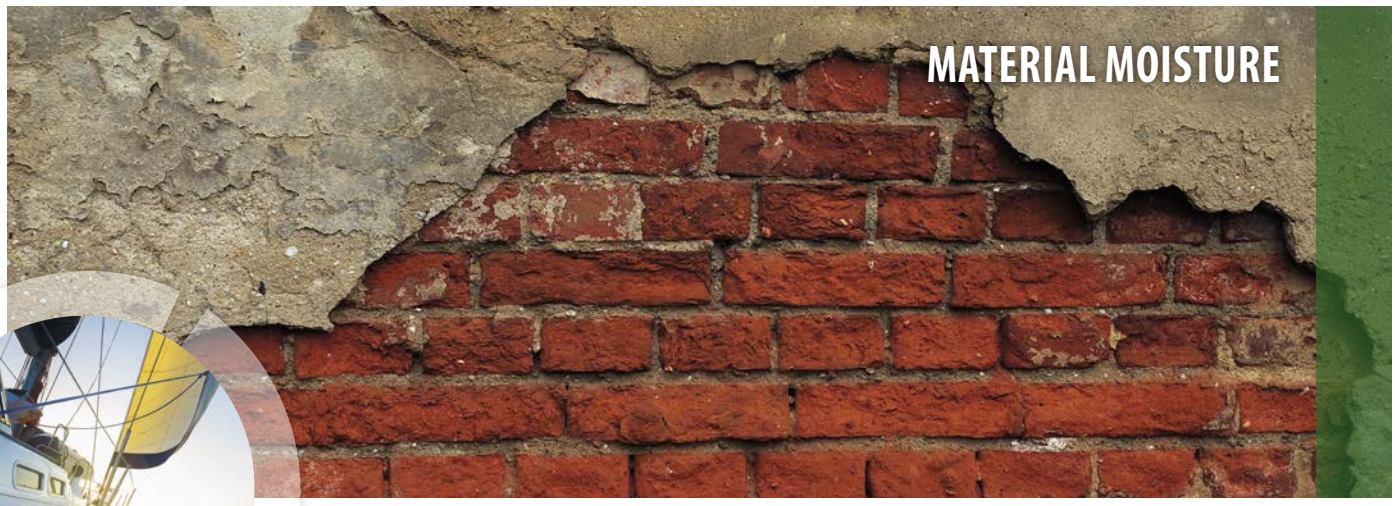
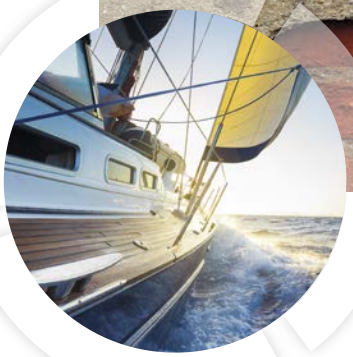
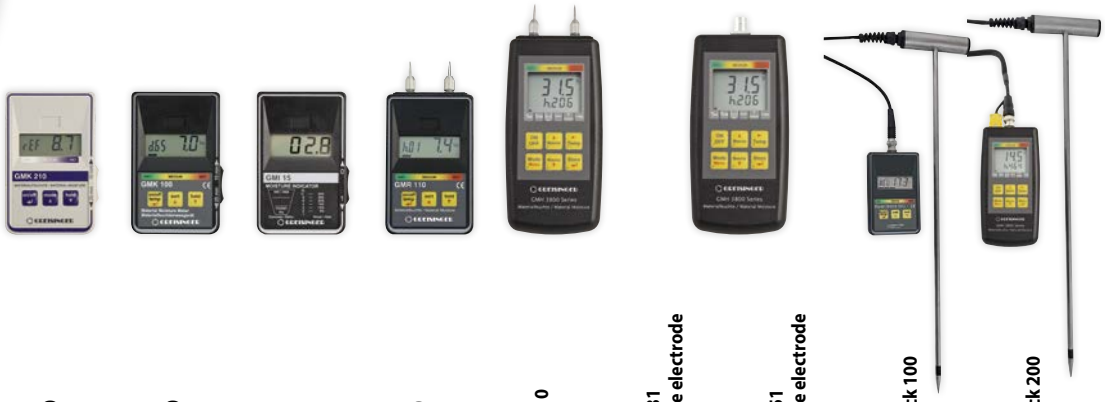


