CE

GANN HYDROMETTE HT 85 T

Operating instructions

GB

GANN

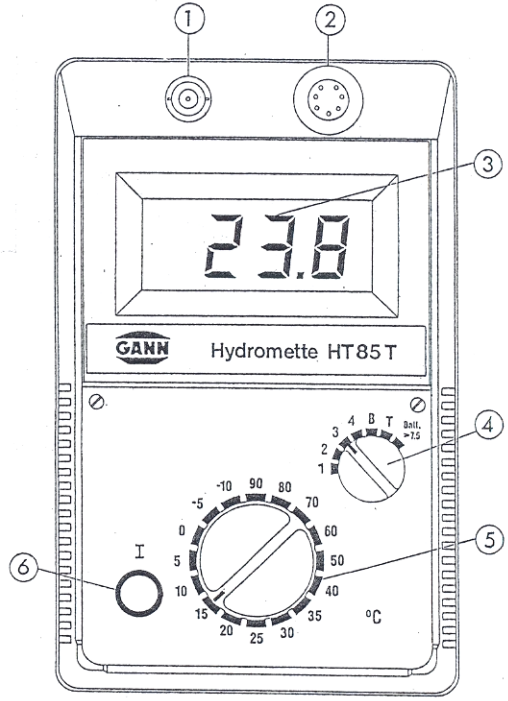
Directive 2002/96/EC on waste electrical and electronic equipment (WEEE)

According to legal regulations, product and packaging are to be disposed of at a recycling centre.
This appliance was manufactured after 12th August 2005.

P.O. Box 10 01 65 70826 Gerlingen, Germany 07/2006

This manual has been most carefully composed. The manufacturer and/or supplier, however, assumes no liability for possible misprints or errors.

INDEX


1
2
3
23.8
GANN
Hydromette HT85T
4
B T
Batt. >7.5
1
2
3
4
5
6
I
-10
-5
0
5
10
15
20
25
30
35
40
50
60
70
80
90
°C

Technical Specifications - Hydromette HT 85 T

①	BNC Connection Socket	for connection of electrodes designed for testing wood and set building materials
②	MS Connection Socket	for connection of temperature probes PT 100
③	LCD Readout	for all measurements
④	Selector Switch	»*position 1 to 4*« for setting group of wood for automatic species correction (see table of species of wood) »*position B*« for measurement of set building materials »*position T*« for temperature measurement with PT 100 probes »*position Batt*« for battery check
⑤	Selector Switch	for setting wood temperature for automatic temperature compensation of wood moisture readings
⑥	Measuring Key	ON/OFF

Battery Check with HT 85 T

Set selector switch ④ to position »Batt« and press measuring key ⑥. The reading displayed should be higher than 7.5 digits. If it is 7.5 digits or lower, the battery is exhausted and should be replaced or recharged if a rechargeable battery is being used. It is recommendable to replace or recharge the battery once the reading of the battery check is below 8 digits.

Power Source

The meter is fitted, as standard, with a 9 V dry battery IEC 6 F 22 or IEC 6 LF 22. It is recommended to use alkali-manganese batteries.
A rechargeable battery can be fitted (optional accessory). It can be recharged from any A.C.
lighting supply socket by means of the charging unit supplied with this special battery.

Calibration

The meter is fitted with an electronic setting device, making manual calibration or adjustment unnecessary.

Measuring ranges

Wood moisture:	4 - 100 % m.c.	
Structural moisture:	0 - 80 digits	with graphs for converting readings into percent of moisture for various building materials
Temperature:	-200 - +200 °C	with temperature probe PT 100

If the measured value exceeds the measuring capacity, the figure »1« appears on the left side of the display screen ③.

Dimensions

Plastic casing: Length 180 mm x Width 115 mm x Height 53 mm.
Weight: about 400 g without accessory.

Admissible ambient temperatures

Storage:	5 to 40 °C; temporarily -10 to 60 °C
Operation:	0 to 50 °C, temporarily -10 to 60 °C not condensing

The meter including accessory must not be stored or used in aggressive air or air contaminated by solvents.

General Remark

The instructions for use of the meter and of the electrodes should be carefully observed to avoid measuring errors which may occur when trying to simplify the measuring procedure.

Warning

Make sure under any circumstances prior to drilling holes for measuring probes or driving electrode pins into walls, ceilings or floors that this happens away from power lines, water pipings or other supply pipes.

Standard and Optional Accessory

Drive-in Electrode M 20 (Ref. No. 3300)

for surface and subsurface measurements on wood up to 50 mm thick. Also for testing chipboard, fibreboard and set construction materials (plaster, mortar, etc.), with measuring pins
- 16 mm long (Ref. No. 4610), penetration depth 10 mm
- 23 mm long (Ref. No. 4620), penetration depth 17 mm.

Surface Measuring Caps M 20-OF 15 (Ref. No. 4315)

for moisture measurements on surfaces (e.g. veneer, concrete) without damaging the material (only in conjunction with electrode M 20).

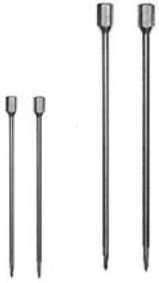
Ram-in Electrode M 18 (Ref. No. 3500)

for testing timber up to 180 mm thick, with uninsulated pins, as standard equipment,
- 40 mm long (Ref. No. 4640), penetration depth 34 mm
- 60 mm long (Ref. No. 4660), penetration depth 54 mm, or

optionally

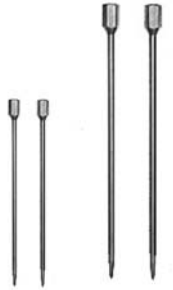
with pins with insulated shank

- 45 mm long (Ref. No. 4550), penetration depth 25 mm
- 60 mm long (Ref. No. 4500), penetration depth 40 mm.



Stick-in Electrode pins M 20-HW 200/300

uninsulated pins, for testing chips, wood-wool, veneer piles (only in conjunction with electrode M 20), with pins
- 200 mm long (Ref. No. 4350)
- 300 mm long (Ref. No. 4355)



Stick-in Electrode pins M 20-Bi

for measurements in depth of non-apparent materials behind another panel, with insulated shank (only in conjunction with handle of electrode M 20)

- 200 mm long (Ref. No. 4360)
- 300 mm long (Ref. No. 4365).

Brush Electrodes M 25 (Ref. No. 3740)

made of stainless steel, for moisture measurements of hard and soft building materials without contact paste, measuring depth up to 100 mm.

Stick-in Electrodes M 6 (Ref. No. 3700)

for testing hard building materials, using contact paste and pre-drilled holes, with pins

- 23 mm long (Ref. No. 4620) penetration depth 17 mm
- 40 mm long (Ref. No. 4640) penetration depth 34 mm
- 60 mm long (Ref. No. 4660) penetration depth 54 mm

Deep Electrodes M 21-100/250
for deep measurements in set building materials, in conjunction with contact paste and pre-drilled holes

- 100 mm long (Ref. No. 3200)
- 250 mm long (Ref. No. 3250).

Contact Paste (Ref. No. 5400)

to ensure good contact between electrode pins and tested building materials. For moisture measurements in hard building materials (cement flooring, concrete, etc.) with electrodes M 6 and M 21.

Flat Electrodes M 6-Bi 200/300

for measurements in insulating material of cement flooring through the edge joint (with insulated shank), only for use in conjunction with the handles of the electrodes M 6.

- size 10 x 0.8 x 200mm (Ref. No. 3702)
- size 10 x 0.8 x 300mm (Ref. No. 3703).

Stick-in Electrodes M 6-150/250

Especially thin uninsulated pins for testing building and Insulating materials through the joint or cross joint of tiles.

- size 150 x 3 mm ∅ (Ref. No. 3706)
- size 250 x 2 mm ∅ (Ref. No. 3707)

(for use with M 6 and M 20 electrodes)

Pt 100 Temperature Probes

Temperature Probe ET 10 (Ref. No. 3165)

Robust stick-in temperature probe for solid and bulk Materials and liquids, measuring range -50 to +250 °C.

Temperature Probe TT 40 (Ref. No. 3180)

Robust immersion and combustion gas temperature probe with long sensor tube, measuring range -50 to +350 °C

Temperature Probe LT 20 (Ref. No. 3190)

Quick responding air/gas temperature probe with long sensor tube, measuring range -20 to +200 °C.

