macropholis	2	179		
Cypress	Cupressus spp.	3	131	0,45	450
Cypress, Northern	Callitris intratropica	2	304		
Cypress, Rottneest Island	Callitris preissii	3	305		
Cypress, White	Callitris glaucophylla	3	303		
Dakua, Salusalu (Fiji)	Decussocarpus vitiensis	3	352	0,38	380



<b>Trade name</b>	<b>Botanic</b>	<b>FMC</b>	<b>FMD, FME</b>	<b>FMW</b>	<b>FMI</b>
Dibetou (Walnut African)	Lovoa trichilioides	4	178	0,50	500
Dillenia (Solomon Island)	Dillenia salomonese	1	357		
Doi (Fiji)	Alphitonia zizphoides	2	274	0,55	550
Douka	Thieghemella africana	4	247	0,66	660
Drypetes, New Guinea	Drypetes spp.	2	141	0,74	740
Duabanga, New Guinea	Duabanga moluccana	2	359		
Ebony, New Guinea Indian	Diospyros spp.	1	136	1,09	1090
Elm, American	Ulmus americana	2	256	0,60	600
Elm, European	Ulmus spp.	2	257	0,61	610
Erima	Octomeles sumatrana	2	480		
Evodia, White	Melicope micrococca	1	464		
Figwood (Moreton Bay)	Ficus macrophylla	2	426		
Fir, Alpine	Abies lasiocarpa	3	104	0,32	320
Fir, Amabilis	Abies amabilis	3	102	0,43	430
Fir, Douglas	Pseudotsuga menziesii	3	219	0,50	500
Fir, Douglas (New Zealand) (Sapwood Treated)	Pseudotsuga menziesii	2	515	0,50	500
Fir, Douglas (New Zealand) (Sapwood Untreated)	Pseudotsuga menziesii	3	516	0,50	500
Fir, Douglas (New Zealand) (Truewood Untreated)	Pseudotsuga menziesii	2	517	0,50	500
Fir, Grand	Abies grandis	3	103	0,37	370
Fir, Red	Abies magnifica	3	100	0,38	380
Fir, White	Abies alba	3	101	0,43	430
Galip	Canarium indicum	2	315		
Garo-Garo	Matixiodendron pschyclados	1	462		
Garuga	Garuga floribunda	1	441		
Gonçalo Alves	Astronium spp.	1	114	0,95	950
Greenheart	Ocotea rodiaei	3	189	0,95	950
Greenheart, Queensland	Endiandra compressa	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)	Guarea cedrata	4	159	0,57	570
Guarea, Scented (White)	Guarea cedrata	3	160	0,57	570
Guariuba	Clarisia racemosa	3	130	0,69	690
Gum, Black	Nyssa sylvatica	3	187	0,50	500
Gum, Blue, Southern	Eucalyptus globulus	2	398		
Gum, Blue, Sydney	Eucalyptus saligna	3	415		
Gum, Grey	Eucalyptus punctata	3	414		
Gum, Grey, Mountain	Eucalyptus cypellocarpa	2	388		
Gum, Maiden's	Eucalyptus maidenii	3	405	0,90	900
Gum, Manna	Eucalyptus viminalis	2	420		
Gum, Mountain	Eucalyptus dalrympleana	2	389		
Gum, Pink	Eucalyptus fasciculosa	3	395		
Gum, Red	Liquidambar styraciflua	3	175	0,51	510
Gum, Red, Forest	Eucalyptus tereticornis	3	418	0,90	900