MATERIAL MOISTURE





APPLICATION:	GMK 210	GMK 100	GMI 15	GMR 110	GMH 3810	GMH 3831 + suitable electrode	GMH 3851 + suitable electrode	BaleCheck 100	BaleCheck 200
Carpenter, joiners, DIY		•	•	•	•	•			
Boat & Caravan (wood & GFK)	•								
Certified glue lam						•	•		
Foelwood, wooden log				•	•	•	•		
Wood chips						•	•		
Plaster, screed, concrete, bricks, lime mortars		•	•	•	•	•	•		
Construction-damage assessment / Water damage restoration		•	•	•	•	•	•		
Hay bale / bale of straw/ Corn (barley, wheat)						•	•	•	•
EQUIPMENT:									
Method	capacitive (non-destructive)					resistive (resistance)			
Sensor / Probe	integrated			integrated		external		external GSF 40	external GSF 40TF
Characteristics	14	18		4		494		4	494
User curves							4		
General functions	Hold, Auto-Off	Hold, Auto-Off		Hold, Auto-Off	Hold, Auto-Off, Sort	Hold, Auto-Off, Sort	Hold, Auto-Off, Sort	Hold, Auto-Off	Hold, Auto-Off, Sort
Serial interface / analog output						• / 0 ... 1 V	• / 0 ... 1 V		• / 0 ... 1 V
Data logger							•		
DEVICE INFORMATION:									
Catalogue page	**Page 45**	**Page 45**	**Page 44**	**Page 50**	**Page 49**	**Page 46**	**Page 46**	**Page 51**	**Page 51**

INFORMATION

Material Moisture Measurement with GREISINGER-handheld instruments

METHODS

○ **Resistive measuring method**

(GMR 110, GMH 3810, GMH 3831, GMH 3851)
The electrical resistance often depends on the material moisture. Therefore the devices measure the (possibly extremely high) values of resistance and convert them to the displayed value by means of integrated characteristic curves. The temperature has to be compensated especially at the measurement of wood – all GREISINGER- instruments have an integrated temperature compensation. In most cases the contact is realised by nails that are driven into the material are used to contact.

○ **Capacitive measuring method**

(GMK 210, GMK 100, GMI 15)
The dielectric properties of an object are often a good indicator for its material moisture. The dielectric coefficient of water is considerably higher than that of dry lumbers or building materials. Therefore the total dielectric coefficient of the measuring object can be easily used to get its material moisture. For the measurement the device has to be applied on the material. Precondition therefore: planar surfaces, no metallic elements.

○ **Relative humidity**

(i.e. GMH 3330 + TFS 0100 E)
Another method is to measure the material moisture indirectly by means of the relative humidity: The humidity in a sealed hole within a material depends on the material moisture. By means of a so-called sorption isotherm or a corresponding table the material moisture can be calculated from the humidity.

○ **Dry method**

The oven dry method can be used for reference point measurement with highest accuracy. The moist material is weighed and afterwards dried at increased temperature until no weight loss is detectable anymore. The material moisture can be calculated from the moist and arid weight.

UNITS

○ **Material moisture u (also „atro"):**

relating to dry mass
material moisture u [%] =
(mass wet - mass dry) / mass dry * 100
Particularly important for carpenters, joiners, etc.

○ **Moisture content w:**

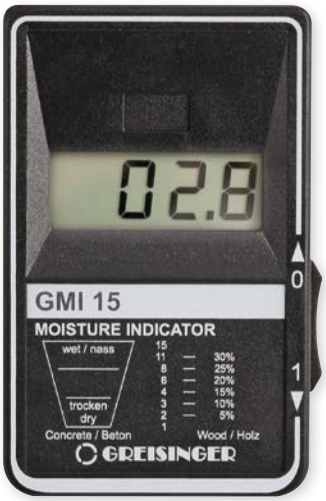
material moisture related to wet total mass
moisture content w [%] =
(mass wet - mass dry) / mass wet * 100
Particularly important for the evaluation of combustibles.