Temperature Probe TT 30 (Ref. No. 3185)

Robust immersion and combustion gas temperature probe with short sensor tube, measuring range -50 to +350 °C.

Temperature Probe ET 50 (Ref. No. 3160)

Quick responding air/gas temperature probe for soft solid substances, bulk materials and fluids,
measuring range -50 to +250 °C.

Temperature Probe OTW 90 (Ref. No. 3175)

Angled special surface temperature probe, e.g. for veneer presses, etc., measuring range -50 to +250 °C.

Temperature Probe OT 100 (Ref. No. 3170)

Spring loaded, low mass surface temperature probe, e.g. for wall surfaces, etc., measuring range -50 to +250 °C.

Temperature Probe OTW 480 (Ref. No. 3176)

Angled special surface temperature probe, length of probe 480mm, dia.∅ 5mm, e.g. for veneer presses, etc., measuring range -50 to +600 °C.

Temperature Probe TT 480 (Ref. No. 3181)

Robust immersion and combustion gas temperature probe, length of probe 480mm, dia.∅ 5mm,
measuring range -50 to +600 °C.

Temperature Probe TT 600 (Ref. No. 3182)

Robust immersion and combustion gas temperature probe, length of probe 480mm, dia.∅ 5mm,
measuring range -50 to +350 °C.

Heat Conducting Paste (Ref. No. 5500)

To improve heat transmission on rough surfaces or where there are contact problems. Unconditionally recommended with OT 100.

Flexible Temperature Probes with Teflon insulated connection cable, for solid and bulk materials as well as liquids up to 120 °C.

FT 2 with Teflon cable 2 m long	(Ref. No. 3195)
FT 5 with Teflon cable 5 m long	(Ref. No. 3196)
FT 10 with Teflon cable 10 m long	(Ref. No. 3197)
FT 20 with Teflon cable 20 m long	(Ref. No. 3198)

Other Accessory

Carrying Case (Ref. No. 5085)

for storing and transport of the measuring instrument and the standard and optional accessory

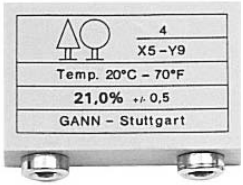
Measuring Cable MK 8 (Ref. No. 6210)

for connection of the electrodes M 6, M 18, M 20, M 20-HW, M 20-Bi and M 21

Rechargeable Battery with Charging Unit (Ref. No. 5100)

for use instead of 9 V dry battery supplied as standard.

Test Devices



Test Standard (Ref.No.6070)

for checking the wood moisture measuring section of the measuring instrument.

Test Standard (Ref.No.6071)

for checking the measuring section for building materials.

Test Standard (Ref.No.6072)

for checking temperature measuring section.

Operating Instructions for Wood Moisture Measurement

using measuring electrodes M 18, M 20, M 20-OF 15 and M 20-HW

- Set selector switch ④ to position stated in the table of wood species for the species to be tested (group 1 - 4).
- Set selector switch ⑤ to the temperature of the wood to be tested.
- Connect measuring electrode to the meter socket ① by means of the measuring cable MK 8.
- Drive-in, stick-in or press the electrode onto the wood to be measured.
- Press measuring key ⑥ and read off result displayed by the pointer indicator or LCD readout as soon as the reading has stabilised. Press measuring key no more than three seconds.

Species Correction

The electrical resistance of the different species of wood may vary considerably at the same moisture content. This requires a correction of the readings according to the species of wood tested. With the Hydromettes HT 85 T four different meter settings have been provided for automatic species correction of the readings. The appropriate setting can be found in a table supplied with each meter, in which some 250 species of wood have been classified in four groups according to their moisture dependent resistance curve. For each of these four groups a separate calibrating curve has been established representing the mean value of the species of wood of each group.

Testing non-classified species of wood

First take a sample of the species of wood in question, with moisture content equalised as well as possible, and take a reading at all four positions of the selector switch. Then determine its actual moisture content by an oven test. The setting at which the meter reading shows the smallest deviation from the result obtained by the oven test now serves for all future measurements.

The oven test should be run at 100 - 105 °C until constant weight. The actual moisture content in per cent is then calculated by the formula:

$$\frac{\text{Loss in weight} \times 100}{\text{Dry weight}}$$

Temperature Compensation

The built-in device for automatic temperature compensation of the readings permits also accurate measurements on cold or hot timber, without the need for using correction tables.

For measurements at normal ambient temperatures, set selector switch ⑤ to 20 °C (68 °F). For temperatures below or above 20 °C, e.g. during or immediately after kiln drying, set switch to actual wood temperature or to temperature prevailing in the dry kiln. Frozen wood with moisture content in excess of 20 % cannot be measured.

Handling of electrodes for wood moisture measurement

Connection of the electrodes

The meter can be used with different types of measuring electrodes according to the individual application. The electrodes M 6, M 18, M 20, M 20-HW and M 20-Bi are connected to the meter socket ① by means of the measuring cable MK 8. On the meter side, this cable is fitted with a BNC plug. Turn clockwise to lock it. To disconnect, turn notched fastening ring anti-clockwise.
Do not use force and do not pull on the cable.

Grain Direction

GANN wood moisture meters have been calibrated for taking readings with electrode pins driven into the test sample across the grain. As the electrical resistance is greater across the grain than parallel to the grain, too high a reading will be obtained if the electrode pins of GANN meters are applied parallel to the grain. The effect can be neglected at readings below 10 % m.c., whereas around 20 % m.c. the meter will read about 2 % m.c. higher.

Thickness of Wood

Electrodes with pins having a penetration of 10 mm can be used on wood up to 30 to 40 mm thick, whereas pins with a penetration of 17 mm are designed for wood thicknesses up to 50 to 65 mm.
For thicker boards or planks, the ram-in electrode M 18 should be used which permits the use of pins with a penetration depth of up to 54 mm. For stock having a uniform moisture content, non-insulated pins can be

used, whereas for all other applications insulated pins making contact only with their uncoated tip having a uniform contact area with the wood, regardless of the penetration depth, should be used.
Any change in meter readings taken with insulated pins at different penetration depths clearly reflect an actual change in moisture content representing the existing moisture gradient.

Drive-in Electrode M 20

Drive the electrode into the wood with the needles across the grain (the electrode body is made of impact-resistant plastic). When withdrawing the electrode, the pins can be loosened by slight sideways rocking movements across the grain.

For determining the average moisture content, the pins have to be driven to a depth of approx. 1/4 to 1/3 of wood thickness.

When the M 20 electrode is supplied with the meter as initial equipment, 10 spare pins 16 and 23 mm long are included in the delivery. They are suitable for testing wood up to 30 mm and 50 mm thick respectively.

If thicker boards or planks are to be measured, the needles can be replaced by longer ones. Naturally, the liability to breakage and/or bending increases with the length of the pins, especially when with-drawing them. Therefore, it is recommended to use the ram-in electrode M 18 for testing thicker wood.

The cap nuts should be tightened by means of a spanner. Loose needles may easily break.

Surface Electrodes M 20-OF 15

Surface measurements should only be taken when the wood moisture content is below 30 % m.c.
For surface measurements on already machined stock or for veneer measurements, the two hexagon cap nuts have to be unscrewed and replaced with the surface measuring caps. For measurement, the two contact pads have to be pressed across the grain onto the stock to be measured or onto the veneer. The measuring depth is about 3 mm, so several veneer layers have to be laid on top of one another for measurement. **Do not measure on metal bases.**

Wood particles adhering to the measuring surface should be removed at regular intervals. If the flexible plastic pads are damaged, new ones can be ordered (Ref. No. 4316) and stuck on using a commercially available instant adhesive on cyanate basis.

Ram-in Electrode M 18

The two needles of the ram-in electrode have to be driven to the required measuring depth, across the grain, using the sliding hammer. For determining the average moisture content, the same measuring depth as described with electrode M 20 is required.
The needles are withdrawn by striking upwards with the sliding hammer. Prior to a series of measurements, the cap nuts should be tightened by means of a spanner. Loose needles may easily break.
When the M 18 electrode is supplied with the meter, 10 spare pins 40 mm and 60 mm long (without insulated shank) are included in the delivery. They are suitable for measuring wood up to 120 mm and 180 mm thick respectively. For testing timber with higher shell m.c. than core m.c., e.g. if boards were exposed to rain, electrode pins with insulated shank should be used. They are available in packets of 10 pins and in lengths of 45 mm (Ref. No. 4550) and 60 mm (Ref. No.4500).

