

MODEL 410 DUAL-GAMMA ANALYZER

DESCRIPTION

The Model 410 Dual-Gamma Analyzer (DGA) is a dual-energy online analyzer which measures the ash and density of a material as it is processed on a conveyor belt. The DGA continuously analyzes the entire material stream in real-time as it moves through the analysis zone, without sampling or preparation of any kind. Energy Technologies Inc. holds three patents: U.S. Patent # 7,006,919B2, 7,253,414B2 and 8,656,846.

COMPONENTS



DGA Belt-mounted Unit (BMU)

The DGA BMU is a fixed nuclear gauging device that utilizes sealed radioactive sources to measure the material's total ash content, density, and weight.

- The source holder, containing two to six energy sources depending on the application, is mounted above the conveyor belt and collimates a conical fan radiation beam down through the material.
- An energy-sensitive, temperature-controlled detector is mounted below the conveyor belt in the beam path.
- A junction box is mounted on or near the BMU for ease of installation and maintenance.



Data Acquisition Unit (DAU)

The DAU is a NEMA 4 electronics enclosure with state-of-the-art equipment for collecting and processing the signals from the BMUs. The DAU consists of:

- Uninterruptable Power Supply (UPS)
- Monitor
- Computer (Windows 10/11 Professional, 64-bit), 16GB RAM, 128GB SSD
- Managed PoE Network Switch
- Web-Enabled Power Relay
- Input/Output Control Modules
 - 4 Digital Inputs/4 Digital Outputs
 - 4 Digital Counters
 - 8 Analog Outputs
 - 12 Thermocouple Inputs

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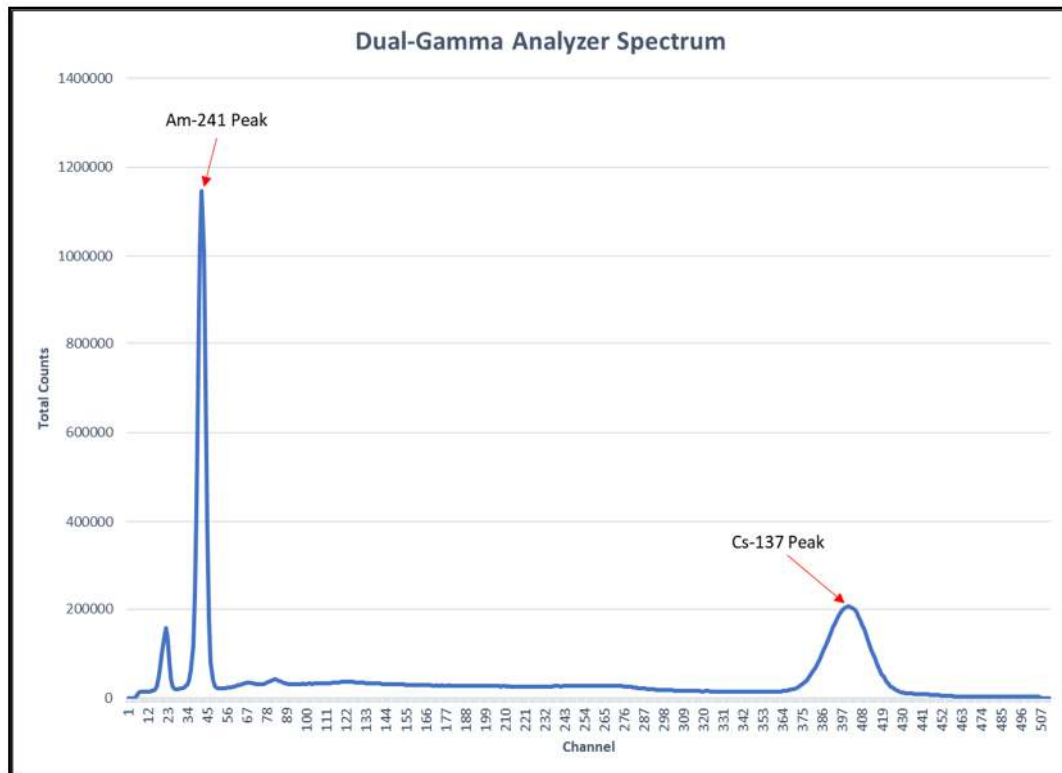