○ **„Digit" (GMI 15)**

The displayed value is relative, that means without a physical unit. This can be used to get comparative moisture information of the same materials. Lower values indicate less moisture, higher values indicate therefore more moisture.

For further information on this topic please see the devices' manuals and our homepage www.greisinger.de

INDICATOR FOR MOISTURE IN WOOD AND BUILDINGS



HIGHLIGHTS:
- nondestructive measurement
- easy and fast moisture rating

GMI 15

Art. no. 600059
Indicator for moisture in wood and buildings

General:

Device for high-speed determination of moisture in buildings, contracting work etc. The GMI 15 allows detection of moisture in wood down to a depth of approx. 3 cm and in concrete or wash floor down to a depth of approx. 4 cm. Detection of moisture behind ceramic tiles and/or various wall or floor coverings. To check moisture simply place device on the surface to be measured - no injection into the measuring object required. The displayed values by „digit" are relative, that means the values can be well compared.

Application:

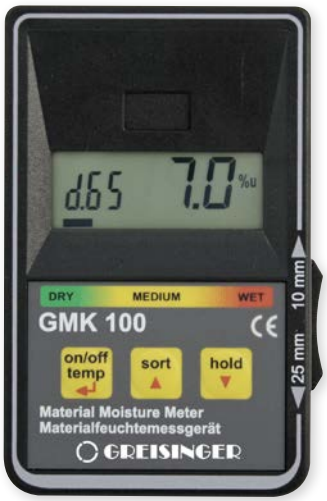
Humidity indication for i.e. estate agents (for fast control state of buildings), property management, house owners, architects, building experts, building contractors, etc.
Note:
The GMI 15 is an indicator for the fast estimation - it does not replace precision instruments like the GMH 3810, GMH 3831, GMH 3851 or GMK 100

Specifications:

Display:	3½-digits, 13 mm high LCD
Display range	
Concrete / floor	0 ... 5 = dry 6 ... 9 = humid, normal humidity level 10 ... = wet
Wood / fibre glass reinforced polyester:	0 ... 3 ~ 0 ... 12 % : dry 3 ... 6 ~ 12 ... 20 % : air-dry 6 ... 11 ~ 20 ... 30 % : wind-dry 11 ... ~ 30 % ... : wet
Power supply:	9 V battery
Battery life:	approx. 60 h
Working temperature:	0 ... 50 °C (material not frozen)
Storage temperature:	-20 ... +70 °C
Relative humidity:	0 ... 80 % RH (non-condensing)
Housing:	Impact resistant ABS plastic housing
Dimensions:	approx. 106 x 67 x 30 mm (H x W x D)
Weight:	approx. 150 g (ready for use)
Scope of supply:	Device, battery, manual

MEASURING DEVICE MOISTURE

AUTOOFF
HOLD



NONDESTRUCTIVE MEASUREMENT

Rear side of device

HIGHLIGHTS:

- Moisture display in percent
- Acoustical and visual moisture rating
- 18 material characteristics for wood and building materials
- 2 different measurement depth
- For wood and building moisture

GMK 100

Art. no. 600105

Measuring device moisture in wood and buildings

General:

The GMK 100 is a capacitive material moisture measuring device with direct moisture display in percent. It is optimally suited for home and handcraft. Depending on the application, it is possible to display the material moisture "u" or the water content "w".
The humidity is measured by a measuring plate on the back of the device. With a side-mounted switch the measuring depths can be changed. With the help of measurements in different depth a statement could be made if for example the material dries already or if the moisture is just on the surface of the material.

Application:

Humidity measurement and indication of wood, concrete, screed, plaster, etc.