Stick-in Electrode M 20-HW

Remove hexagonal union nuts with standard electrode pins on the electrode M 20 and replace by electrode pins M 20-HW. Tighten firmly.
When testing chips and wood wool it is recommended to compress the material. To do so, the shavings should be loaded with a weight of about 5 kg. Wood wool bales need not to be compressed.

Test Standard for Wood Moisture Measuring Circuit

The test standard (Ref.No. 6070) permits to check the meter as well as the connection cable and the measuring electrodes M18 and M20 both in respect to proper function and accurate readings.

To do so, connect the cable to the meter and insert the two plugs of the cable into the bushings of the test standard. If the measuring electrode is to be included in the check, connect electrode to the cable and insert the two electrode pins into the bushings of the test standard.

Set wood species selector ④ to position 4 and temperature selector switch ⑤ to 20°C and press measuring key ⑥. The meter should read 21.0 %. The admissible tolerance is ± 0.5%. The meter and the test standard have a temperature of about 20°C.

General Information on Wood Moisture Measurement

The working principle of the Hydromette HT 85 T is based on the electrical resistance or conductivity measuring method, well known for many years. This method is based on the fact that the electrical resistance is dictated to a large extent by the wood moisture content. The conductivity of bone-dry timber is very poor and its resistance very high so that no current worth mentioning can flow.
The conductivity of wood increases with its moisture content, and its resistance decreases.

In the range above the fibre saturation point (about 30 % m.c.) readings become progressively less accurate, depending on the moisture content of the timber to be measured, its specific weight and temperature and the species of wood. With European conifers and exotic woods, such as Meranti/Lauan, greater measuring errors must be expected in the range above 40 % m.c., whereas relatively accurate readings can be obtained with oak, beech, white afara, etc. up to a range of 60 - 80 % moisture content.

To achieve as accurate readings as possible, the samples selected should be measured at several spots. It should always be observed that the minimum penetration depth of the electrode pins, driven into the wood across the grain, is 1/4 and the maximum depth 1/3 of wood thickness. Testing frozen wood with a moisture content in excess of 20 % is not possible.

Effects of Wood Preservers

Treatment of wood with organic preservers or impregnating agents have, in general, little effect on the meter readings. Treatment with preservatives containing salts or other inorganic constituents that change the conductivity of wood, however, has a great effect on the accuracy of the readings and as it is erratic, a suitable table correction cannot be provided.

Moisture Checks on Plywood

Some of the various types of glue used in the manufacture of plywood have a lower electrical resistance than the wood. This will affect the accuracy of electrical resistance moisture meters when the electrode pins get in touch with a glue line. The meter will then show too high a moisture content.

To find out whether a conductive glue has been used in manufacturing the plywood to be tested, drive the electrode pins to a depth of no more than half the thickness of the first ply and read the result. Then drive the pins further into the plywood until they come in contact with the first glue line. If the reading now displayed is not noticeably higher than before, the glue may be considered to have no effect on the accuracy of the meter readings.

Static Electricity

At wood moisture contents below 10 %, circumstances such as low air relative humidity, friction during timber handling or highly insulated surroundings may cause static electricity of very high voltages. The operator too may contribute, e.g. by his clothing or shoes made of man-made fibre, to build up a static charge. This may result not only in fluctuating or negative readings, but can also destroy transistors and integrated circuits used in manufacturing the moisture meter.

The results can be markedly improved, if the operator stands perfectly still and avoids moving the meter and the measuring cable while taking the reading.

Especially at the outlet of veneer dryers, very high static charges have to be expected. Therefore, moisture measurements of dried veneer should be made only after the static charge has been sufficiently reduced, what can be sped up by employing suitable grounding measures.

Wood Moisture Equilibrium - Equilibrium Moisture Content

When storing wood for a sufficiently long space of time in a constant ambient atmosphere, it will adopt the moisture content that corresponds to this climate which is called Wood Moisture Equilibrium.

Once the wood has reached its moisture equilibrium, it will neither give off moisture nor absorb it from the air, unless the ambient atmosphere changes. The following table shows some moisture equilibrium values which wood adopts at the various conditions specified.

Wood Moisture					
Air relative humidity	Air Temperature in 10°	15°	20°	25°	30°
	Wood Moisture Content				
20 %	4.7 %	4.7 %	4.6 %	4.4 %	4.3 %
30 %	6.3 %	6.2 %	6.1 %	6.0 %	5.9 %
40 %	7.9 %	7.8 %	7.7 %	7.5 %	7.5 %
50 %	9.4 %	9.3 %	9.2 %	9.0 %	9.0 %
60 %	11.1 %	11.0 %	10.8 %	10.6 %	10.5 %
70 %	13.3 %	13.2 %	13.0 %	12.8 %	12.6 %
80 %	16.2 %	16.3 %	16.0 %	15.8 %	15.6 %
90 %	21.2 %	20.8 %	20.6 %	20.3 %	20.1 %

Monitoring Kiln Drying

The HYDROMETTE HT 85 T allows continual control and supervision of wood moisture content and equilibrium moisture (EMC) inside the closed drying kiln. The portable meter can be used to supervise any number of dry kilns, while the measuring station equipment is separately required for each kiln.

The monitoring system is suitable for both brick-built and pre-fabricated compartment kilns of any design. In each kiln, any desired number of wood-moisture measuring points can be provided. For monitoring equilibrium moisture content and temperature measurement only one each measuring point is required unless the fans are periodically reversed. In the latter case, one each EMC and temperature measuring should be installed at the two opposite sides in direction of air flow as these readings should always be taken at the air entry side of the kiln load.

For taking moisture measurements on wood in the dry kiln during the drying process, set selector switch ④ to position appropriate to species of wood to be measured, and temperature selector switch ⑤ to temperature prevailing in the kiln. For E.M.C. measurements set selector switch ④ to position 3 and for temperature measurement to position »T«.

For M.C. and E.M.C. measurements in dry kilns, special electrodes and probes have to be used. They should be connected with the measuring-point selector switch TKMU by means of Teflon insulated, heat-proof special cables. Whenever readings are to be taken, the Hydromette moisture meter is to be connected to the measuring point selector switch using the measuring cable MK 8.

The measuring point selector switch TKMU is available for connection of up to 6 or 10 MC and EMC measuring points, and also optionally with connection device for one or two temperature measuring points. For arrangement of the wood moisture and equilibrium moisture measuring points in the dry kiln, proceed as described hereinafter.

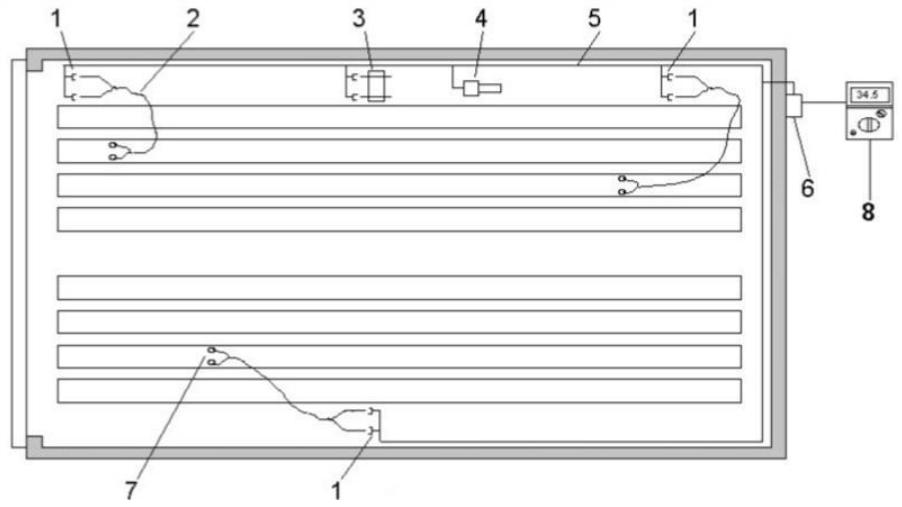
Assembly Instructions

Installation involves merely the installation of the measuring-point selector switch ⑥ outside the kiln, mounting a wall connector ① for each MC and EMC measuring point inside the kiln, and installing the main cables ⑤.

