

## NMT 204 neutron moisture meter



### Use:

A measuring set used for process on-line moisture measurements of bulk solid and liquid materials during their technological processing. The measuring principle is based on laws for interaction between fast neutrons and atomic nuclei of the individual elements contained in the measured material. The advantage of this measuring principle is the fact that, in contrast to other moisture measurement methods, relatively big material volume is measured, ranging from  $0.06\text{m}^3$  to  $0.1\text{m}^3$ .

The device is used in all manufacturing and processing industry branches, namely in production of building materials, glass, ceramic, chemical industry, smelting, and metallurgy. The system is suitable for moisture measurements of input raw materials, regulation of drying processes, water dosing control, optimizing of solid fuel consumption according to moisture, etc.

### Description:

The system is comprised of a detection unit, a compact preamplifier block, a high voltage power supply and an evaluation unit. The detection unit can be placed either directly in the relevant technological device which transports the measured material, or in a prepared measuring container, through which a part of the material (or the whole amount) will pass. The evaluation unit can be installed on the required station (e.g. control room). When the moisture meter is installed and calibrated, the output values represent absolute moisture values of the measured material.

### Measuring point captation device:

For moisture measurements with the NMT 204 moisture meter material volume about  $0.1\text{ m}^3$  (100l) or higher must be ensured. For accurate measurements the probe must be covered by the minimum of 150mm in all points except the cable bushing, which is a cylinder with c. 345 mm minimum diameter and 550mm length. If other forms with

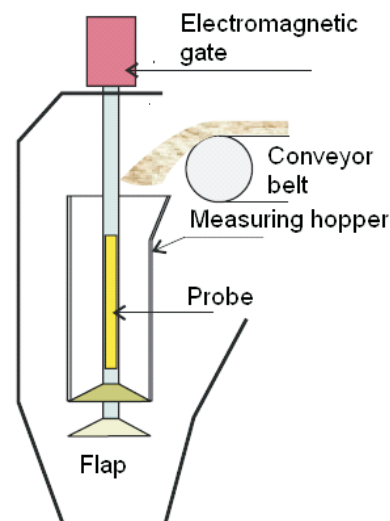
smaller dimensions are used, the device will measure with lower accuracy. If during the measurement the volume decreases under the given parameters, the state cannot be measured. Bigger volume of material (more than 100l) will not influence the measurement that much and measurement accuracy will slightly increase.

There are several ways of installing the NMT 204 moisture meter based on the conditions at the measuring point. The ideal position is moisture measurement in the reservoir at the outlet. A protective casing made of hard metal is installed in the reservoir and the moisture meter probe is inserted in the casing. The advantage is very low price for mounting; also, no additional mechanical parts are necessary. However, there is a danger of destroying the detection part by vibrations caused by the material falling into the reservoir or by vibration removers. For these cases a special part for sensor fixing, mounted out of the vibrating part, is used.



### Measuring container at the transfer point:

One of the variants of process installation is placing a measuring container at the transfer point behind the conveyor belt (see diagram). When the flap is closed, the container with the probe is filled and the measurement is performed. The size and shape of the container do not inhibit the flow of the material. As soon as material moisture is measured, the flap will open by means of an electromagnetic gate and the material will be discharged from the container.



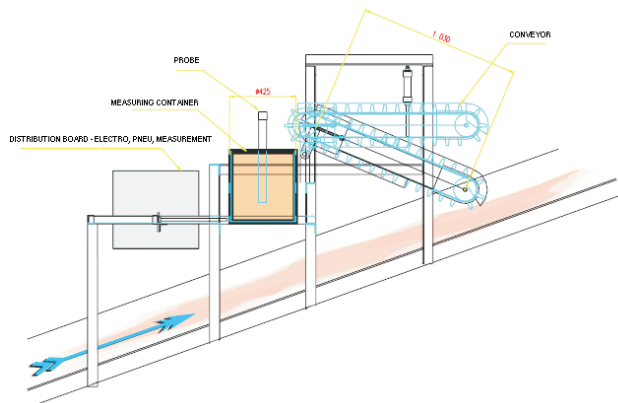
The catalogue sheet contains only some parameters important for your decision. For planning always require a corresponding user manual and eventually a technical consultation on the possibilities of use.

