



NMT 204 neutron moisture meter



Use:

An operational on-line measuring kit designed to measure the moisture in bulk and liquid materials undergoing processing. The measuring principle is based on applying the laws of the interaction of fast neutrons with the atomic nuclei of elements contained in the measured material. The advantage of this measuring principle is mainly the fact that, unlike many other methods of measurement used to determine moisture content, it measures a relatively large volume of material, in a range of about 0.06m^3 to 0.1m^3 .

The device is used in all manufacturing and processing industries, particularly in the production of building materials, in the glass, ceramics and chemical industries, and in metallurgy. The system is good for determining the moisture content of raw materials, for controlling drying processes, managing water dosage, optimizing the consumption of solid fuels according to their moisture, etc.

Description:

The system consists of a detection unit, compact block preamplifier, high-voltage power source and evaluation unit. The detection unit can be placed either directly in the equipment where the measured material is being transported or in a pre-made measuring vessel through which a part or the whole quantity of material passes. The evaluation unit can be installed as needed in a desired workstation (control room, etc.). After calibrating the installed hygrometer, it indicates the output values of the absolute moisture value of the material.

Measuring point captation device:

Measuring moisture using the NMT 204 hygrometer requires a volume of material of about 0.1 m^3 (100 liters) or higher. To ensure the accuracy of the measurement, the probe must be submerged to at least 150 mm at all points, with the exception of cable glands, which form a cylinder with a diameter of at least 345 mm and length of 550 mm. When using a different shape with smaller dimensions, the

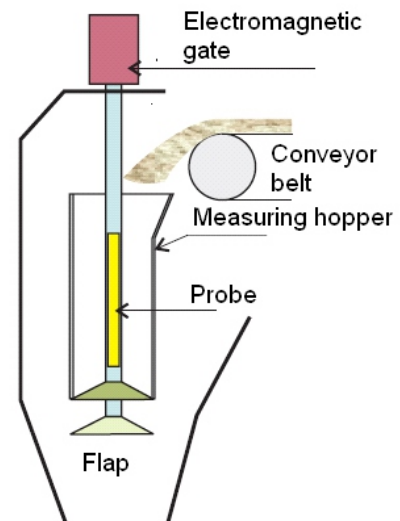
measured moisture will exhibit larger deviations from the actual state. An unmeasurable state occurs when during the course of measurement, the volume of the given parameters changes. A larger volume of material (over 100 liters) will not affect the accuracy of the measurement that much and the precision will increase slightly.

Under the conditions of the measuring location, there can be several methods for installing the NMT 204 hygrometer. The ideal situation is to measure the moisture in the hopper at the outlet. A protective casing made of tungsten carbide is installed in the hopper and the probe of the hygrometer is inserted into it. The advantage of this installation is the very low price and the lack of any need for other mechanical parts. The danger is the destruction of the detection portion by vibrations when material falls into the hopper, or the use of vibrating adhesive removers. For cases like these, a special part is used as a grip for the probe and mounted outside the shaking portion.



Sampling vessel at the transfer point:

One of the variants of the installation is to locate the measuring vessel after the conveyor belt at the drop-off point (see diagram). After closing the flap, the vessel where the probe is inserted will fill and measuring will subsequently take place. Because of its shape and size, the vessel does not prevent the flow around of material while filling. As soon as the moisture content of the material is measured, the flap opens by an electromagnetic latch and the material empties from the vessel.



The catalogue has only those selected important parameters for your final decision. For project designs always ask for the user's guide for this product and any engineering consultation about possible uses.

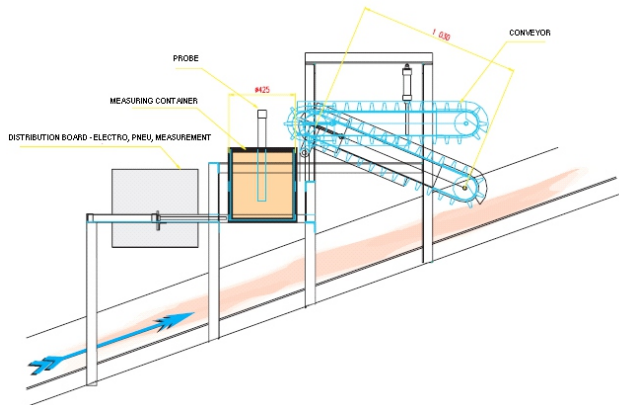


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Sampling vessel moving to the drop-off point:

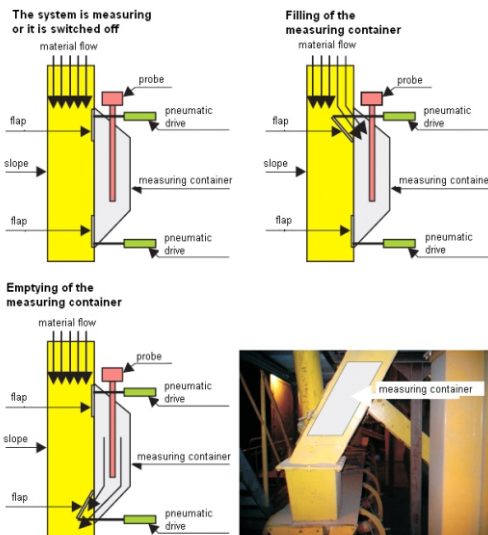
Another application is to let the sample vessel flow with the material falling at the drop-off point. There are two means of doing this and the first one has the entire vessel from the previous description, including the electronics, moving upwards to the drop-off point. After it fills up with material, the vessel retracts over the drop-off point and the measurement is performed. The top-fill remains loose without the vessel.

The second method has the sample vessel moving in the shape of a trough from the side into the flow of the material. In this case, the measurement takes place at the drop-off point and after the measurement is complete, the vessel and probe retract beyond the top-fill. The trough empties during the retraction.



Sampling vessel on a chute:

Here a bypass is used where a sampling vessel with a minimum cross-section of 400 x 400 mm and length of 600 mm is installed on the side of the chute. The probe is positioned in the middle of the vessel. The vessel is filled and emptied by air or an electrically-operated flap.



Sampling vessel above the belt:

In this application, the material is sampled directly from the surface of the belt using a tripper. The sampling vessel is located at the tripper. The vessel is filled by activating the tripper and closing the bottom of the sample vessel. Measuring takes place after filling and once the measurement is completed, the flap is opened and the material spills back onto the conveyor. Installation can be done at an incline to the conveyor belt.

For managing and controlling the sample vessel, a control system from the distribution board has the task of filling the vessel, measuring and emptying the vessel based on commands from the control room. It also checks the status of the equipment and reports any malfunctions.

Legislation:

Due to the presence of a closed neutron emitter ("sealed source"), deploying the NMT 204 hygrometer falls under the administration of the State Office for Nuclear Safety ("SONS"). The law requires that an application for the installation and use of closed neutron emitters be submitted to SONS. The application includes the reason for the installation, location, use, protection, personnel responsible for supervision, periodic inspection and disposal of sealed sources. Once the application is approved, the NMT204 neutron moisture meter can be installed. All legislative action – processing of the application is done by our company on the basis of the required documentation. We also provide regular wear 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 to + 150°C
Dimensions	38 x 400 mm diameter
Weight	0,9 kg

Shielding casing:

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

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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