Specifications:

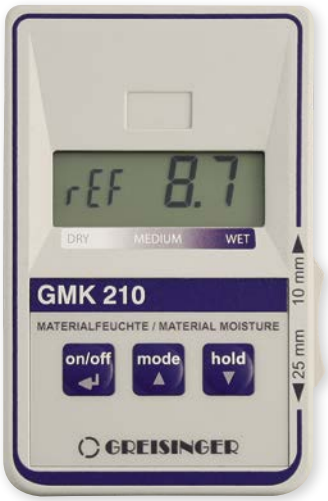
Display:	2 displays for material and measured value, in % material moisture or in % moisture content, backlight
Moisture rating	
Visual:	Rating of the moisture in 6 levels from WET to DRY
Acoustic:	Signal tone
Measurement depths:	10 mm and 25 mm
Curves:	18 characteristic curves for wood (with assignment tabel for wood species) and popular materials, additionally reference curve (rEF) for high-resolution relative measurements
Working temperature:	-5 ... +50 °C (not frozen)
Storage temperature:	-25 ... +70 °C
Power supply:	9 V battery
Battery life:	max. 2000 h without backlight
Power backlight:	approx. 2.5 mA (Auto-Off)
Housing:	impact-resistant ABS plastic housing, plastic foil keyboard, clear screen
Dimensions:	approx. 106 x 67 x 30 mm (H x W x D)
Weight:	approx. 145 g (ready for use)
Scope of supply:	Device, battery, calibration protocol, manual

Accessories and spare parts:

PW 25
Art. no. 601368
Testing probe to control the deivce

MEASURING DEVICE MOISTURE

AUTOOFF
HOLD



NONDESTRUCTIVE MEASUREMENT

Rear side of device

HIGHLIGHTS:

- Moisture display in percent
- Acoustical and visual moisture rating
- 14 material characteristics for wood and GFK
- 2 different measurement depth for Caravan & Boat
- Search mode for quickly locating humidity and the like

GMK 210

Art. no. 600107

Moisture measuring device for caravan and boat

General:

The GMK 210 is a capacitive material moisture measuring device with direct moisture display in percent. It is optimally suited for home and handicraft. Depending on the application, it is possible to display the material moisture "u" or the water content "w".
The humidity is measured by a measuring plate on the back of the device. With a side-mounted switch the measuring depth can be changed. With the help of measurements in different depth a statement could be made if for example the material dries already or if the moisture is just on the surface of the material.

Application:

Humidity measurement and indication of wood and GFK (glass fiber reinforced plastic)

Specifications:

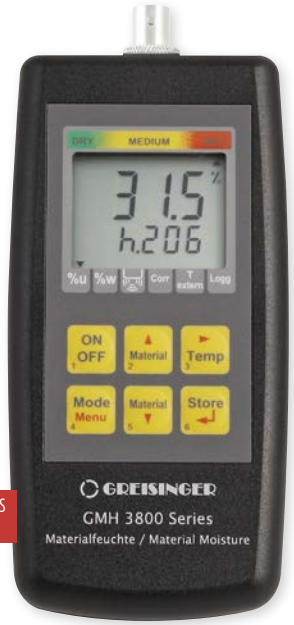
Display:	2 displays for material and measured value, in % material moisture or in % moisture content, backlight
Moisture rating	
Visual:	Rating of the moisture in 6 levels from WET to DRY
Acoustic:	Signal tone
Measurement depths:	10 mm and 25 mm
Curves:	14 characteristic curves for wood (with assignment tabel for wood species) and GFK, insulating materials i.e. Styropor; additionally reference curve for high-resolution relative measurements
Working temperature:	-5 ... +50 °C (not frozen)
Storage temperature:	-25 ... +70 °C
Power supply:	9 V battery
Battery life:	max. 2000 h without backlight
Power backlight:	approx. 2.5 mA (Auto-Off)
Housing:	impact-resistant ABS plastic housing, plastic foil keyboard, clear screen
Dimensions:	approx. 106 x 67 x 30 mm (H x W x D)
Weight:	approx. 145 g (ready for use)
Scope of supply:	Device, battery, calibration protocol, manual

Accessories and spare parts:

PW 25
Art. no. 601368
Testing probe to control the deivce

PRECISION MATERIAL MOISTURE MEASURING DEVICE FOR WOOD, BUILDING MATERIALS, STRAW, HAY, PAPER, TEXTILES, ETC.