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### Measuring container running into the transfer point:

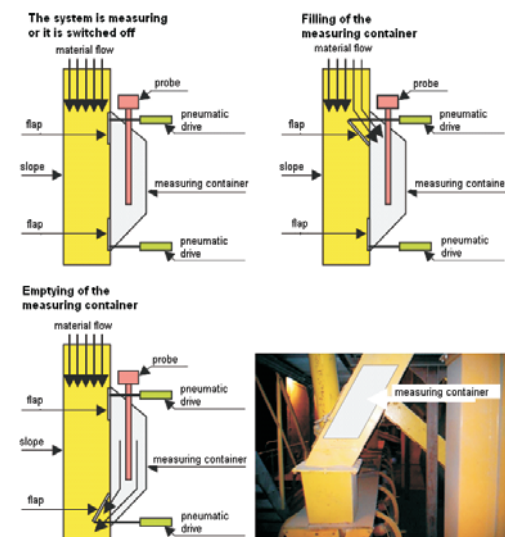
Another possibility of use is a measuring container running into the material flow at the transfer point. There are two possible methods: one is the running of the whole container as described above, including the electronics, into the transfer point from above. When the container is filled with material, it is pushed above the transfer point and measurement is performed. The transfer point remains free, without a container.

The other method is the running of the trough-shaped measuring container into the transfer point from the side. The measurement takes place at the transfer point and after the measurement the container, including the probe, is pushed outside the transfer point. During this pushing the trough is emptied.



### Measuring container in the slope:

In this case a so-called bypass is used. The measuring container with a minimum cross-section 400 x 400 mm and 600mm length is installed on the side of the slope. The probe is placed in the middle of the container. The container is filled and emptied by means of air-operated or electrically operated flaps.



### Legislation:

The use of the NMT 204 moisture meter falls under the authority of the Civil Nuclear Safety Office (CNSO) because of the presence of a closed neutron emitter (CNE). There is a statutory duty to submit an "Installation and use of a closed neutron emitter" application to the CNSO. The application must contain the reason for the installation, its location, the use, protection method, supervisor, regular inspection and disposal of the CNE. After the approval of the application the NMT 204 neutron moisture meter can be mounted. Our company provides all legislative procedures elaboration of the application following the necessary groundwork data. We also provide regular abrasion tests.

### Detection unit - probe:

Neutron source	Am Be up to 3.7 gbq activity
Neutron detector	proportional, SNM 18-1 type
Operating voltage range	1400-1800 V
Temperature range	-50° C..+ 150 °C
Dimensions	38 x 400 mm diameter
Weight	0,9 kg

### Shield cover:

Material	polypropylene
Outer dimensions	250 x 330 mm
Weight	18,0 kg

### Measuring container above the belt:

In this case the material is taken directly from the belt by means of a gathering belt. The measuring container is placed behind the gathering belt. It is filled by starting the gathering belt and closing the bottom flap of the container. After filling the container, the measurement is performed, then the flap opens and the material is discharged back on the conveyor. Installation on an inclined conveyor is also possible.

A control system with a distribution board for container filling, measuring and container emptying directed from the control room (automatically or manually) is available. The system also checks the condition of the device and announces any failures.

### Evaluation unit:

Power supply	24V/DC
Input impulse level	3.5 10 V
Number of inputs	1 to 6
Output	LED display current 0-20mA, 4-20mA sup. 0-10 V DC
Temperature range	-20°C to 70°C
Dimensions	300 x 200 x 120mm
Protection	IP 66

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