

With the following calculation the right TK1 can be calculated:

For example: Measure with your BM2 at 23°C a moisture content of 30% and by the sample in the fridge (at app. 8°C) just 20%.

$$TK1 = \frac{30}{20} = 1.5$$

**NOTE:** Before measuring allow your BM2 to become conditioned to the sample temperature.

## 2.9 Measuring range

In the menu item “Valid” is the validity of the calibration curve given. A valid measurement is shown in the measuring window black, a invalid is shown gray. This feature can be best explained by an example.

The goal is a valid range from 5% up to 25% moisture content because for certain materials readings above 25% lose accuracy

Enter the following values in the shown order:

idx      idx      idx      idx      idx      idx  
 (1)      (2)      (3)      (4)      (5)      (6)

Idx(1)	Idx(2)	Idx(3)	Idx(4)	Idx(5)	Idx(6)
50%	25.1%	25%	5%	4.9%	0%
0	0	1	1	0	0

The measuring range should be defined in the area of the measured samples.

## 2.10 Completion

If all values of the created calibration curve are stored in the BM2 device, you can measure the material with the new calibration curve.

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## 1.0 INTRODUCTION

A selection of calibration curves are permanently stored in the BM2. However, if none of the provided calibration curves suit the material to be measured, the user can create and store a new calibration curve for use in these special cases.

The following pages provide instructions for creating a user-defined calibration curve.

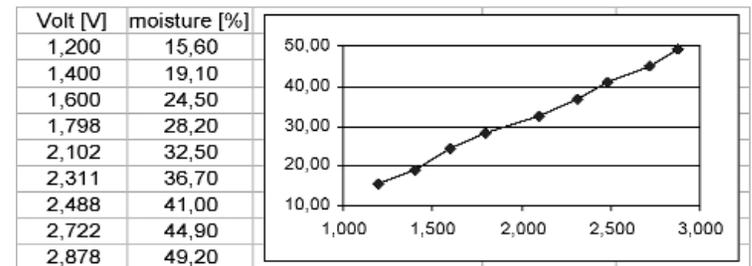
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It is important that the samples after moistening and drying for long enough can align and cool. Airtight seal!

There are a maximum of 16 index points available. However, there should be a maximum and minimum also registered. As many points as possible over the entire measuring range should be included.

We recommend that the captured voltage and moisture contents are inscribed in a graphic. Not linear points can be corrected. The values should be (as shown in the example below) almost on a straight line.



To save the values you have to leave the “Moisture” menu item by pressing the shift button (  $\hat{=}$  ) first, and then the symbol with the opened door (  $\square$  ). .

To be sure that all values are in the correct order and are correct, double check the whole values in the calibration curve!

### 2.8 Temperature compensation

For the temperature compensation, a factor (TK1) is pre-programmed, which can also be altered manually. However we recommend using the standard compensation factors which are calculated and tested for materials with a temperature sensitive calibration curve. If you do not know the compensation factor of your product we recommend using the standard settings of the BM2 for temperature compensation.

To get an exact TK1, take three samples with exactly the same moisture content and pack them in sealed plastic bags. Now heat and cool the samples to different temperatures. (also the BM2)

Bag1 23 °C  
Bag 2 08 °C  
Bag 3 40 °C

Use the ( ▲ ) or ( ▼ ) buttons to scroll to the menu item “Name” and confirm this by pressing the ( ↵ ) button.

You have ten characters for your calibration curve name.

Enter the name with the 0...9 or A...Z buttons. The name should consist of the fill quantity and the variety (for example. 2.5k corn or 300g coffee). If you press the button several times, the fast forward function will be activated. If the cursor is in the right position, shows the right letter or character by pressing the button. Accept the whole name by pressing the ( ↵ ) button.

## 2.7 Transfer the values

1. Press ( ▲ ) or ( ▼ ) keys to scroll through the menus until “Moisture” appears on the display. Accept this by pressing ( ↵ ). From this menu item you can transfer the values.
2. Weight the sample (which one?) and use the formulas in section 2.4 to calculate the actual moisture content.
3. Fill the BM2 measuring chamber with the correct fill quantity (section 2.1) Make sure the sample is sample evenly distributed to ensure reproducible results.

**NOTE:** Do not use a funnel or other tool when you fill the measuring chamber. Smooth the material by hand: (NOT BY FS4!!). Do not compress the sample material.

4. When the measuring chamber is filled, press the right button ( ▼ ) to transfer the voltage value of the sample. If this was successful, you jump automatically to the next line. The actual moisture content has to be typed in by hand.