The picture on the following page shows a possible installation in a double track compartment kiln. The wall connector ① for each MC and EMC measuring point is bolted to the inside kiln wall. Where several kiln trucks are in use, it is advisable to arrange the wall connectors near the end of each truck so that the electrode connecting cables ② can be conveniently connected when the trucks are in position. Suitable mounting screws and spacers are included in the delivery of complete measuring point assemblies.

The EMC ③ and temperature ④ measuring points are to be installed on the air entry side of the kiln load. In case of reversing-type dry kilns, i.e. where the fans run alternately in forward and inverse direction, EMC and temperature measuring points are to be installed on either side in direction of the air flow. The HYDROMETTE wood moisture meter ⑧ is connected to the selector switch by means of the standard cable MK 8.

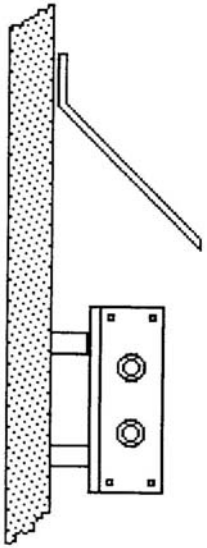
Air entry side



Air exit side

Fig. 1

Typical layout of an installation with one each EMC and temperature measuring point and three wood moisture measuring points.



The wall connector for the EMC probe is best mounted near the existing dry and wet bulb thermometer or hygrometer. The probe should lie directly in the air flow, but not close to the spraying system. It should be protected against drip water by an aluminium cover as shown in Fig. 2. Furthermore, it should also be protected against direct radiating heat.

The measuring station selector switch should be installed outside the kiln in a position combining easy accessibility with the shortest cable lines to the wall connectors inside the kiln. The selector switch can also be mounted outdoors, but should then be protected against direct exposure to influence of the weather.

Cables should be run from the kiln interior to the outside in an aluminium or plastic conduit. In brick-built kilns, the tube should be grouted in with a slight downward angle to the outside. In prefabricated kilns, it should be welded in or mounted with a sealing flange and should also slope at a slight downward angle.

In all cases, the cable duct should be sealed on the inside after cables have been installed, either by sealing compound or drilled rubber plug.

The main cables ⑤ joining the wall connectors ① up to the measuring point selector switch ⑥ are fitted on one end with cable shoes which need only be plugged over the terminal pins in the selector switch. The other end of the cable must be plugged into the cable shoes mounted onto the wall connectors after stripping the ends of the two conductors. Then the sockets of the two cable shoes must be crimped to tighten the two conductors and to ensure good contact.

Inside the kiln, cables should be fixed directly to the kiln wall by means of the cable strings included in delivery. They must not be laid in conduits, unless they are laid in dry kilns made of wooden panels.

Each standard wood moisture measuring point consists of two stainless steel electrodes 10, 15 and 25 mm long, one electrode cable 4 m long, one wall connector including spacers and fastening screws and one main cable 10 m long with cable strings and fastening screws. The 15 mm and 25 mm electrodes are also available with Teflon insulation upon special request. For very thick woods electrodes 40 mm long are also available in insulated and uninsulated design.

The penetration depth should be 1/3 of the thickness of the boards to be measured, but at least 10 mm.

Preparing Wood-Moisture Measuring Points

Measuring points should always be arranged roughly in the centre of the stack. Where several kiln trucks are used or stacks loaded into the kiln, it is recommendable to distribute the measuring points among several stacks and at different levels.

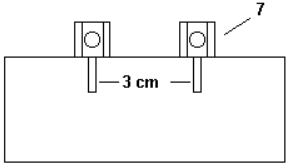


Fig. 3

When loading the kiln truck or piling the pallets, drill holes of 3 mm dia. to the full electrode penetrating depth into the board selected. Holes should be across the grain, 3 cm apart (Fig. 3). Drive the electrodes into the board using the special electrode tool available for driving-in and extracting electrodes. Insert the plugs of the electrode cable into the connecting bores of the electrodes and lead the cable around the side or back of the stack.
Take care not to damage the cable when stacking the remainder of the wood on the truck or pallet.
When the truck or pallet is in position, connect the electrode cable to the wall connector in the kiln.

EMC Measuring Point

The EMC measuring point consists of an electrode holder with 50 wooden EMC sensors, one wall connector and a main cable 10 m long with fastening strings. Pull the plug-in type electrode holder from the wall connector and loosen knurled nuts as far as the stop. EMC is measured on a thin specimen of White Afara. The sensor has to be placed between the clamps of the electrode holder, with the grain at right angles with them. Then tighten the knurled nuts as far as they will go. Now plug the holder into the sockets of the wall connector.

The sensor has to be replaced after each drying cycle.

Temperature Measuring Point

In addition to MC and EMC measuring points also a temperature measuring point can be installed and connected to the measuring point selector switch for taking readings with the Hydromette HT 85 T. It should preferably be placed close to the EMC measuring point. The temperature probe is supplied in standard design with a connection cable 10 m long and a fastening bracket. Longer cables, also for MC and EMC measuring points, are available on request.

Final Remarks

The meaning of the term »wood moisture« is obvious and requires no explanation, except perhaps that the moisture percentage always refers to the dry weight.

»**Wood equilibrium moisture**« (EMC), however, a factor of the greatest importance in effective drying, is not always clearly understood. It means the degree of moisture a piece of wood attains if stored long enough in a given atmosphere, i.e. at a definite ambient temperature and air humidity.

The »**drying gradient**« finally is the ratio between wood moisture and equilibrium moisture. This can be expressed in the formula

$$\frac{\text{Wood Moisture}}{\text{Equilibrium Moisture}} = \text{Drying Gradient}$$

Conventional drying schedules frequently refer to the air relative humidity or wet bulb depression (psychrometric difference). The following table permits converting wet bulb depression values into EMC values and vice versa.

Wet bulb depression	Dry Bulb Temperature (°C) (Drying Temperature)										
	35	40	45	50	55	60	65	70	75	80	85
	EMC Values										
25			1.6	2.5	3.2	3.4	3.6	3.7	3.8	3.9	3.9
20	2.0	3.0	3.5	4.2	4.6	4.7	4.8	4.9	4.9	4.8	4.7
18	3.0	3.9	4.3	4.9	5.2	5.3	5.4	5.4	5.4	5.3	5.3
16	4.0	4.9	5.3	5.7	5.8	5.9	6.0	6.0	6.0	5.9	5.8
14	5.4	5.9	6.2	6.5	6.7	6.7	6.7	6.6	6.6	6.5	6.4
12	6.5	7.0	7.2	7.5	7.7	7.7	7.5	7.5	7.4	7.3	7.2
10	7.8	8.2	8.4	8.6	8.7	8.6	8.5	8.4	8.3	8.2	8.0
9	8.5	8.9	9.1	9.3	9.3	9.2	9.1	9.0	8.8	8.7	8.5
8	9.3	9.6	9.7	9.8	9.9	9.8	9.7	9.6	9.5	9.3	9.2
7	10.2	10.4	10.6	10.7	10.7	10.6	10.5	10.4	10.2	9.9	9.8

Wet bulb depression	Dry Bulb Temperature (°C) (Drying Temperature)										
	35	40	45	50	55	60	65	70	75	80	85
	EMC Values										
6	11.2	11.4	11.5	11.6	11.5	11.4	11.3	11.1	10.8	10.7	10.5
5	12.2	12.4	12.6	12.7	12.6	12.5	12.4	12.2	11.8	11.7	11.4
4	13.6	13.8	13.9	13.9	13.8	13.7	13.6	13.4	13.1	12.8	12.6
3	15.3	15.7	15.7	15.5	15.4	15.3	15.0	14.8	14.5	14.3	14.0
2.5	16.7	16.9	16.8	16.6	16.4	16.3	16.1	15.8	15.5	15.3	14.9
2	18.0	18.0	18.0	17.8	17.6	17.4	17.1	16.8	16.5	16.3	16.0
1.8	18.6	18.7	18.7	18.5	18.3	18.0	17.6	17.3	17.0	16.7	16.4
1.6	19.3	19.4	19.4	19.2	19.0	18.7	18.3	18.0	17.7	17.3	17.0
1.4	19.9	20.0	20.0	19.8	19.6	19.3	19.0	18.6	18.3	17.9	17.6
1.2	20.8	20.9	20.9	20.7	20.5	20.3	19.8	19.4	19.0	18.7	18.3

Operating Instructions for Moisture Measurement of Building Materials

Set selector switch ④ to position »B«

Connect selected measuring electrode to the meter socket ① by means of the measuring cable MK 8 and drive-in or stick-in electrode into the material to be measured.