Tachometer

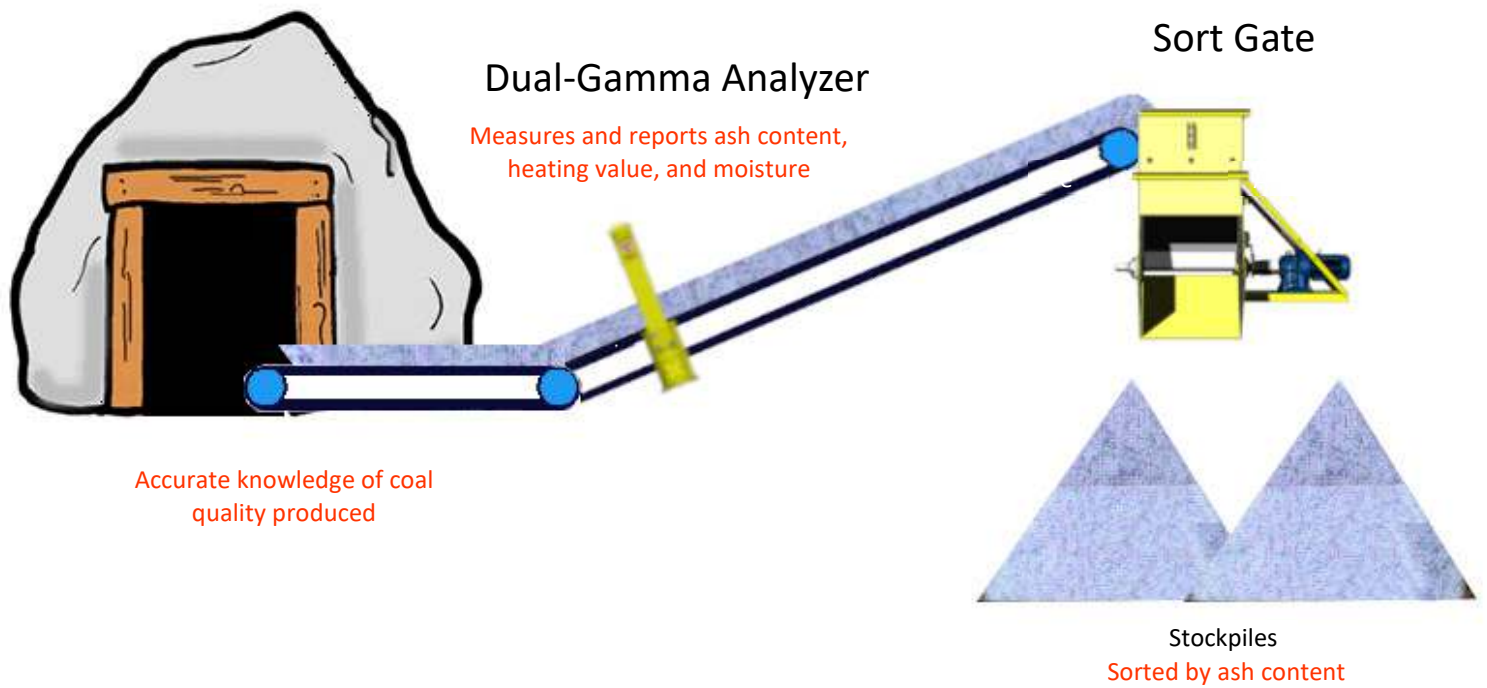
The tachometer is an optional device wired back into the input/output control modules. The tachometer provides belt moving, stopped, or speed information so analysis does not continue (weight accumulated) when the conveyor belt is stopped.

OPERATION

The measurement principle is based on the different attenuation characteristics of gamma particles as a function of energy. This difference depends on the atomic number of the measured material such that the gauge response can be interpreted as a change in the ratio of groups of elements having different average atomic numbers. The DGA response is calibrated with material samples which have been analyzed by conventional laboratory analysis to determine ash weight percent.



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INSTALLATION AND COMMISSIONING TIMELINE

The production, installation, and commissioning of the Model 410 DGA generally takes approximately one month. This timeline begins after the receipt of the purchase order and includes the following:

- Application for Radioactive Material License
- Site-specific drawing package based on measurements acquired during a site visit
 - Equipment locations
 - Electrical/Communication requirements
- Collect & ship site-specific standards to ETI
- Manufacturing of
 - BMU
 - DAU
- Factory Acceptance Test & Report
- Shipment of equipment to the site
- Radioactive material license issued
- Radioactive material license to the site
- Site Construction
 - DAU installed
 - BMU installed & conveyor belt back in operation
 - Interconnecting conduit & wiring run
 - Power conduit & wiring run
- Start-up
 - Terminate all wiring
 - Install radioactive material
 - Functional testing
- Calibration, Site Acceptance Test, and Report
- Training