

Powered by Thermo Scientific patented pulse mode, ion chamber technology in conjunction with a 500 mCi (18.5 GBq) source, the MOLA ensures repeatability of $\pm 0.2\%$. It optimizes blast furnace performance by accurately determining the moisture content in metallurgical grade coke and/or iron ore pellets to improve your operations and profitability.

Thermo Scientific MOLA

Moisture On-Line Analyzer for the Steel Industry



Features

- Stability over wide temperature range
- High accuracy and repeatability
- Patented, state-of-the-art ion chamber design
- Low maintenance
- Easy to install
- Rugged design—able to withstand tough environments

Rugged & Non-Intrusive

The Thermo Scientific MOLA Model 7200a is a moisture on-line analyzer that accurately and reliably measures the concentration of hydrogenous material in a process vessel. Designed for harsh industrial applications, the rugged density gauge uses patented neutron backscatter, pulse mode, ion chamber technology to non-intrusively measure the moisture content in metallurgical grade coke and/or iron ore pellets.

Improves Operations

Optimizing blast furnace performance is the key to improving operations and increasing profitability. The MOLA is engineered to help steel mills effectively manage the most pressing process issues, including variability in coke size, differing amounts of surface moisture, harsh environmental conditions at the point of measurement and high coke volume.

Stable & Repeatable

Pulse mode technology allows for excellent stability and repeatability over a wide temperature range without the need for high voltages or temperature stabilization of the circuitry. The signal from the detector is sent to a 1400A 'M' transmitter where the calculations and density compensation (external input from density gauge) are performed. The output from the transmitter is a 4 to 20 mA signal that can be set in many different units of measurement to facilitate international usage.

Easy-to-Install & Service

Like all Thermo Scientific nuclear gauges, the MOLA is easy-to-install and service. With no component exceeding 45 pounds, installation is greatly simplified. The streamlined design also allows for rapid diagnostics and servicing of the unit.

Technology

The MOLA moisture head consists of a radioisotope neutron source with appropriate shielding and an ion chamber neutron detector. The radioisotope source emits high-energy (fast) neutrons which pass through the wall of the hopper into the process material. As the fast neutrons enter the process material, they are scattered by repeated collisions with the other types of nuclei in the process material, including the hydrogen in the moisture. The scattering reflects many of the neutrons back through the hopper wall back to the MOLA.

The measurement of moisture is made possible by the fact that while the fast neutrons lose little energy in collisions with carbon, oxygen and the other nuclei in the process material, they experience a great loss of energy in collisions with hydrogen nuclei which converts them to low-energy (thermal neutrons). The number

of thermal neutrons produced is proportional to the density of hydrogen in the process material.

The ion chamber detector in the MOLA produces a current output for every thermal neutron that strikes it, generating a signal that is directly proportional to the hydrogen density of the process material. If all the hydrogen in the process material is contained in the moisture, or if there is a constant amount of hydrogen contained in other forms, the current rate from the ion chamber detector can be calibrated in terms of weight of moisture per unit volume of the process material. The current rate of the ion chamber detector can be calibrated in terms of the percent-by-weight moisture in the process material if the bulk density of the process material is reasonably constant or if the optional bulk density compensation is provided.

Thermo Scientific MOLA Model 7200A

General Specifications

Moisture Gauge Head	3 components, none weighing more than 20.4 kg (45 lbs); Total weight 44.5 kg (98 lbs)
Response Time Constant	4 sec default, adjustable to 1024 sec
Radiation Source	500 mCi AmBe (18.5 GBq)
Source Decay Effects	Negligible. 432-year half-life
Surface Radiation	Less than 5 mRem/hr (50 μ Sv/hr), measured at 300 mm (1 ft) from the surface of the source head
Sealed Source and Device Registry	Meets General License Device requirements (US)
Operating Temperature	-40°C to +80°C (-40°F to +176°F) CSA; -20°C to +70°C (-4°F to +158°F) ATEX
Power Requirements	\pm 15 VDC for the detector; 110 to 240 VAC or 24 VDC for the 1400A 'M' transmitter
Materials of Construction	Detector and source head: 316 Stainless Steel 1400A 'M' transmitter: NEMA 4X Stainless Steel 316 housing
Accuracy	Up to \pm 0.2%, depending on application
Approvals	CSA (C, US) approved for use in Class I Div 1, Groups B, C, D; Class I Div 2, Groups A, B, C, D; Class II Div 1, Groups E, F, G; Class III; Temp Code: T6; Encl. type 4X; Ta: -40°C to +80°C (-40°F to +176°F) ATEX approved for use in II 2 G IIC T3-T6; (T6: Tamb -20°C to +40°C); (T4: Tamb -20°C to +55°C); (T3: Tamb -20°C to +70°C)

Transmitter Specifications

System Architecture	Multiprocessor based electronics means uninterrupted output during data entry and system interrogation. Surface-mounted technology provides high degree of reliability. All user data doubly stored in non-volatile memory with no battery backup required.
Approvals	FMRC approved for use in Class I, Div. 2, Groups A, B, C, D; Class II, Div. 2, Groups F, G; Class III, Div. 2; NEMA 4X; CSA approved as above plus Class II, Div. 2, Group E; ENCL. TYPE 4X CE Mark: Compliant Low Voltage Directive: Compliant EMC Directive: Compliant
Display	Four-line backlit display; easy to use setup menus; displays up to eight readouts simultaneously
Current Outputs	4 to 20 mA isolated self-powered or loop-powered into 800 ohms, field scalable One (1) current output standard Up to three current outputs available, each representing independent span channels
Serial Outputs	RS 485 half duplex; RS 232 full duplex
Contact Closure Outputs	Up to 6 - 115 VAC/28 VDC SPDT @ 10 amps (230 VAC SPDT @ 8 A)
Inputs	Density meter: 4 to 20 mA linear Dry contact closure
Programming Options	Menu-driven direct keypad entry
Mounting	Transmitter can be mounted up to 1000 ft (300 m) from the detector.

Commissioning included with the purchase of a detector. Contact Thermo Fisher Scientific concerning the disposal of sources from existing detectors.

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