



Thermo Scientific CB Omni Fusion Online Analyzers for Mining Industry

The Thermo Scientific CB Omni Fusion online elemental analyzer integrates into a material conveyor and provides a minute-by-minute elemental analysis of bulk raw materials. Online analysis of ores, concentrates and various raw materials allows accurate high frequency process control to reduce process upsets, increase throughput and maintain quality all while extending mine life.

The revolutionary technology used by the CB Fusion was developed and introduced to the cement industry in 1984 by a company based in San Diego, California. The company, originally known as Gamma-Metrics, is now part of Thermo Fisher Scientific and has continued its technology driven legacy by introducing countless improvements to its original analyzer. This unique system analyzes an entire material stream, in real-time, and is not subject to errors and costs associated with material sampling. Thermo Scientific's latest version of the CrossBelt is the CB Omni Fusion® which uses either Prompt Gamma Neutron Activation Analysis (PGNAA) or Pulsed Fast Neutron Activation Analysis (PFTNA) depending on the neutron source selected. The CB Omni Fusion offers a truly unique option to accommodate an isotope, Cf-252,

or a neutron generator as its excitation source. The end user chooses which source best fits their needs. During the entire life of the system, if so desired, the source can be exchanged for the alternate option at any time. The CB Omni Fusion is truly a unique system that provides unparalleled performance, reliability and flexibility to meet the analytical needs of your process.



Features

- Modular design for ease of installation
- Belt widths from 0.6 m (23.6 in) to 1.8 m (70.8 in)
- Variable tunnel heights to accommodate process conditions
- Isotope OR Neutron Generator for excitation
- State-of-the-art electronics
- Comprehensive, flexible user interface-Omni View
- Flexible plant connectivity
- One to four large volume, NaI detectors
- Robust accuracy over varied conditions

Benefits

- Blend, sort and monitor product quality in real-time
- Removes need for continuous sampling
- Extends mine life
- Yields consistent product quality
- Reduces effects of process upsets
- Increases mill throughput
- Reduces energy consumption
- Extends refractory life

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Applications

Thermo Scientific cross-belt analyzer systems are powerful process optimization tools that can be used in many different applications such as:

- Material sorting
- Material blending
- Mine grade control
- Stockpile control

Sorting

Process optimization by effectively sorting materials based on material composition is one popular use of a CB Omni Fusion online analyzer. Sorting can be done based on the economic component of different materials or the concentration of impurities. Optional software can automatically send signals to diversion gates or over-head trippers to place differing materials into locations based composition.

Blending

Another popular use is controlling stockpile or grade chemistry to meet quality targets. Blending in this manner ensures smooth downstream processing and minimizes process upsets while at the same time proving flexibility for mining operations. Whether the stockpile is longitudinal or circular, the CB Omni Fusion allows the producers to achieve consistent stockpiles, with minimal variations within and between piles.

Using optional software, quality control can be accomplished either automatically or with a person in the loop (manually). In either case, the analyzer tracks the chemistry of the stockpile compared to the target chemistry and determines the preferred proportions of the source raw materials.

Proportioning

A primary determinant of pyrometallurgical process efficiency is the chemical uniformity of the feed. Feed uniformity is derived from the precise dosage control of fluxes and slag-builders. Located downstream of the last component addition, a CB Omni Fusion provides the precise control needed to minimize feed variability while at the same time minimizing raw material costs and satisfying multiple quality control targets.

Using optional software, material dosing and proportioning can be accomplished automatically with the system's analysis triggering feed rate changes as frequently as each minute. The optional software accounts for varying time delays from the feeders to the analyzer and can accommodate multiple material sources and control parameters. The control algorithm minimizes material cost and allows the user to define priorities among the different control parameters.

Analyzer Components

Analyzer Assembly

A unique modular assembly and frame easily mounts onto a conveyor belt line. The analyzer assembly contains the neutron sources, detector(s), shielding and support frame.