<b>Trade name</b>	<b>Botanic</b>	<b>FMC</b>	<b>FMD, FME</b>	<b>FMW</b>	<b>FMI</b>
Gum, Red, River	Eucalyptus camaldulensis	4	382		
Gum, Rose	Eucalyptus grandis	3	400		
Gum, Shining	Eucalyptus nitens	2	409	0,63	630
Gum, spotted (Victoria) (lemon-scented)	Corymbia citriodora	2	337		
Gum, Sugar	Eucalyptus cladocalyx	3	384		
Gum, White Dunn's	Eucalyptus dunnii	1	394		
Gum, Yellow	Eucalyptus leucoxyton	2	404		
Handlewood, Grey	Aphanante philippinensis	2	280		
Handlewood, White	Streblus pendulinus	2	538		
Hardwood, Johnstone River	Bakhousia bancroftii	3	288		
Hemlock	Tsuga heterophylla	3	255	0,46	460
Hemlock, Chinese	Tsuga chinensis	3	254		
Heritiera (Menkulang), New Guinea	Heritiera spp.	2	163	0,63	630
Hevea	Hevea Brasiliensis	2	554	0,49	490
Hickory	Carya spp.	2	125	0,76	760
Hollywood, Yellow	Premna lignum-vitae	2	512		
Horizontal	Anodopetalum biglandulosum	3	277		
Incensewood	Pseudocarapa nitidula	2	514		
Iroko	Chlorophora excelsa	2	129	0,63	630
Ironbark, Grey	Eucalyptus drephanophylla	3	393		
Ironbark, Grey	Eucalyptus paniculata	3	411		
Ironbark, Red	Eucalyptus sideroxyton	3	416		
Ironbark, Red, Broad-Leaved	Eucalyptus fibrosa	3	397		
Ironbark, Red, Narrow-Leaved	Eucalyptus crebra	3	387		
Jarra	Eucalyptus marginata	3	147	0,76	760
Jelutong	Dyera costulata	2	142	0,41	410
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	610
Karri	Eucalyptus diversicolor	2	146	0,85	850
Kauceti	Kermadecia vitiensis	1	450		
Kauri	Agathis australis, borneensis	2	108	0,46	460
Keledang	Artocarpus lanceifolius	3	113	0,55	550
Kempas	Koompassia excelsa	2	171	0,82	820
KerANJI (Malaysia)	Dialium platysepalum	2	355		
Keruing	Dipterocarpus spp.	3	137	0,73	730
Kiso	Chisocheton schumannii	1	331		
Kopie	Goupia glabra	2	158	0,81	810
Lacewood, Yellow	Polyalthia oblongifolia	2	509	0,53	530
Laran	Anthocephalus chinensis	2	278	0,50	500
Larch, European	Larix decidua	3	172	0,55	550
Larch, Japanese	Larix kaempferi	3	173	0,53	530
Larch, Western	Larix occidentalis	3	174	0,55	550
Leatherwood	Eucryphia lucida	3	423		
Lightwood	Acacia implexa	2	260		

<b>Trade name</b>	<b>Botanic</b>	<b>FMC</b>	<b>FMD, FME</b>	<b>FMW</b>	<b>FMI</b>
Macadamia	Floydia praealta	2	438		
Magnolia	Magnolia acuminata/grandiflora	3	180	0,52	520
Mahogany, (New Guinea)	Dysoxylum spp.	2	363		
Mahogany, African	Khaya spp.	4	170	0,50	500
Mahogany, Brush	Geissos benthamii	2	443		
Mahogany, Honduras (American)	Swietenia spp.	3	242	0,51	510
Mahogany, Miva	Dysoxylum muelleri	3	361		
Mahogany, Philippine	Shorea almon	1	227	0,48	480
Mahogany, Philippine, Light Red	Parashorea plicata	3	193	0,51	510
Mahogany, Philippine, Red	Shorea negrosensis	3	234	0,46	460
Mahogany, Red	Eucalyptus botryoides	3	379		
Mahogany, Rose	Dysoxylum fraseranum	2	360		
Mahogany, Sapelli (Sapele)	Entandrophragma cylindricum	3	144	0,63	630
Mahogany, Sipo (Utile)	Entandrophragma utile	4	145	0,60	600
Mahogany, Southern	Eucalyptus botryoides	2	380		
Mahogany, Tiama (Gedu Nohor)	Entandrophragma angolense	3	143	0,53	530
Mahogany, White	Eucalyptus acmenoides	3	375		
Mako	Trischospermum richii	1	547		
Makore	Thieghemella heckelii	3	248	0,62	620
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	960
Maniltoa (Fiji)	Maniltoa grandiflora	1	460		
Maniltoa (New Guinea)	Maniltoa pimenteliana	1	461		
Mansonia	Mansonia altissima	3	182	0,60	600
Maple, New Guinea	Flindersia pimentelianan	3	435	0,55	550
Maple, Queensland	Flindersia brayleyana	4	432		
Maple, Rose	Cryptocarya erythroxylon	2	340		
Maple, Scented	Flindersia laevicarpa	3	434		
Maple, Sugar	Acer saccharum	3	106	0,68	680
Mararie	Pseudoweinwanna lachnocarpa	3	518		
Marri	Eucalyptus calophylla	2	381		
Masiratu	Degeneria vitiensis	2	354		
Matai	Podocarpus spicatus	2	507	0,51	510
Meranti, Bukit Frim 1999	Shorea platicladus	2	236		
Meranti, Dark Red	Shorea spp.	3	237	0,63	630
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	Shorea leprosula	3	232	0,53	530
Meranti, White	Shorea hypochra	3	230	0,55	550
Meranti, Yellow	Shorea multiflora	1	233	0,53	530