Press measuring key ⑥ and read off result displayed by the pointer indicator ⑥ or LCD readout ③.

Convert reading into per cent of moisture by means of scale graphs listed at the end of this section.

Connection of the Electrodes

Different electrodes can be used with the meter depending on the material to be tested. The electrodes are connected to the meter socket ① by means of the measuring cable MK 8. On the meter side, this cable is fitted with a BNC plug. Turn clockwise to lock it. To disconnect, turn notched fastening ring anti-clockwise and draw off plug. Do not use force and do not pull on the cable.

Testing Set Building Materials

For testing soft building materials, the drive-in electrode M 20 should be used, whereas hard building materials, such as concrete and cement flooring, are to be measured with the stick-in electrodes M 6 or M 21/100, using contact paste.

For penetration measurements up to a depth of 250 mm on concrete or masonry, the special electrodes M 21/250 are available. The special stick-in electrodes M 20-Bi, available with insulated pins 200 or 300 mm long, are specially designed for measurements of materials hidden beneath another panel or covering, or otherwise inaccessible to other electrodes.

Special measurement caps type M 20-OF 15 are available for surface measurements (e.g. on concrete, etc.). They can be used only in conjunction with the electrode M 20.

Drive-in Electrode M 20

For penetration measurements, up to a depth of 70 mm, on soft, set building materials (gypsum, plaster, etc.), drive electrode pins into the material to be tested (the electrode body is of impact resistant plastic). Take care that both pins of the electrode are driven only into the material to be tested.

When withdrawing the electrode, the pins can be loosened by slight sideways rocking movements. The cap nuts should be tightened by means of a spanner prior to a series of measurements. Loose pins may easily break.

When the meter is supplied with the M 20 electrode as initial equipment, 10 spare pins 16 and 23 mm long (commercial steel nails) are included in the delivery. They can be used for measurements up to a depth of 20 mm or 30 mm, respectively. For measurements to greater depths they can be replaced by longer pins, but it should be noted that the liability to breakage or bending increases with the length of the pins.

Surface Measurement Caps M 20-OF 15

For surface measurements on smooth materials, the two hexagonal union nuts have to be unscrewed and replaced by the surface measurement caps. To perform the measurement, the two contact surfaces should be firmly pressed onto the material being measured. The measurement depth is about 3 mm. Particles adhering to the measurement surface should be regularly removed. If the elastic plastic pads should once be damaged, they can be re-ordered and stuck on using a commercially available instant adhesive on cyanate basis.
Measuring errors can be caused by a contaminated or dirty surface (e.g. oil).

Stick-in Electrode M 6

The two electrodes exclusively designed for moisture checks on set building materials are pressed, at approx. 10 cm apart, into the material to be tested. Both electrodes have to be inserted into the same type of building material. Also, the section to be measured must be coherent and not be crossed by another material. If the material is too hard to press in the electrodes by hand (e.g. cement flooring, concrete, etc.) drill 6 mm holes and fill them with contact paste. Then stick the pins into the contact paste.

When the meter is supplied with the M 6 stick-in electrodes as initial equipment, two pins 23 mm, 40 mm and 60 mm long are included in the delivery. They are suitable for measurements in depths up to 30 mm, 50 mm or 70 mm respectively.

The cap nuts should be tightened by means of a spanner. To ensure good contact, drilled holes should be tightly filled to their full depth with contact paste. Where hard building materials are involved and no contact paste is used, a considerable measuring error must be expected (the values indicated will be too low).

Brush Electrodes M 25

The two brush electrodes, made of stainless steel, are specially designed for depth measurements on hard and soft building materials ***without using additional contact paste***. To do so, drill two blind holes approx. 5 – 8 cm apart and with a diameter of 6 mm. To ensure sufficient contact, the blind holes must be drilled to s depth of at least 2 cm. Make sure that both electrodes are inserted in the same, coherent material. When testing cement flooring, the blind holes should be drilled to 75 % of the overall thickness of the cement flooring.

To ensure a long life, always turn the electrodes clockwise when inserting or withdrawing them.
Be careful when using pliers or similar tools.

Deep Electrode M 21-100/250

These two electrodes, exclusively designed for the measurement of set building materials, allow a measuring depth of up to 100 mm or 250 mm, respectively. Insulated sleeves prevent the results from being distorted by a high degree of surface moisture, such as dew or rain.

Drill two 10 mm dia. blind holes approx. 8 cm or 10 cm apart (the section to be measured must be coherent and consist of the same material).

It is very important that a sharp drill is used at low speed. Where a lot of heat is generated in the hole, it is necessary to wait at least 10 minutes before introducing the electrodes or contact paste. Insert the tube point 30 mm vertically into the contact paste in order to fill it with paste. Clean the outside of the electrode tube right to the point and insert into blind hole.

Prepare the second hole in the same way. Connect measuring cable to the electrode rod and insert the latter into the electrode tube. Press the contact paste

to the end of the hole by exerting pressure with the rod. Connect the measuring cable to the meter, press measuring key and read off result.

Warning
The readings may possibly be distorted if there is too much contact material in the electrode tube or if an electrode tube contaminated with contact paste is repeatedly removed and inserted.

Contact Paste

The contact paste is supplied in quantities of approx. 450 g in a plastic box sealed with a screw cap. It is used to produce a good contact between the electrode point and the building material to be measured or to serve as an extension to the electrode point. The moisture displaced by the drilling process is reconducted to the material to be measured by the water contained in the highly conductive contact paste.

The surface of the material to be measured must not be smeared with the contact paste as the latter has a high conductivity. When using the M 6 electrodes, it is advisable for an appropriate amount of the paste to be rolled into a thin strand and pressed into the hole with the reverse end of the drill.

It is possible to keep the contact paste mouldable by adding normal tap water. The quantity contained in a box is generally sufficient for approx. 50 measurements.

Flat Electrodes M 6-Bi 200/300

These two electrodes are exclusively designed for measurement if insulating material through the edge joint of the cement flooring. Spaced about 5 to 10 cm, they have to be pushed forward through the edge joint along the cement flooring down to the insulating layer. Particular care should be taken to avoid that the shrinking hose of the pins is not damaged because otherwise a moist cement flooring can cause measuring errors. The cap nuts should be tightened by means of a spanner or pliers.

The two flat electrodes can only be used with the M6 electrode handles.

Stick-in Electrodes M 6- 150 / 250

These very thin electrode pins are specially designed for testing building or insulating materials for moisture content, if the pin holes shall be kept as small as possible. The two 2 mm dia. pins, made of ductile high-grade steel, can, for example, be stuck approx. 3 to 5 cm apart through the edge joint of the cement flooring into the insulating layer.

For use of these pins being specially developed for measurements through the cross joint of tiles, a special 3 mm dia. hard-matel drill 160 mm long *(Ref. No. 6078)* is available. It permits drilling a hole through the cement flooring up to the insulating layer. The electrode pins should be spaced, if possible, no more than 10 cm (maximum 15 cm).

The electrode pins can be used with the handles of the M 6 electrodes *(Ref. No. 3700)* and with the M 20 electrode (Ref. No. 3300).

Stick-in Electrode M 20-Bi 200/300

For measurement of hidden beams in framework buildings and, particularly, in insulated flat roofs or facades.

In order to prevent damage to the insulation of the points, it is advisable not to drive them into hard building materials (plaster, gypsum plaster boards, etc.). Insulating materials such as fibre glass, rock wool, etc. can, of course, be easily penetrated. Otherwise, preliminary 10 mm dia. holes have to be drilled. The insulated points allow correct measurement uninfluenced by the moisture content of other material traversed by the electrode pins.

Remove hexagonal union nuts with standard electrode pins from the electrode M 20 and fit electrode pins M 20-Bi. Tighten firmly.

Test standard for structural Moisture Measuring Section

The optionally available test standard (Ref.No.6071) permits the user to check proper function of the structural moisture measuring section of the meter as well as of the connection cable MK 8 and of the measuring electrodes M6 and M20 at any time.