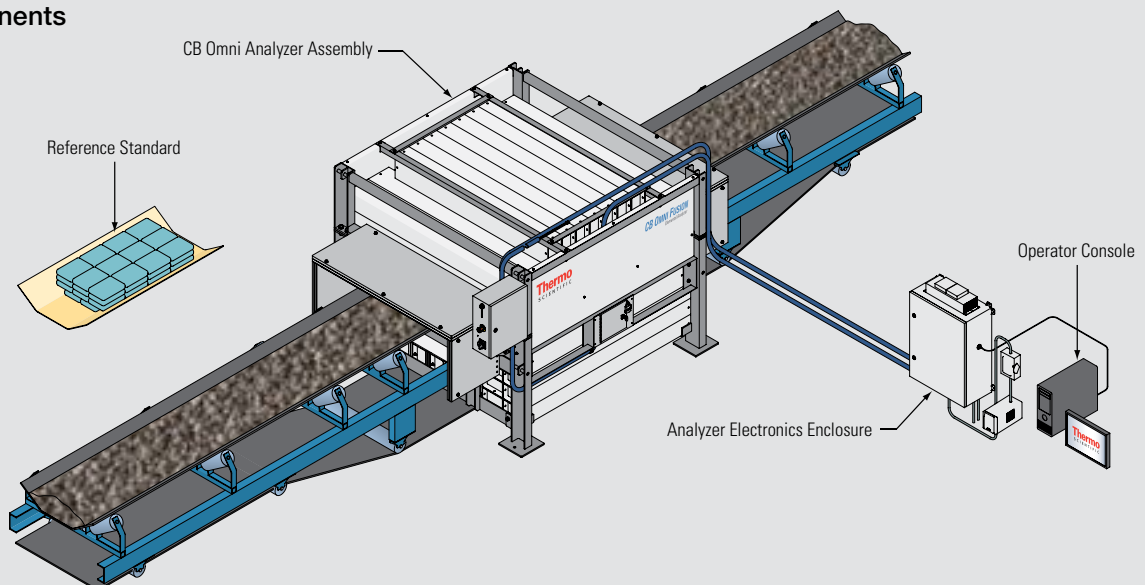
Electronics Enclosure

Advanced, high-speed digital electronics control, process, monitor and exchange information between the Analyzer Assembly and the Operator Console. Electronics are housed in a NEMA 4X enclosure.

Neutron Generator Electronics (optional)

If the neutron generator option is selected, an additional electronics will be mounted to the analyzer assembly. This

Analyzer Components



module contains control electronics for the neutron generator and incorporates all necessary safety features.

Operator Console with Omni View

The Thermo Scientific Operator Console (OpCon) is the user interface for the CB Omni Fusion and runs the unique and state-of-the-art Omni View software package. Omni View processes displays and archives data from the CB Omni Fusion and can be coupled with optional process control software to allow either automated or manual quality control. For additional information please reference individual specification sheets for Thermo Scientific's software options.

Reference Standards

Modular reference standards are used to qualify and monitor system performance.

Unmatched Options and Flexibility

The CB Omni Fusion provides its users with many flexible options. In addition to the ability to select from two different neutron sources, another key capability is the option to specify the number of detectors desired to be used. The more demanding the application, the more benefit may be derived from an increased number of detectors. A typical configuration uses two detectors however depending on application and budget allowances alternate configurations can be specified. The CB Omni Fusion can accommodate from one to four large volume Sodium Iodide (NaI) detectors. As well, detector positioning is adjustable to allow additional optimization per application.

Additional flexibility comes in the form of multiple available configurations to accommodate various process conditions. The CB Omni Fusion is tailored to optimize performance based on a site's process conditions. The tunnel opening of each analyzer is customized to the specifics of the site considering belt width, idler angle, idler dimensions, surcharge angle, production rate, belt loading variation and material size. This practice ensures the highest possible neutron-gamma efficiency for each process which results in enhanced accuracy per a given neutron flux level.

One of the most important features of the CB Omni Fusion is the user interface used to interact with the instrument. Our most flexible and configurable interface to date is the powerful and unique Omni View software. An additional, separate, data sheet is available which describes this unique software package in more detail.

Automatic Belt Load Compensation (ABLC)

The CB Omni Fusion incorporates the unique Automatic Belt Load Compensation feature which ensures analyzer accuracy over a range of changing production rates and belt loading. As the material loading on the belt decreases, the background signal from elements in the conveyor itself grows accordingly. If not accommodated this would cause the analyzer to be inaccurate. The unique ABLC feature ensures that the system stays accurate no matter what loading conditions are encountered.

Information Exchange and PC Interfaces

Integration of an online analyzer into a cement production line generally requires a communication interface with

a plant control network. The CB Omni Fusion is extremely flexible in this regard and is compatible with most major communication protocols. The most popular protocol in use today is OPC. The system configures easily as either an OPC Server or an OPC Client.

Remote Assistance

All Thermo Scientific online analyzers are equipped with the capability to connect to the system from one of our service centers in order to provide rapid interactive assistance. The connection is made via the World Wide Web through an Ethernet connection.

Automatic Diagnostics

In addition to the remote assistance capability described above, the CB Omni Fusion comes with Thermo Scientific's powerful Automatic Diagnostics software.