AUTOOFF
AUTOHOLD



466 WOOD TYPE CHARACTERISTICS
28 CONSTRUCTION MATERIALS

HIGHLIGHTS:

- serial interface or analog output 0 ... 1 V, freely scalable
- 4 programmable characteristics (GMH 3851)
- incl. calibration protocol

ADDITIONAL FUNCTIONS GMH 3851:

LOGG

CONFORM TOEN 14080 : 2013 EN 16351 : 2015
SUITABLE E.G. FOR GLUED TIMBER CONSTRUCTION AND LAMINATED TIMBER (MPA CERTIFIED AND LISTED)

GMH 3831

Art. no. 609289

Resistive material-moisture and temperature measuring device, w/o accessories

GMH 3851

Art. no. 602009

Resistive material-moisture and temperature measuring device, w/o accessories, with data logger and programmable characteristic curves memory

General:

The GMH 3831 and GMH 3851 offer decisive advantages in handling, user-friendliness, functional range and accuracy. The absolute moisture of 494 material types is displayed directly and can be automatically converted to water content. The cumbersome usage of calculation tables becomes a thing of the past. Additionally you get a moisture rating (wet ... dry) of the measured material.

Application:

Precision measurements in cut-wood, chip board, veneer, sawdust, wood chips, wood wool, flax, straw, hay, concrete, bricks, wash floor, plaster, limestone mortar, cement mortar, paper, carton, textiles, wood chips, professional firewood humidity measurement, etc.

User:

architect, expert, inspector, building contractor, painter, carpenter, parquet joiner, floor tiler, wood works, timber desiccation plant, building repair company, textile industry etc.

Specifications:

Measuring principle	
Moisture:	Resistive material moisture measurement acc. to DIN EN 13183-2:2002
Temperature:	**extern:** thermocouple, type K (NiCr-Ni) **intern:** NTC
Characteristic curves:	494 material characteristics
Measuring range	
Moisture:	0.0 ... 100.0 % u (material moisture) 0.0 ... 50.0 % w (water content, wet basis) (depends on selected characteristic)
Temperature:	-40.0 ... +200.0 °C (-40.0 ... +392.0 °F)
Moisture rating:	9 steps (dry ... wet)
Resolution:	0.1 % or 0.1 °C (0.1 °F)
Device accuracy: (at nominal temperature)	
Wood:	±0.2 % material moisture (deviation from corresponding characteristic curve in range 6 ... 30 %)
Building material:	±0.2 % material moisture (deviation from corresponding characteristic curve)
Temperature:	(external) ± 0.5 % of m.v. ± 0.3 °C
Temperature compensation:	automatic or manual
Sensor connection	
Moisture:	BNC
Temperature:	thermovoltage-free type K (NiCr-Ni) socket
Permitted working temperature:	-5 ... +50 °C (not frozen)
Display:	two 4-digit LCD displays (12.4 mm and 7 mm high), additional indicator arrows
Output:	3-pole jack connector Ø 3.5 mm, either with serial interface or analog output
Serial interface:	connectable to RS232 or USB interface of PCs via electrically isolated interface converter GRS 3100, GRS 3105 or USB 3100 N (accessories).
Analog output:	0 ... 1 V, freely scalable
Average value:	of 3 measurements, e.g. for professional firewood moisture measurements
Power supply:	9 V battery, additional socket for external 10.5 ... 12 V direct current power supply (adequate PSU: GNG10/3000).
Battery life:	approx. 120 h
Housing:	Impact-resistant ABS plastic housing, membrane keyboard, transparent panel, integrated pop-up clip
Dimensions:	142 x 71 x 26 mm (H x W x D)
Weight:	155 g
Scope of supply:	Device, battery, calibration protocol, manual

additional functions GMH 3851:

User specific characteristics: 4, freely programmable
Interpolation points per curve: 20
By means of the gratis software GMHKonfig the interpolation points can be comfortably edited and stored to the instrument (Required accessories: interface converter)
Sort limitaion of different materials (up to 8)
Data logger:
This instrument is essential for the documentation of material state by quality assurance systems, etc. By means of the integrated data logger there can be up to 10.000 measuring values recorded and processed on demand. Additionally it is possible to individually program 4 material curves (e.g. with dry oven or CM-method). This instruments finally makes paper correction tables unnecessary.
Logger function
- manual:
  99 data sets (fetch data via buttons or interface)
- cyclic:
  10.000 data sets (fetch data via interface)
  adjustable cycle time: 30 s ... 1 h

The logger is started or stopped by keypad or interface. The software GSOFT3050 (see accessories) is available for comfortable read-out of logger data.

