Units of moisture measurings and their conversions

Established moisture measuring instruments (like GMH3830 before V1.4) are displaying the material moisture relative to the dry weight of a material. In practice other units are used, too, especially the wet basis moisture content. The display of newer instruments (like GMH3830 V1.4 or GMR100) can be switched to both units.

Moisture content MC or u (relative to dry weight) = dry basis moisture content

Most common unit for moisture measuring instruments. The unit is %, sometimes used: % MC.
The unit expresses the moisture content like calculated below:

Moisture content u [%] = (weight $_{wet}$ – weight $_{dry}$) / weight $_{dry}$ *100

Or:

Moisture content u [%] = (weight $_{water}$) / (weight $_{dry}$) *100

Weight $_{wet}$: weight of the wet material
Weight $_{water}$: weight of water in the wet material
Weight $_{dry}$: oven-dry weight of material

Examples: 1kg of wet wood, which contains 500 g of water has a moisture content u of 100%
1kg of wet wood, which contains 200 g of water has a moisture content u of 25%

Wet-Basis Moisture Content w (relative to total weight)

The wet-basis moisture content expresses the ratio of the mass of water to the total mass of the substance. The ratio is represented by the following equation (the unit is % as well):

wet-basis moisture w[%] = (weight $_{wet}$ – weight $_{dry}$) / weight $_{wet}$ *100

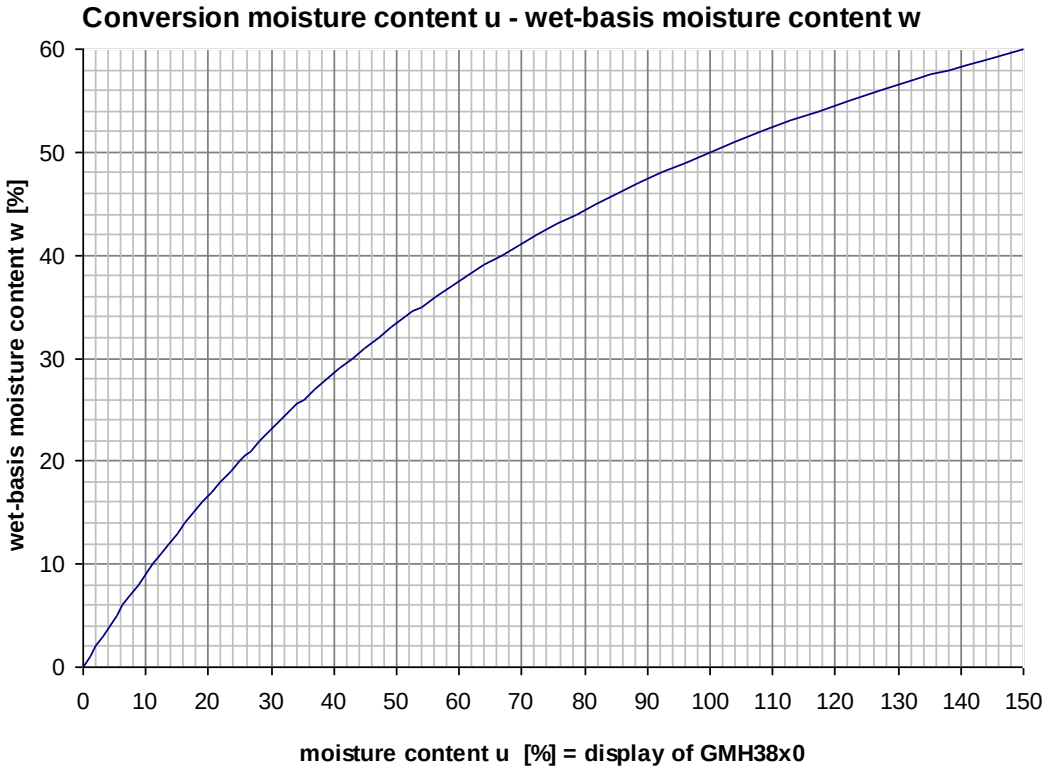
or:

wet-basis moisture w[%] = (weight $_{water}$) / weight $_{wet}$ *100

Conversion meter display u -> wet-basis moisture w

wet-basis moisture w[%] = 100 * Moisture content u[%] / (100 + Moisture content u[%])

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



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rarely used:

Dry-Content

The unit is % again.

dry content[%] = $weight_{dry}$ / $weight_{wet}$ *100

Conversion meter display u -> dry content

dry content[%] = 10000 / (100 + Moisture content u[%])

Examples: 1 kg of wet wood, which contains 500 g of water has a moisture content u of 50%
1 kg of wet wood, which contains 200 g of water has a moisture content u of 80%

Volumetric water content from material moisture u

(for example for concrete)
Material moisture related to volume v [% vol] = volume water / volume wet *100
Derivation from:

I. Material moisture u [%] = mass $_{water}$ / mass $_{dry}$ *100
II. mass $_{dry}$ = dry density * volume $_{dry}$

Assumed: volume $_{wet}$ = volume $_{dry}$; density water = 1kg/dm3
Applies: v[% vol] = volume $_{water}$ / volume $_{dry}$ *100

v[% vol] = material moisture u * dry density / density $_{water}$

Example:
Dry density (concrete)= 2.2 kg/dm3;
measured material moisture u = 3%

v = 2.3%*2.2/1 = 6.6% vol