

Injection probe GSF38TF

for resistive material moisture measuring devices with BNC connector
with integrated temperature sensor (thermocouple type K)

Safety Instructions

This device has been designed and tested in accordance to the safety regulations for electronic devices.

However, its trouble-free operation and reliability cannot be guaranteed unless the standard safety measures and special safety advises given in this manual will be adhered to when using it.

Risk of injury! Only use this injection probe extremely carefully. Keep it out of reach from children.

Intended purpose: The injection probe is only for measuring bales, bulk cargo or similar, like, for example splints, wood chips, insulating material, straw, hay, etc. This probe can be connected to resistive moisture measuring devices (e.g. GMH3830, GHH91 with BNC/RCA adapter). The temperature measuring via the integrated sensor is supported eg. by the instrument GMH3830/-50.

Operating And Maintenance:

- Treat the injection probe carefully (do not throw, hit against etc.). Protect plugs and sockets from soiling.
- When disconnecting the cables do not pull at the cable but on the plug. For locking and unlocking the BNC cable the movable ring has to be turned in its according direction. When having attached the plug right, it can be connected or disconnected gently without effort.
- The plastic insulator (3) has to be clean and dry in the range of the sensor pike, when not, faulty measurements may occur.
- Only use original cable! Otherwise faulty measurements are possible!
- The connection of the cables (within scope of supply) is done at the connection terminal (4): Type-K cable (yellow plug and socket) for temperature measuring, BNC-cable for moisture measuring.

Generals for measurements

The resistance of the medium between the conical metal surfaces (1) and (2) is measured. The medium being measured has to be compressed well. **The best is, having a constant pressure onto the medium during the measurement. Do not release during the measuring, otherwise the contact to the medium can be interrupted, in this case a to dry value would be measured.**

It is better to repeat the measurement a few times for having best results: the highest value measured is the most exact one. The measurement of wood chips or things like that is depending on temperature. For an exact measuring result the temperature is automatically compensated when using the suitable instrument (e.g. GMH3830). The temperature-measuring is done at the tip of the probe (1), a sufficient time to adjust the sensors temperature to the material has to be waited.

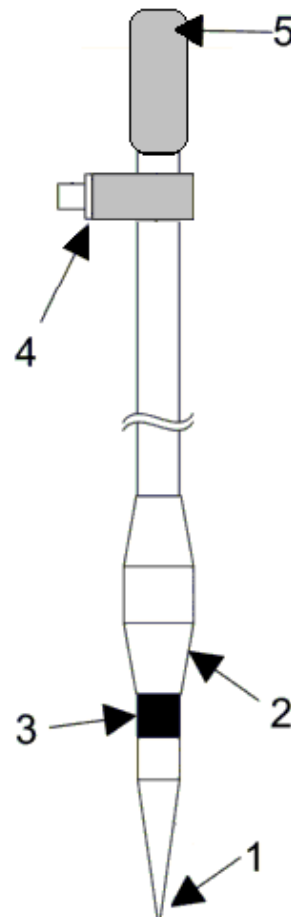
Different measuring results are depending on different types of wood: Select correct wood-group or wood-type before measuring. Refer to operation manual of the connected measuring device. When pushing in the probes, oscillating movements have to be avoided. Otherwise hollows between the probes and the material may falsify the measurement.

Measuring bales of straw and hay bales:

Always inject the electrodes form the plain side of round bales never from the round side, the probe can be inserted much easier.

Technical Specification

Meas. principle	Resistive material moisture measurement. temperature: insulated thermocouple type K in probe tip
Connection	BNC (cable included in scope of supply). For connecting devices with RCA connector an adapter has to be used. Temperature: Type K extension cable (included in scope of supply)
Dimensions	shaft Ø 15mm, contact surface 2: Ø 25mm, Wood bar handle, overall length 126cm, max meas. depth ca 100 cm short type: plastic handle, overall length 58 cm, max meas. depth ca 35 cm
Weight	ca. 330 g (short type 270 g)



Wood Chips as fuel

Especially when measuring wood chips it is necessary to have a continuous pressure of the measuring surfaces on the material. Do not release probe handle, otherwise the contact can be interrupted and a dryer value than the real one would be measured.

A sufficient compression of the material can be realized by stepping with the foot on the measuring site, or by measuring in a separate bucket, in which the material could be compressed easier.

Instrument settings for measuring wood chips:

GMH3830/3850 Version >= 1.5: **h.461 (specialised GSF38 curve**, also suitable for MC above 30%)

others: We recommend "Wood group C" (GMH38x0 instruments: "h. C"). This group delivers a sufficient accuracy for the fuel application up to 30% MC.

Wood chips are classified in different quality groups.

The size and the moisture content (MC or u) or the wet-basis moisture content (w) are the measure for the usability.

Usually a moisture content (w) of maximum 30% is recommended.

Chip size

Class		Size
G 30	small chips	smaller than 3cm
G 50	mid size chips	3 - 5cm
G 100	crude chips	5 - 10cm

moisture content

Class		Wet basis moisture content w (can be displayed directly of GMH3830 V1.4)	moisture content u (instrument's display e.g. of GMH3830 <V1.4)
w 20	air dry	<20 %	<25 %
w 30	storeable	20 – 30 %	25 – 43 %
w 35	conditionally storeable	30 – 35 %	43 – 54 %
w 40	wet	35 – 40 %	54 – 67 %
w 50	fresh cut	40 – 50 %	67 – 100 %

The higher the moisture content, the lower is the heating value per weight!

Older instruments (e.g. GMH3830 before V1.4) cannot be switched from moisture content u to w, in this case the wet basis moisture content can be calculated like following:

Conversion meter display u -> wet-basis moisture w

$$\text{wet-basis moisture } w[\%] = 100 * \text{Moisture content } u[\%] / (100 + \text{Moisture content } u[\%])$$

Examples: 1kg of wet wood, which contains 500g of water has a moisture content u of 50%
1kg of wet wood, which contains 200g of water has a moisture content u of 20%