To do so, connect the cable to the meter and insert the two plugs in the bushings of the test adapter. If an electrode is to be included in the check, connect it to the cable and insert the two pins into the bushings.

Set selector switch ④ to position »B« and press measuring key ⑥ when a reading of 45 digits should be obtained. A tolerance of ± 2 digits is admissible.

Equilibrium Moisture Content

What is generally referred to as equilibrium moisture value relates to an ambient temperature of 20 °C and an ambient air humidity of 65 % R.H. These values are frequently also termed »air dry«. They must not, however, be confused with the values at which the material can be processed or worked.

Before painting or laying a floor, the diffusion capacity of the covering and future ambient conditions in the room must be taken into consideration. When laying PVC flooring in a centrally heated room with an anhydrite sub-floor, the flooring cannot be laid until the floor has dried to approx. 0.6 % m.c.

On the other hand, parquetry flooring can be laid on a cement floor in a room with normal stove heating, with a moisture range of 2.5 to 3.0 % m.c.

The long-term ambient conditions must also be taken into account when assessing wall surfaces. Lime stuff in an old vaulted cellar may have a moisture content of 2.6 % and still be treated. But a moisture content above only 1 % is considered too high for gypsum plaster in a centrally heated room.

It is of prime importance to consider ambient conditions when determining the moisture content of a building material. All materials are exposed to constantly changing temperatures and air humidities. The effect on the moisture content of the material basically depends on the thermal conductivity, heat capacity, resistance to diffusion of water vapour and the hygroscopic properties of the material.

The »desired« moisture content of a material, therefore, corresponds to its mean equilibrium moisture under the changing ambient conditions to which the material is constantly exposed. Air humidity values for Central Europe lie in the range of approx. 45 to 65 % R.H. in summer and approx. 30 to 45 % in winter.

A lot of damage occurs in winter, particularly in centrally heated rooms, as a result of these great swings.

It is not possible to set universally valid values. It always requires the craftsman's and the expert's experience to draw correct conclusions from any readings.

In the case of inorganic building materials, the water content is generally given as a percentage of dry weight. The hygroscopic water content of any material is to a large extent proportional to its density, i.e. for all apparent densities of a building material, the same value is shown when giving the moisture in percentage of dry weight, but at twice the apparent density, a reading in in percentage of volume would be twice as great.

Equilibrium moisture values

The moisture ranges shown in the graphs have the following meaning:

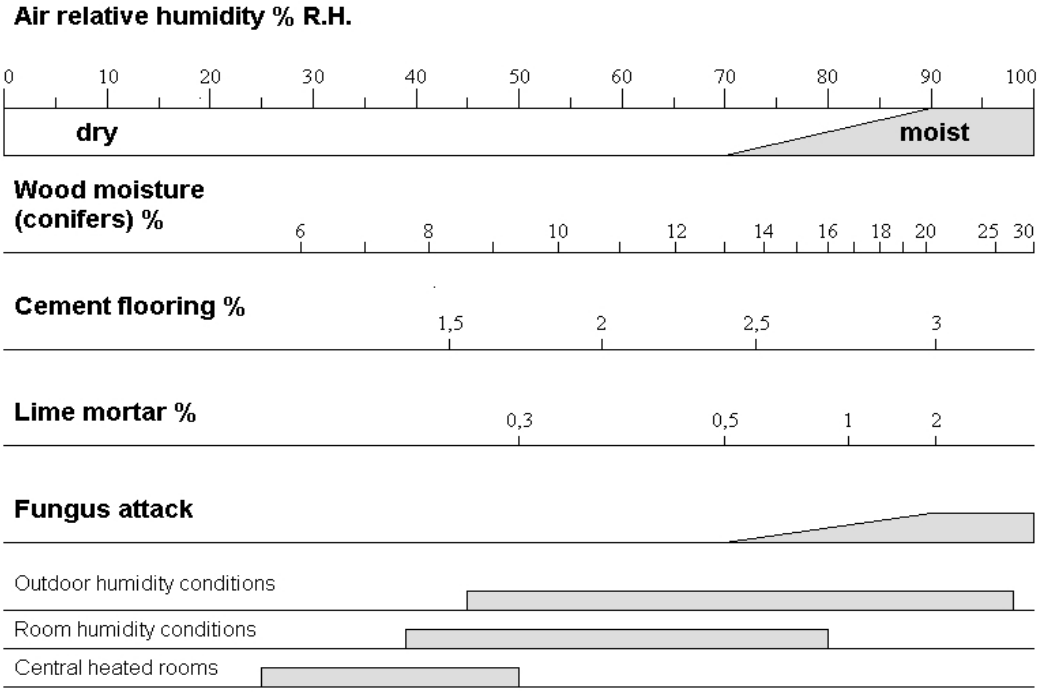
Ambient climate % RH

Condition of material dry equalizing range moist

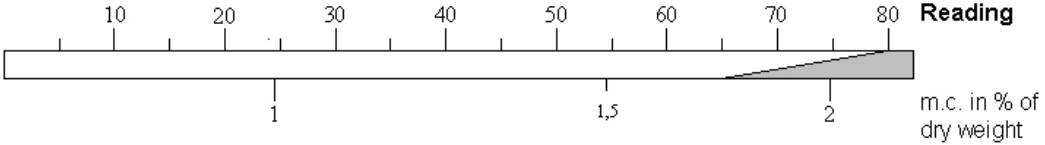
White section:	dry	equilibrium moisture attained
White-black section:	equilibrating phase	**Caution:** Floor covering or glues impervious to moisture should not be processed yet
Black section:	moist	Performing any work should be avoided

It should be noticed that a state of complete moisture equilibrium is usually achieved only after 1 -2 years. Vapour barriers and long term ambient humidity are decisive factors.

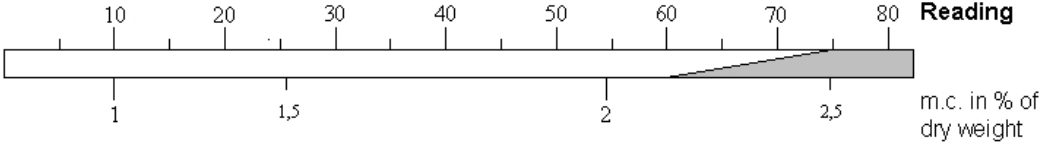
Table of Comparison Air Humidity - Structural Moisture