<b>Trade name</b>	<b>Botanic</b>	<b>FMC</b>	<b>FMD, FME</b>	<b>FMW</b>	<b>FMI</b>
Merawan	Hopea sulcala	2	164	0,71	710
Merbau (Kwila)	Intsia spp.	3	167	0,77	770
Mersawa	Anisoptera laevis	3	109	0,60	600
Messmate	Eucalyptus obliqua	3	410	0,78	780
Moabi	Baillonella toxisperma	4	116	0,81	810
Mora	Mora excelsa	2	185	0,97	970
Moustiquaire	Cryptocarya spp.	2	342		
Movingui (Ayan)	Distemonanthus benthamianus	3	138	0,68	680
Musizi	Maesopsis eminii	4	457		
Neuburgia	Neuburgia collina	3	471		
Nutmeg (Fiji)	Myristica spp.	2	468		
Nutmeg (New Guinea)	Myristica buchneriana	2	467	0,45	450
Oak, American Red	Quercus spp.	3	222	0,66	660
Oak, American White	Quercus spp.	2	223	0,67	670
Oak, European	Quercus petraea	3	221	0,63	630
Oak, Japanese	Quercus spp.	2	224	0,63	630
Oak, New Guinea	Castanopsis acuminatissima	2	321	0,60	600
Oak, Silky, Fishtail	Neorites kevediana	1	470		
Oak, Silky, Northern	Cardwellia sublimia	2	319	0,53	530
Oak, Silky, Red	Stenocarpus salignus	2	536		
Oak, Silky, Southern	Grevillea robusta	1	446		
Oak, Silky, White	Stenocarpus sinuatus	2	537		
Oak, Tulip, Blush	Argyrodendron actinophyllum	2	283		
Oak, Tulip, Brown	Argyrodendron trifoliolatum	3	285		
Oak, Tulip, Red	Argyrodendron peralatum	4	284		
Oak, Tulip, White	Pterygota horsfieldii	2	522	0,69	690
Obah	Eugenia spp.	2	424		
Odoko	Scottellilia coriacea	2	530		
Olive, East African	Olea hochstetteri	3	191	0,85	850
Olivillo	Aextoxicon punctatum	2	266		
Opepe	Nauclea diderrichii	4	186	0,71	710
Padouk, African	Pterocarpus soyauxii	2	220	0,70	700
Palaquium, Solomon Island	Palaquium spp.	1	192	0,58	580
Panga Panga	Millettia stuhlmannii	2	184	0,76	760
Papuacedrus	Papuacedrus papuana	3	481		
Para Angelim	Hymenolobium excelsum	3	166	0,75	750
Parinari, Fijian	Parinari insularum	2	482		
Penarahan	Myristica iners	3	466		
Peppermint, Broad-Leaved	Eucalyptus dives	3	392	0,76	760
Peppermint, Narrow-Leaved	Eucalyptus australiana	3	377		
Peroba De Campos	Paratecoma peroba	3	194	0,69	690
Persimmon	Diospyros pentamera	2	135	0,78	780
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		