Accessories and spare parts:

GSOFT 3050
Art. no. 601336
Windows software for GMH 3000 and GMH 5000 with logger

GRS 3100
Art. no. 601097
Interface Converter GMH3xxx <=>PC, RS232

USB 3100 N
Art. no. 601092
Interface Converter GMH3xxx <=>PC, USB

additional accessories: see next page

OPTIONAL ACCESSORIES

1

GMK 38
Art. no. 601261
Measuring cable, BNC to 2x banana plug, legth 90 cm

2

GHE 91*
Art. no. 601263
Impact electrode, to drive in Ø 2.5 mm steel pins without auxiliary aids

3

GSE 91*
Art. no. 601266
Impact electrode, to drive in 2.5 mm Ø 2.5 mm steel pins

4

GEG 91
Art. no. 601268
Handle for retrofit of impact electrode

5

GSG 91*
Art. no. 601270
impact electrode with handle, to drive in Ø 2.5 mm steel pins or for GMS 300/91

6

GST 91
Art. no. 601273
Steel pins
9 steel nails (3 pieces each, 12, 16 and 23 mm long) in plastic case, Ø 2.5 mm

GST 91/40
Art. no. 601275
Steel pins
10 steel nails, 40 mm long, Ø 2.5 mm, in plastic case

7

GST 45i
Art. no. 601277
Steel pins
2 Teflon isolated steel nails, 45 mm long, Ø 2.5 mm

GST 60i
Art. no. 601279
Steel pins, as above, 60 mm long

8

GOK 91
Art. no. 601287
Surface measuring caps (pair, to be screwed on GSG 91/ GSE 91)

9

GMS 300/91
Art. no. 601289
measuring pins 300 mm long (pair, to be screwed on GSG 91/GSE 91), for wood chips, wood wool, paper, carton, etc.

10

GST 15B*
Art. no. 601281
Steel pins
2 steel nails with bore hole, 15 mm long, Ø 3.8 mm (for direct connection of measuring cable GMK 38)

GST 25B*
Art. no. 601283
Steel pins, as above, Ø 3.8 x 25 mm

GST 40B*
Art. no. 601285
Steel pins, as above, Ø 3.8 x 40 mm

11

GBSK 91*
Art. no. 601293
brush-type probe (pair, banana socket Ø 4 mm), depth down to approx. 100 mm

12

GBSL 91*
Art. no. 601294
Short brush-type probe, (pair, banana socket Ø 4 mm), depth down to approx. 300 mm

13

GEF 38*
Art. no. 601296
Flat electrode (pair, banana socket Ø 4 mm), for screed, paper, etc.

14

GLP 91
Art. no. 601299
Conducting paste 100 ml, for surface measurements and depth indication in walls, wash floors etc. with brush probes

15

GSP 91*
Art. no. 601301
Sensor for surface measurements on paper, textiles etc.

GSP 91 ES
Art. no. 601303
Spare sensor element for GSP 91

16

GMZ 38*
Art. no. 605783
Moisture tongs, for measurements of veneers or thin wood (up to approx. 10 mm)

17

GSF 50 (110 cm)
Art. no. 601306
GSF 50K (43 cm)
Art. no. 601308
Material moisture insertion probe, (without temperature sensor) for measurement up to a depth of 40 cm or 107 cm, incl. 1 m connection cable.
Suitable for: wood chips, wood wool, straw, hay, grain, saw dust, etc.

18

GSF 50TF (110 cm)
Art. no. 601312
GSF 50TFK (43 cm)
Art. no. 601313
Material moisture insertion probe, with temperature sensor), for measurement up to a depth of 40 cm or 107 cm, incl. 1 m connection cable.
Suitable for: wood chips, wood wool, straw, hay, grain, saw dust, etc.