5. To save the values you have to leave the “Moisture” menu item by pressing the shift button ( ⬆ ) first, and then the symbol with the opened door ( ⬆ ).

Now you have to dry Sample 1 successively and transfer the voltage value by following steps above. The calculated moisture content has to be typed in by hand. In parallel, Sample 2 has to be moistened successively. The calculated moisture content has to be typed in by hand.

## 2.0 CREATE THE CALIBRATION CURVE

### 2.1 Define the fill quantity

The fill quantity, that is, the amount of sample material placed in the measuring chamber, must be greater than 13 litres (FS4: 500ml) at no moisture state.

**NOTE:** The fill quantity must be the same in all measurements.

### 2.2 Prepare the samples

The procedure requires approximately 30 liters (HMC-FS4: 2kg) of sample material. The sample should be mixed and then divided into two sections of equal volume.

#### Sample 1

The total weight of this sample has to be chosen so that when the material is dried, the total weight is not less than the fill quantity, i.e., 13 liters.

This sample will be successively dried and thus lose weight.

#### Sample 2

The total weight of this sample has to be chosen so that the total weight is more than the fill quantity, i.e., 13 liters.

This sample will be moistened and thus increase in weight

### IMPORTANT

1. The beginning total weight of both samples must be accurately documented. This should be done with a very accurate scale.
2. The amount of the material in each sample has to remain the same during the entire process. No sample material should be removed.
3. These two samples must be hermetically stored.
4. The reference moisture content of the sample material has to be determined immediately.

### 2.3 Determination of reference moisture content

Collect sample material not used in Samples 1 and 2. This will be used to determine the reference moisture content according to the dry method “CEN/TS 14961:2005.”

1. Weigh the sample accurately.
2. Put the sample in a special oven at 105 °C until it no longer loses weight.

Now the reference moisture content can be calculated as follows:

$$\%F = \frac{M_n - M_t}{M_n} \times 100$$

$M_n$ : Mass with average moisture content  
 $M_t$ : Mass of the dried sample  
 $\%F$ : Calculated moisture content

**NOTE:** The dried sample material may no longer be used for measuring purposes

### 2.4. Determination of the material moisture

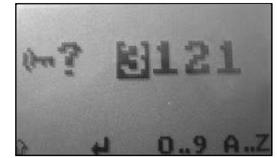
Now that you have determined the reference moisture content of your sample, you can calculate the actual moisture content of the sample, using the formula below:

$$\%F_{\text{neu}} = \frac{\text{Gew}_{\text{mom}} - \text{Gref} \cdot \frac{100 - \%F}{100}}{\frac{\text{Gew}_{\text{mom}}}{100}}$$

$\%F_{\text{neu}}$	Actual moisture content of the sample
$\text{Gew}_{\text{mom}}$	Actual weight of the sample
Gref	Sample weight before sample preparation (dry method)
$\%F$	With dry method certain reference moisture content

### 2.5 Unlock the BM2

From this menu, you can access the **Calibrate**, **Password** and **Reset** functions of the BM2 and temporarily unlock them.



**NOTE:** Functions remain unlocked until the power is turned off, then re-lock at the next start up.

**IMPORTANT:** To access and modify these features, you must enter the four digit super-user password. This password is the serial number located near the factory settings. The four digit serial number also appears under the menu item “Status” or when the device is booting.

#### Unlocking Procedure

1. To access the “unlock” feature, press the ( ) button repeatedly until you reach the main menu.
2. Press the ( ) or ( ) buttons to scroll to “Options.” Press the ( ) button to confirm.
3. Press the 0..9 button until you have reached the correct number. Press the ( ) button to confirm.
4. The character will be confirmed and the cursor will jump to the next position. Repeat Step 3 until you have entered the four numbers of your password, then press the ( ) button again to confirm.

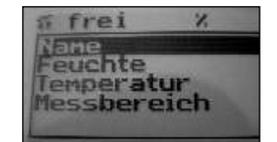


**NOTE:** Press the ( ) and ( ) successively to abort the password check. The 0..9 button also contains a fast forward function, starting when you press the 0..9 button several times. The character is confirmed automatically after a few seconds

### 2.6. Change the calibration curve name

Once the device is unlocked, the menu item “Material Calibration” becomes available.

A list with all calibration curves is shown on the display. Choose an “empty” calibration curve, or a curve you don’t need.



BM2 Biomass Moisture Meter  
**CUSTOMER CALIBRATION**

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