<b>Trade name</b>	<b>Botanic</b>	<b>FMC</b>	<b>FMD, FME</b>	<b>FMW</b>	<b>FMI</b>
Pine, Bunya	Pinus bidwillii	3	485		
Pine, Canary Island	Pinus canariensis	3	486		
Pine, Caribbean	Pinus caribaea	3	198	0,63	630
Pine, Celery-Top	Phyllocladus aspenifolius	2	484		
Pine, Corsican	Pinus nigra	4	204	0,56	560
Pine, Hoop	Araucaria cunninghamii	3	281	0,56	560
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	510
Pine, Lodgepole	Pinus contorta	3	199	0,41	410
Pine, Maritime	Pinus pinaster	3	206	0,50	500
Pine, Parana Red	Araucaria angustifolia	1	110	0,50	500
Pine, Parana White	Araucaria angustifolia	2	111	0,50	500
Pine, Pitch	Pinus palustris	3	205	0,59	590
Pine, Ponderosa	Pinus ponderosa	3	208	0,44	440
Pine, Radiata	Pinus radiata	3	209	0,48	480
Pine, Radiata (New Zealand) (Sapwood Aac)	Pinus radiata	3	490	0,47	470
Pine, Radiata (New Zealand) (Sapwood Boliden)	Pinus radiata	3	491	0,47	470
Pine, Radiata (New Zealand) (Sapwood Boron)	Pinus radiata	2	492	0,47	470
Pine, Radiata (New Zealand) (Sapwood Tanalith)	Pinus radiata	2	493	0,47	470
Pine, Radiata (New Zealand) (Sapwood Untreated)	Pinus radiata	3	494	0,47	470
Pine, Red	Pinus resinosa	2	495	0,46	460
Pine, Scots	Pinus sylvestris	3	210	0,48	480
Pine, Shortleaf	Pinus echinata	3	200	0,51	510
Pine, Slash (Queensland)	Pinus elliotii	3	487	0,59	590
Pine, Southern	Pinus echinata	3	201	0,51	510
Pine, Stone	Pinus pinea	3	207		
Pine, Sugar	Pinus lambertiana	3	202	0,36	360
Pine, White	Pinus monticola	3	203	0,39	390
Pittosporum (Tasmania)	Pittosporum bicolor	2	496		
Planchonella, Fijian	Planchonella vitiensis	1	500		
Planchonella, New Guinea	Planchonella kaernbachiana	1	497		
Planchonella, New Guinea	Planchonella torricellensis	1	499		
Planchonella, Solomon Island	Planchonella thyrsoidea	1	498		
Planchonia	Planchonia papuana	2	504	0,64	640
Pleiogynium	Pleiogynium timorense	2	505		
Podocarp, Fijian	Podocarpus neriifolia	3	506		
Podocarp, Red	Decussocarpus vitiensis	3	353	0,38	380
Poplar, Black	Populus nigra	2	216	0,43	430
Poplar, Pink	Euroschinus falcata	2	425		
Poplar, Yellow (Whitewood American)	Liriodendron tulipifera	3	176	0,44	440
Quandong, Brown	Eleacarpus coorangooloo	2	366		

