# Thermo Scientific MOLA Moisture On-line Analyzer

Stainless steel moisture analyzer for the steel industry

The Thermo Scientific™ MOLA Moisture On-line Analyzer 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.

- Powered by Thermo Scientific patented (patent #7368726) pulse mode, ion chamber technology
- High accuracy and repeatability of ±0.2%
- Easy to install and low maintenance
- Rugged design is able to withstand tough environments

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## Rugged & Non-Intrusive

The Thermo Scientific MOLA moisture on-line analyzer 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 analyzer 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 the Thermo Scientific™ 1400S 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 analyzer 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.

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| General Specifications | |
|---|---|
| Moisture Gauge Head | Three 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 +75°C (-40°F to +167°F) CSA; -20°C to +70°C (-4°F to +158°F) ATEX |
| Power Requirements | ±15 VDC for the detector; 110 to 240 VAC or 24 VDC for the 1400S transmitter |
| Materials of Construction | Detector and source head: 316 Stainless Steel |
| Precision | ±0.2% (results on 2-in steel wall hopper) or better, 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)<br>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); GOST-Compliant |

| Transmitter Specifications | |
|---|---|
| System Architecture | Multiprocessor based electronics means uninterrupted output during data entry and system interrogation.<br>Surface-mounted technology provides high degree of reliability.<br>All user data doubly stored in non-volatile memory with no battery backup required. |
| Approvals | CSA 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; Class II, Div. 2, Group E; ENCL. TYPE 4X<br>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<br>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 | 4 to 20 mA linear; Dry contact closure |
| Programming Options | Menu-driven direct keypad entry |
| Mounting | Transmitter can be mounted up to 2500 ft (762 m) from the detector |

## MOLA Technology

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

While the fast neutrons lose little energy in collisions with carbon, oxygen and the other nuclei, collisions with hydrogen nuclei convert them to low-energy (thermal neutrons). The number of thermal neutrons produced is proportional to the density of the hydrogen in the process material.

The detector produces a current output for every thermal neutron that strikes it, generating a signal that is proportional to this hydrogen density. 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 thedetector can be calibrated in terms of weight of moisture per unit volume. This rate can be calibrated in terms of the percent-byweight moisture if the bulk density of the process material is reasonably constant or if optional bulk density compensation is provided.

**For more information, visit our website at thermoscientific.com**



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