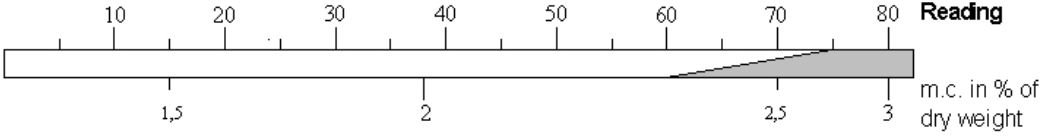
Concrete B 15



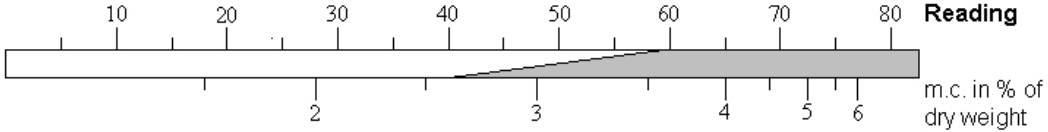
Concrete B 25



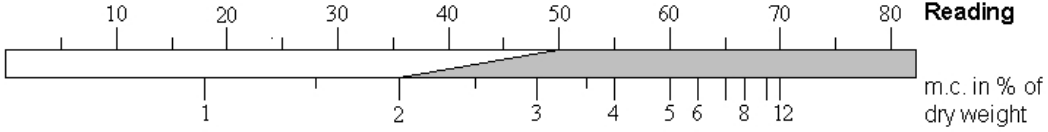
Concrete B 35



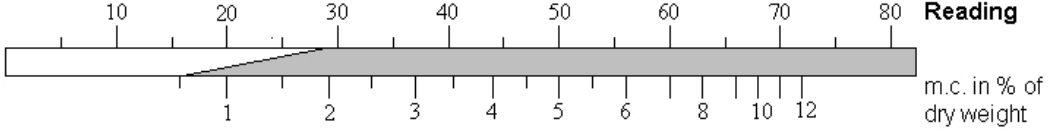
Cement mortar



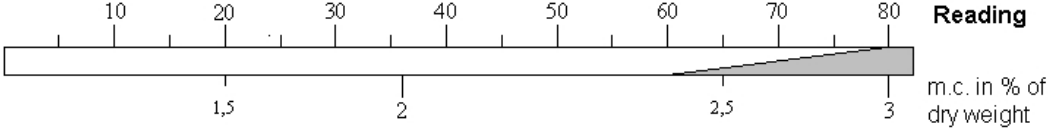
Lime mortar



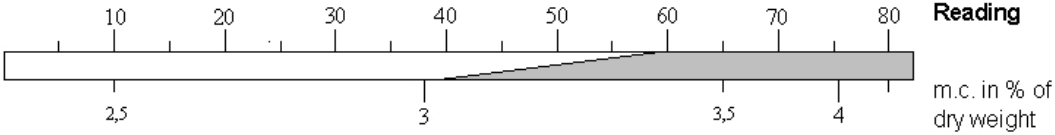
Plaster



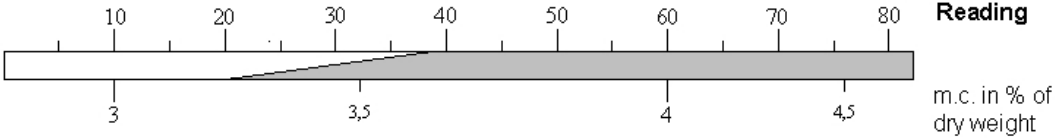
Cement flooring
without additives except
setting accelerator



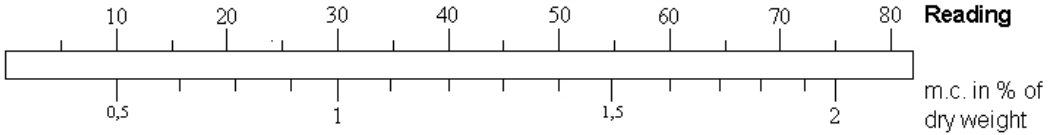
Cement flooring
with addition of synthetics



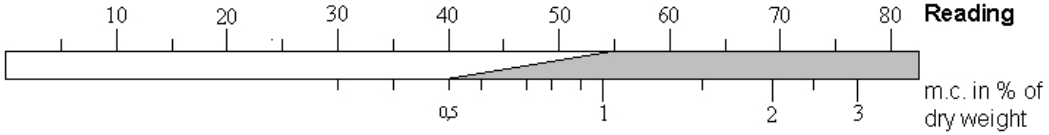
Cement flooring
with addition of bitumen



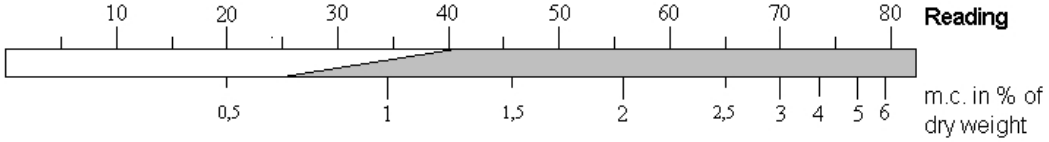
Ardurapid cement flooring



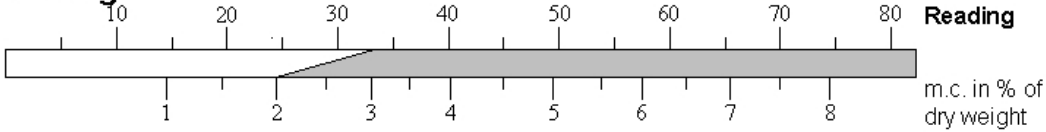
Durament flooring



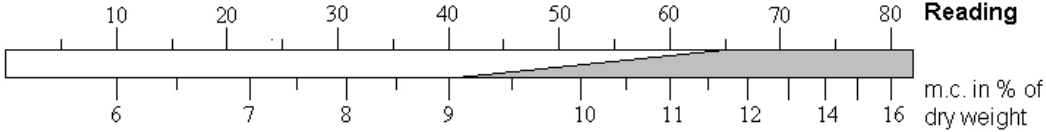
Gypsum flooring



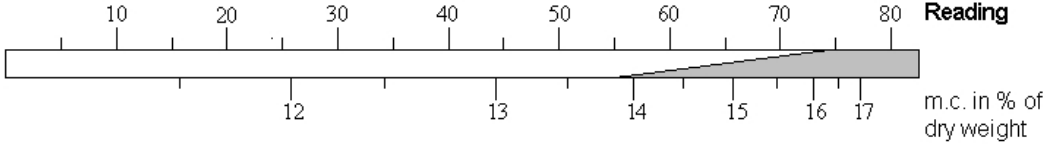
Elastizell flooring



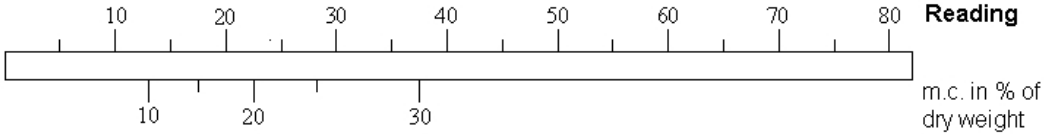
Wood cement flooring



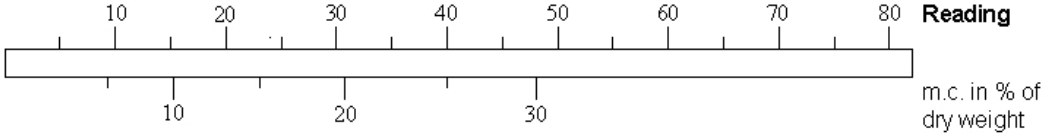
Xylolith



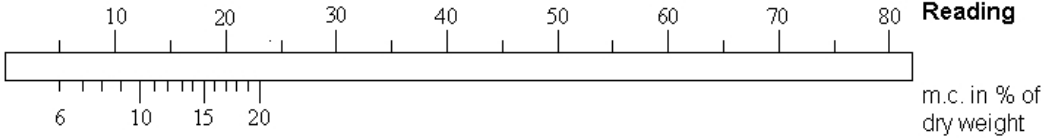
Bitumen based softboard



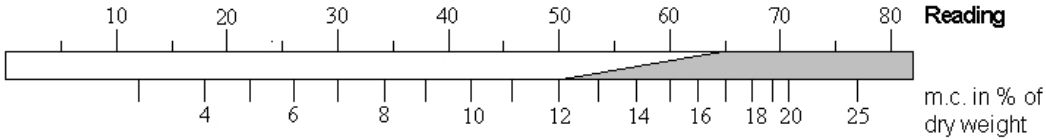
Cork



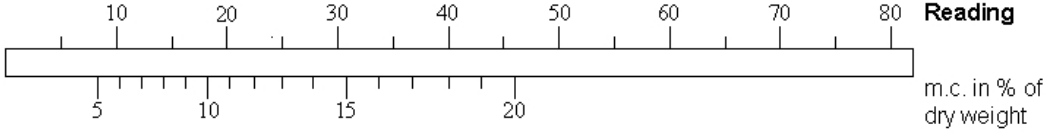
Polystyrene



Aerated concrete



Cement-bonded chipboard



Building or Insulating Materials Not Assignable to One of the Preceding Conversion Graphs

Some building materials, e.g. brick, sand lime brick, etc., cannot be measured with the usual accuracy due to their varying mineral additives or burning times. However, this does not mean that comparative measurements on the same material and on the same site would be of no value.

Obtaining various high values may, for example, show the extent of a damp patch due to water damage. Or comparative measures on the dry inside and the damp outside of a wall may show how the drying process is progressing.

Insulating materials, e.g. rock or glass wool, plastic foams, etc., cannot be measured in their dry condition due to their great insulating capacity. Readings fluctuate widely and even give minus values, due to endogenous statics. Damp to wet insulating materials can be measured in the range of 20 - 100 digits or scale divisions. Conversion to percentage by weight or volume percentage, however, is not possible. It is important that the insulating material is not over-penetrated by the electrodes. If this is done, an incorrect value may be shown as the underlying support is usually of a much higher moisture content.