<b>Trade name</b>	<b>Botanic</b>	<b>FMC</b>	<b>FMD, FME</b>	<b>FMW</b>	<b>FMI</b>
Quandong, Silver	Elaeocarpus angustifolius	2	364		
Quandong, Solomon Island	Elaeocarpus spaericus	1	365		
Qumu	Acacia Richii	2	263		
Raintree (Fiji)	Samanea saman	1	526	0,51	510
Ramin	Gonystylus spp.	2	156	0,58	580
Red Louro	Ocotea rubra	3	190	0,57	570
Redwood	Sequoia sempervirens	2	226	0,37	370
Rengas	Gluta spp.	2	155	0,59	590
Resak (Malaysia)	Cotylelobium melanoxyton	2	338		
Rimu - Non-Truewood Boron	Dacrydium cupressinum	2	346	0,52	520
Rimu - Non-Truewood Tanalith	Dacrydium cupressinum	2	347	0,52	520
Rimu - Non-Truewood Untreated	Dacrydium cupressinum	2	348	0,52	520
Rimu - Treuwood Untreated	Dacrydium cupressinum	1	349	0,52	520
Robinia	Robinia pseudoacacia	2	225	0,69	690
Roble Pellin	Nothofagus obliqua	2	479		
Rosewood, Brasil	Dalbergia nigra	2	133	0,83	830
Rosewood, Indian	Dalbergia latifolia	3	132	0,83	830
Rosewood, New Guinea	Pterocarpus indicus	2	519	0,56	560
Rosewood, Philippine	Pterocarpus indicus	2	520	0,56	560
Sasauria (Fiji)	Dysoxylum quercifolium	2	362		
Sassafras	Doryphora sassafras	2	358	0,53	530
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	Rhodospaera rhodanthema	3	525		
Scentbark	Eucalyptus aromaphloia	2	376		
Schizomeria, New Guinea	Schizomeria serrata	2	528		
Schizomeria, Solomon Island	Schizomeria serrata	1	529		
Sepetir	Sindora coriacea	1	239	0,55	550
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	Ailanthus peekelii	2	267		
Sirus, White	Ailanthus triphysa	2	268		
Sloanea	Sloanea spp.	2	533		
Spondias	Spondias mariana	2	535		
Spruce, European	Picea abies	3	196	0,43	430
Spruce, Nordic	Picea abies	4	555	0,43	430
Spruce, Sitka	Picea sitchensis	3	197	0,41	410

<b>Trade name</b>	<b>Botanic</b>	<b>FMC</b>	<b>FMD, FME</b>	<b>FMW</b>	<b>FMI</b>
Spruce-Pine-Fir	Softwood	4	240	0,50	500
Sterculia	Sterculia spp.	2	241	0,80	800
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	570
Sycamore, Satin	Ceratopetalum succirubrum	2	330		
Tallowwood	Eucalyptus microcoris	3	406		
Tatajuba	Bagassa guianensis	2	115	0,76	760
Taun (Malaysia)	Pometia pinnata	2	212	0,70	700
Taun (New Guinea)	Pometia pinnata	3	213	0,70	700
Taun (Philippines)	Pometia pinnata	4	214	0,70	700
Taun (Solomon Island)	Pometia pinnata	2	215	0,70	700
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	630
Terap	Artocarpus elasticus	4	112	0,55	550
Terminalia, Red Brown	Terminalia microcarpa	1	245		
Terminalia, Yellow	Terminalia complanata	2	244	0,48	480
Tetrameles	Tetrameles nudiflora	2	546		
Tingle, Red	Eucalyptus jacksonii	4	402		
Tingle, Yellow	Eucalyptus guilfoylei	4	401		
Tornillo	Cedrelinga catenaeformis	3	127	0,50	500
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	760
Vaivai-Ni-Vaikau	Serianthes myriadenia	1	531	0,45	450
Vatica, Philippine	Vatica, manggachapoi	2	550		
Vitex, New Guinea	Vitex cofassus	2	551	0,71	710
Vuga	Metrosideros collina	1	465		
Vutu	Barringtonia edulis	1	289		
Walnut (Paldao), New Guinea	Dracontomelum dao	2	139	0,63	630
Walnut, Black	Juglans nigra	3	168	0,58	580
Walnut, Blush	Beilschmiedia obtusifolia	2	291		
Walnut, European	Juglans regia	3	169	0,61	610
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	790
Woolybutt	Eucalyptus longifolia	3	422		