19

GSF 40 (67 cm)
Art. no. 601316
Material moisture insertion probe, without temperature sensor, for measurement of pressed bales up to a depth of 60 cm, incl. 1 m connection cable. Suitable for: pressed hay or straw bales, grain

** Measuring cable GMK 38 necessary for GHE 91, GSE 91, GSG 91, GST 15B / 25B / 40B, GBSK 91, GBSL 91, GEF 38, GSP 91, GMZ 38*

OPTIONAL ACCESSORIES

20

GSF 40TF (67 cm)
Art. no. 601319
Material moisture insertion probe, with temperature sensor, for measurement of pressed bales up to a depth of 60 cm, incl. 1 m connection cable. Suitable for: pressed hay or straw bales, grain

21

GTF 38
Art. no. 601347
Material moisture temperature probe Ø 2.2 mm, to be inserted in measuring pins holes, potential free, recommended for wood moisture measurements

22

GES 38
Art. no. 601350
NiCr-Ni injection probe potential free, Ø 4 x 150 mm, 1 m cable (recommended for wood moisture measurements)

23

GPAD 38
Art. no. 601328
Testing adapter (with 2 test points) for GMH 38xx and GMR 110

24

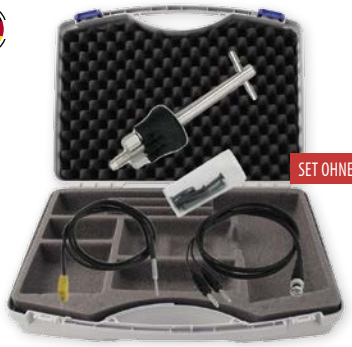
GKK 3500
Art. no. 601052
Plastic case (394 x 294 x 106 mm) with cut-outs for device and accessories (device and accessories are not included)

25

pict.: GMH3831 in ST-RN

ST-RN
Art. no. 601074
Protection bag with blanked out sensor connections (suitable for GMH 3831, GMH 3851)

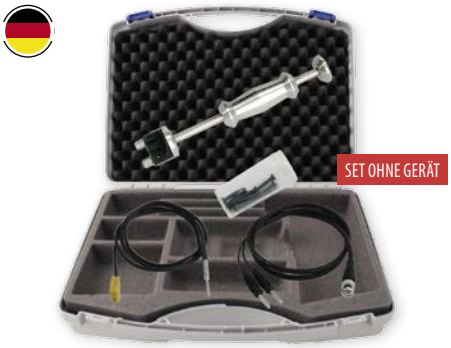
ACCESSORIES-SETS



SET 38 HF
Art. no. 602071
Material moisture accessory set for GMH 3831/51 (without instrument), Wood moisture

Content:
- GKK 3500 (case)
- GMK 38 (measuring cable)
- GSE 91 (impact electrode)
- GST 91 (measuring nails)
- GTF 38 (temperature probe)

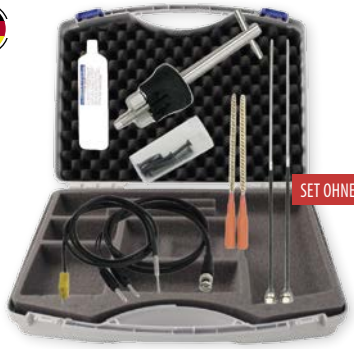
Application:
Wood



SET 38 MPA
Art. no. 602075
Material moisture accessory set for GMH 3831/51 (without instrument), MPA wood moisture, accessories tested like wood glulam subject to mandatory approval by MPA

Content:
- GKK 3500 (case)
- GMK 38 (measuring cable)
- GHE 91 (reciprocating piston electrode)
- GST 91 (measuring nails)
- GTF 38 (temperature probe)

Application:
wood, gluelam, production of laminated timber



SET 38 BF
Art. no. 602073
Material moisture accessory set for GMH 3831/51 (without instrument), Wood and building moisture set

Content:
- GKK 3500 (case)
- GMK 38 (measuring cable)
- GSE 91 (impact electrode)
- GST 91 (measuring nails)
- GTF 38 (temperature probe)
- GMS 300/91 (measuring rods)
- GBSK 91 (wire brush)
- GLP 91 (conductive paste)

Application:
wood, concrete, screed, plaster