Operating Instructions for Temperature Measurement

Temperature measurement using Pt 100 sensors and FT probes

- Set selector switch ④ to position »T«.
- Connect selected temperature probe to the meter socket ②
- Hold temperature probe in the air or bring it in contact with the material to be tested according to the following instructions.
- Press measuring key ⑥ and read off result in °C displayed by the LCD readout ③

General Information About Temperature Measurement

For correct readings a temperature balance between the measuring sensor and the object to be measured must be achieved. This is easy to attain when measuring liquids in large quantities or large objects with a high heat content. One must ensure that the sensor tube and head are not affected by another temperature such as ambient air temperature.

Therefore, it is recommended that the sensor be totally immersed or a screen be fitted to the tube. This screen can be made of polyester or of foam rubber about 3 cm dia., and sufficiently long to protect the exposed length of the tube which will be pushed through the middle. In the case of surface measurements with temperature probe OT 100, a block of polyester or rubber foam with a length of side of at least 30 mm will be sufficient to protect against convection heat or cold when taking temperature measurements on walls.

In the case of materials which are poor heat conductors or of low heat content (e.g. rock wool, glass wool, etc.) it is often not possible to achieve a correct temperature measurement with electrical sensors. To obtain utilizable results, it may become necessary either to take into account the ambient temperature or to carry out approximate measurements.

When measuring insulating materials whose surface temperature generally corresponds to the ambient temperature, the stick-in temperature probe ET 50 should be used. Measurement or response times, however, increase considerably.

Instructions for Use of the Temperature Probes

Surface Temperature Probe OT 100

The OT 100 is a special probe with low mass for measuring surface temperatures. Coat the sensor head with heat conducting paste and press it against the object to be measured. The sensor head must lie totally flat and in good contact. There must be no air (only a thin layer of heat conducting paste) between the sensor head and the object to be measured.

The response time ranges between 10 and 40 seconds depending on the material to be measured. In order to achieve good results, sufficient heat content and heat conductivity of the material to be measured is indispensable.

Note
Avoid damage to the spring-loaded tip of the probe, which may be caused by exerting excessive pressure or by bending the tip.

Surface Temperature Probe OTW 90 / OTW480

The OTW 90 / OTW 480 is an angled special probe with low mass for measuring surface temperatures. It is specially designed for measurements in plate presses. For measurements on rough surfaces coat the sensor head with heat conducting paste and press it against the object to be measured. The sensor head must lie totally flat and in good contact. There must be no air (only a thin layer of heat conducting paste) between the sensor head and the object to be measured.

The response time ranges between 20 and 60 seconds depending on the material to be measured. In order to achieve good results, sufficient heat content and heat conductivity of the material is indispensable.

Heat Conducting Paste

The heat conducting paste is supplied in packages containing 2 tubes of 30 g each. Its purpose is to improve the transfer of heat between the sensor and the object being measured. Temperature measurements with the probes OT 100 and OTW 90 on rough surfaces should generally be carried out in conjunction with heat conducting paste.

Stick-in Temperature Probe ET 10

The stick-in probe ET 10 is a simple probe for measuring temperatures in liquids and semi-solid materials (e.g. frozen materials), and for measuring core temperatures in pre-drilled holes.

Dip the sensor tip to a depth of at least 4 cm into the liquid or stick it into the material to be measured and take the reading. When measuring core temperatures, keep the hole as small as possible. Remove dust from the hole and wait for heat generated during drilling to dissipate. Coat sensor tip with heat conducting paste, insert and take the reading. Shallow holes can be directly filled with heat conducting paste.

Depending on the material to be tested, the response time lies between approx. 20 seconds (liquids) and 180 seconds.

Stick-in Temperature Probe ET 50

The stick-in probe ET 50 is a special sensor for measuring temperatures in liquids and soft materials, and for measuring core temperatures in pre-drilled holes.

Dip the sensor into the liquid or insert it into the soft material to be measured, in both cases at least as far as the first swelling (or approx. 6 cm deep), and take the reading. When measuring core temperatures, keep the hole as small as possible. Remove dust from the hole and wait for heat generated during drilling to dissipate. Coat sensor tip with heat conducting paste, insert and take the reading. Shallow holes can be directly filled with heat conducting paste.

Depending on the material to be tested, the response time lies between approx. 10 seconds (liquids) and 120 seconds.

Air/Gas Temperature Probe LT 20

The LT 20 is a special probe for measuring temperatures in air or gaseous mixtures. Hold measuring tip at least 4 cm deep into the medium to be measured and take the reading. Owing to its length of 480 mm, it is particularly suitable for measurements in air-ducts.

Depending on the speed of the air or gas-flow, the response time lies between 10 and 30 seconds for 10 °C each of change in temperature.

Immersion and Combustion Gas Temperature Probe TT 30/ TT40/ TT480/ TT600

These immersion probes are special sensors for measuring temperatures in liquids and core temperatures in pre-drilled holes as well as in combustion and waste gas of burners.

Dip the sensor tip at least 6 cm deep into the medium to be measured, and take the reading. When measuring core temperatures, keep the hole as small as possible. Remove dust from the hole and wait for heat generated during drilling to dissipate. Coat sensor tip with silicone heat conducting paste, insert and take the reading.

Depending on the material to be measured, the response time lies between approx. 10 seconds (liquids) and 180 seconds.

Flexible Temperature Probes of FT Series

To ensure correct temperature measurement, it is indispensable to balance temperature between the measuring probe and the material to be measured. This is easy to achieve when measuring liquids in large quantities or large objects with a high heat content. One must ensure that the sensor (total length of shrinking hose) is not affected by another temperature (ambient air temperature). Therefore it is essential to ensure that the sensor at temperatures below 60 °C be totally immersed (at least 6 cm) into the material to be tested.

For measurement of room temperatures (store-rooms, dry kilns, etc.) fix the temperature probe at a well ventilated place.

When testing the temperature of bulk materials, care should be taken that the complete sensor tip (shrinking hose plus at least 10 cm of the cable) is immersed in the material to be tested.

The temperature probes type FT can be employed for measurements up to 120 °C.
The Teflon insulated connection cable permits the use in slightly corrosive media, too.

Test Standard for Temperature Measuring Circuit (Ref.No.6072)

Connect the test standard to the 7-pin plug and set selector switch to position »T«.
After pressing the measuring Key ON/OFF, the meter should read 0 °C.

Final Remarks

The information and tables as well as the general terms and definitions contained in the instructions for use have been taken from technical literature. The manufacturer or supplier of the measurement equipment therefore cannot be held responsible for the correctness of this information.

The conclusions to be drawn from the measurement results by each user are governed by the individual circumstances and experiences and knowledge gained in the course of his professional practice.

In case of doubt about what moisture content, e.g. of the undercoat for a paint or of the sub-flooring for a floor covering is still permissible, the user should ask advice from the manufacturer of the paint or of the floor covering.

- Technical modifications reserved -

Warranty

GANN warrants for twelve months from date of purchase to correct, by repair or replacement of defective parts free of charge, any product defect due to faulty material or poor workmanship. Replacement or repair of any part do not constitute a new warranty period.

When lodging a warranty claim, return the meter complete with all accessories, postage paid, to GANN or to the supplier, together with a description of the fault noticed.

This warranty does not cover batteries, cables and electrode pins. GANN assumes no responsibility for damage or faulty performance caused by misuse or careless handling or storage, or where repairs have been made or attempted by the owner or third party. Proof of purchase is required.

GANN Mess- u. Regeltechnik GmbH
Schillerstrasse 63
70839 Gerlingen, Fed. Rep. of Germany

EC DECLARATION OF CONFORMITY

In accordance with the Directive on Electromagnetic Compatibility 89/336EEC in version 93/31/EEC

We hereby declare that the handheld moisture meter

GANN HYDROMETTE HT 85 T

corresponds to the aforementioned directive both with respect to its conception and type of construction and the design as marketed by us.

This declaration becomes void if the moisture meters are modified without our approval.

Applied harmonized standards in particular:

- EN 55011/03.91
- DIN EN 50082-1/03.93
- DIN VDE 0875-11/07.92

Applied national technical standards and specifications:

- IEC 1000-4-2/1995
- IEC 801-3/1984
- IEC 1000-4-4/01.95
- IEC 65A/77B

Gann Mess-u. Regeltechnik GmbH, Stuttgart, Germany