<i>Trade name</i>	<i>Botanic</i>	<i>FMC</i>	<i>FMD, FME</i>	<i>FMW</i>	<i>FMI</i>
Yaka	Dacrydium nausoriensis/nidilum	2	351	0,56	560
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		
	Acer Macrophyllum	3		0,55	545
	Acer pseudeplatanus			0,57	570
	Acer saccharum			0,68	680
	Agathis australis			0,46	460
	Agathis borneensis			0,46	460
	Agathis macrophylla			0,46	460
	Amburana cearensis	2		0,67	670
	Anadenanthera macrocarpa	3		0,89	890
	Andira inermis	2		0,64	640
	Aspidosperma polyneuron	3		0,67	670
	Aspidosperma centrale	3		0,87	865
	Astronium gravelens	3		0,78	780
	Aucoumea klaineana pierre	2		0,39	390
	Balfourodendron riedelianum	3		0,80	800
	Carpines Betulus	3		0,67	670
	Celtis occidentalis	3		0,53	530
	Chlorophora tinctoria - odorata			0,76	760
	Coelostegia durio	2		0,61	607
	Couarati guianensis.	2		0,54	540
	Cupressus lusitanica			0,45	450
	Cupressus macrocarpa			0,45	450
	Dinizia excelsa	2		0,89	890
	Diospyros virginiana			0,78	780
	Dipleryx odorata	3		0,94	940
	Diploptropis purpurea	2		0,91	910
	Dipterocarpus crinitus			0,73	730
	Dipterocarpus warburgii			0,73	730
	Entandrophragma candollei	3		0,63	625
	Entandrophragma utile			0,60	600
	Erythropleum ivornense	3		0,80	800
	Eschweilera longipes	2		0,90	900
	Eurisma uncinatum	3		0,59	590
	Fraxious americana			0,64	640
	Gmelina arborea	3		0,47	470
	Guibourtia arnoldiana	2		0,79	790
	Hallea ciliata			0,52	520
	Heritiera javanica	3		0,64	640
	Hymenolobium excelsum	2		0,65	650
	Iryanthera grandis	3		0,63	630
	Juglans neotropica	2		0,65	650
	Manilkara bidentata	3		0,92	920
	Manilkara huberi	2		1,10	1100
	Mezilaurus navalium	3		0,76	760





Aerated Concrete	18	18	0.00	0.00
Amino Plastic Particle board	30	30	0.00	0.00
Brick	13	13	0.00	0.00
Cardboard	25	25	0.00	0.00
Concrete 200 kg/m3	14	14	0.00	0.00
Concrete 350 kg/m3	15	15	0.00	0.00
Concrete 500 kg/m3	16	16	0.00	0.00
Cork	32	32	0.00	0.00
Floor. Anhydrite GD12	10	10	0.00	2.01
Floor. Anhydrite GD20	10	10	0.00	2.02
Floor. Arduparid	11	11	0.00	0.00
Floor. Cement	27	27	0.00	2.03
Floor. Elastic	17	17	0.00	0.00
Floor. Gypsum	19	19	0.00	0.00
Floor. Wood-Cement	22	22	0.00	0.00
Gypsum	21	21	0.00	0.00
Gypsum. Synthetic	20	20	0.00	0.00
Lime Mortar	23	23	0.00	0.00
MDF	28	28	0.00	0.00
Phenol Plastic Particle board	31	31	0.00	0.00
Sand-Lime Brick	24	24	0.00	0.00
Slab. Asbestos-Cement	12	12	0.00	0.00
Styropor	29	29	0.00	0.00
Wood-Granite	26	26	0.00	0.00

## 5 Paper

Reference values of paper.

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

<b>Material</b>	<b>FMC</b>	<b>FMD, FME</b>	<b>FMW</b>
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

## Notes