Auto Diagnostics continually monitors, records, trends and analyzes critical system health parameters and compares the results to normal specification for use by our customer service organization. The information that Auto Diagnostics collects allows our service engineers to rapidly understand and address potential issues well before they become a problem. As well, if an unexpected system failure occurs, Auto Diagnostics provides pre-collected, historical system information that allows rapid diagnosis to help implement a quick repair.

Auto Diagnostic information is routinely monitored on a periodic basis when the system is maintained with a Thermo Scientific Product Support Agreement and if allowed by your information technology department, can send e-mail messages to your local Thermo Scientific service center. If the system is not maintained by a Thermo Scientific Product Support Agreement, information collected by Auto Diagnostics can still be accessed by our organization to rapidly diagnosis the system and effect repairs when needed.

The CB Omni Fusion is truly a unique system that provides unparalleled performance, reliability and flexibility for raw material analysis and control.

Analysis Capabilities

A partial list of materials that can be analyzed includes:

- Ores of ferrochrome, ferromanganese & ferronickel
- Iron Ore
- Phosphates
- Copper
- Industrial minerals
- Sulphide and laterite nickle ores
- Bauxite/alumina
- Limestone

The CB Omni Fusion system measures and reports these elements*:

Ag, Al, Au, Ca, Cd, Cl, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Ni, P, S, Si, Ti, V, Zn and Moisture (optional).

The CB Omni computes various oxides and customer defined ratios and quality parameters. Examples:

CaO:MgO (Basicity), SiO₂:MgO, Ni:Fe, Etc.

*Capability is subject to concentrations being above the limits of detection

CB Omni Fusion Specifications

Specifications

Belt Size	600 mm (24 in)	800 mm (30 in)	900 mm (36 in)	1000 mm (42 in)	1200 mm (48 in)	1400 mm (54 in)	1800 mm (72 in)
Length of Unit	2103 mm (79 in)	2103 mm (79 in)	2103 mm (79 in)	2103 mm (79 in)	2103 mm (79 in)	2103 mm (79 in)	2103 mm (79 in)
Approximate Width	1905 mm (75 in)	1905 mm (75 in)	2190 mm (86 in)	2190 mm (86 in)	2190 mm (86 in)	2350 mm (92.5 in)	2550 mm (100 in)
Approximate Height (Minimum)	1590 mm (63 in)	1630 mm (64 in)	1650 mm (65 in)	1670 mm (66 in)	1710 mm (67 in)	1750 mm (69 in)	1830 mm (72 in)
Approximate Height (Maximum)	1740 mm (69 in)	1780 mm (70 in)	1800 mm (71 in)	1820 mm (72 in)	1860 mm (73 in)	1900 mm (75 in)	1980 mm (78 in)
Weight	5260 kg (11,596 lb)	5260 kg (11,596 lb)	5500 kg (12,125 lb)	5500 kg (12,125 lb)	5500 kg (12,125 lb)	5900 kg (13,007 lb)	6651 kg (14,663 lb)

Standard Physical Specifications

Troughing Angle	35°
Electronics Enclosure	NEMA 4X enclosure; 762 mm H x 610 mm W x 305 mm D (30 in x 24 in x 12 in)
Electronics Connection to Analyzer	Standard 25-meter cable provided
Operating Temperature	-30°C to +50°C (-22°F to +122°F)

Electrical Specifications

Electronics Enclosure	230 VAC 50 or 60 Hz, 7 Amps 3 wire (L1, N, GND)
Operator Console	120 VAC 50 or 60 Hz, 5 Amps 1 Phase or 230 VAC 50 or 60 Hz, 2.5 Amps 1 Phase

Communications

Electronics Enclosure to Operator Console (Customer Supplied)	Fiber Optic 62.5/125 multimode (minimum of 2 fibers) 2000 meters maximum (longer distances optionally available)
Operator Console to Customer	OPC client/server link, major communication protocols, ODBC
Offsite (Remote) Communication	Ethernet connection to World Wide Web (Internet)
Neutron Source	Either a neutron generator or Cf-252, with amounts determined by application and accuracy requirements

Neutron Generator (optional)

Power Supply	Integrated high voltage power supply
Electronics Enclosure Dimensions	490 mm x 178 mm x 178 mm (19.3 in x 7.0 in x 7.0 in)
Electronics Enclosure Weight	Approximately 5 kg (11 lb)

Related Products

Raw Mix Optimization Software (RAMOS), Pre-Blending Optimization Software (PREBOS), AccuLink – Automatic Calibration Software

Find out more at thermofisher.com/PGNAA_PFTNA