

Thermo Scientific CB Omni Fusion

Cross-Belt Online Elemental Analyzer

The Thermo Scientific CB Omni Fusion online elemental analyzer provides a reliable and accurate means of achieving consistent stockpile and raw mix chemistry to improve kiln efficiency and minimize production costs. The unique Fusion system is the only online analyzer in the market place that allows the use of either an isotope, Cf-252 or a neutron generator as an excitation source



Features & Benefits:

Features

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

Benefits

- Delivers consistent clinker quality
- Increases kiln throughput
- Reduces kiln upsets
- Reduces energy consumption
- Extends refractory life
- Extends quarry life
- Minimizes use of highest cost, most expensive materials

In 1984, a revolutionary new way of process control was introduced to the cement industry from a company based in San Diego, California. That same 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. 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 Thermal Neutron Activation (PFTNA) Analysis depending on the excitation source selected. The CB Omni Fusion offers a truly unique option to accommodate either an isotope, Cf-252, or a neutron generator. The end user chooses which source best fits their needs. During the entire life of the system, if so desired, the excitation source can be

exchanged for the alternate option at any time. The CB Omni Fusion provides the analyzer owner an unrivaled choice to adapt to changing market conditions.

As with previous generations of online analyzers, the system integrates into a conveyor belt line and analyzes, in real-time, the composition of raw materials being transported by conveyor. The system analyzes the entire material stream and is not subject to errors and costs associated with material sampling.

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

Applications

Thermo Scientific cross-belt analyzer systems are typically used in the following applications throughout the world:

- Pre-blending stockpile control
- Raw materials proportioning control
- Material sorting



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Pre-Blending Stockpile Applications

One of the most popular uses of cross-belt online analysis systems is controlling stockpile chemistry to meet quality targets, thus ensuring smooth kiln operation and providing flexibility in quarry operations. Whether the stockpile is longitudinal or circular, the CB Omni allows 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.

Raw Mix Proportioning Applications

A primary determinant of kiln efficiency is the chemical uniformity of kiln feed. Kiln feed uniformity is in turn derived from the precise control of raw mix. Located downstream of the last raw mix component addition, a CB Omni Fusion provides the precise control needed to minimize raw mix variability while at the same time minimizing raw material costs and satisfying multiple quality control targets.

Using optional software, raw mix proportioning can be accomplished automatically with the system's analysis triggering proportioning changes as frequently as each minute. The optional software accounts for varying time delays from the feeders to the analyzer and can accommodate multiple raw mix sources and control parameters.

P 385 Neutron Generator Accelerator Head



Neutron Generator Expertise

Thermo Scientific has been developing and manufacturing neutron generators for more than 50 years. With a proven track record in critical applications such as explosive and WMD detection as well as well logging and reactor starts, Thermo Scientific knows neutron generator technology.

One of our commonly used neutron generators is the field-proven P 385 model, which incorporates the latest in digital control. The P 385 is designed for longevity and lifetime cost savings. The P 385 has high neutron output, modern digital control, advanced functions, excellent economics, and a higher flux at the target plane and end cap. What is more, the P-385 has its high voltage power supply integrated which eliminates bulky, and potentially dangerous, external cables.

The P-385 accelerator head is U.S. DOT exempt, which allows it to ship fully pressurized, simplifying transport logistics and planning

Unmatched Options and Flexibility

The CB Omni Fusion provides its users with many flexible options. One already mentioned is its ability to switch from one excitation source to another if costs, reliability or experience change.

Other options available are the number of detectors that can be specified. The more demanding the application, the more benefit may be derived from an increased number of detectors. The CB Omni Fusion accommodates one to four large volume Sodium Iodide (NaI) detectors. Because raw mix proportioning requires tighter precision and better "repeatability", additional detectors can be specified if desired. Conversely, the modest repeatability needs of analyzers used for stockpile control may often use fewer detectors if desired. As well, detector positioning is adjustable to allow additional optimization per application if desired.

Additional flexibility comes in the form of multiple available configurations to accommodate various process conditions. The CB Omni Fusion can be tailored to optimize performance and fit a multitude of varied processes. The tunnel opening of each analyzer is customized to the specifics of the site considering belt width, idler angle, idler dimensions, surcharge angle, belt loading variation and material size. This practice ensures the most efficiency from its neutron sources, resulting in lower neutron flux levels to achieve a given accuracy target.

Finally, the most important feature is the user interface used to interact with the instrument. Our most flexible and configurable user interface to date is the powerful and unique Omni View software.

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 either 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 notifying us of potential issues with the system. 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.

Analyzer Components

The CB Omni Fusion analyzer system consists of four major subassemblies:

Analyzer Assembly

A unique modular assembly and frame easily mounts onto a conveyor belt line. The analyzer assembly contains the neutron sources, the detector(s), the shielding and support frame. There is no requirement for sun-shade or restricted access to the system.

Electronics Module

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 that can be located outdoors.

Neutron Generator Electronics Module

If the neutron generator option is selected, an additional electronics module for the neutron generator will be mounted to the analyzer assembly. This module contains control electronics for the neutron generator and incorporates all necessary safety features.

Operator Console

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 the individual specification sheets for Thermo Scientific's software options.

Reference Standards

Unique modular reference standards are used to qualify and monitor system performance.

Analysis Capabilities

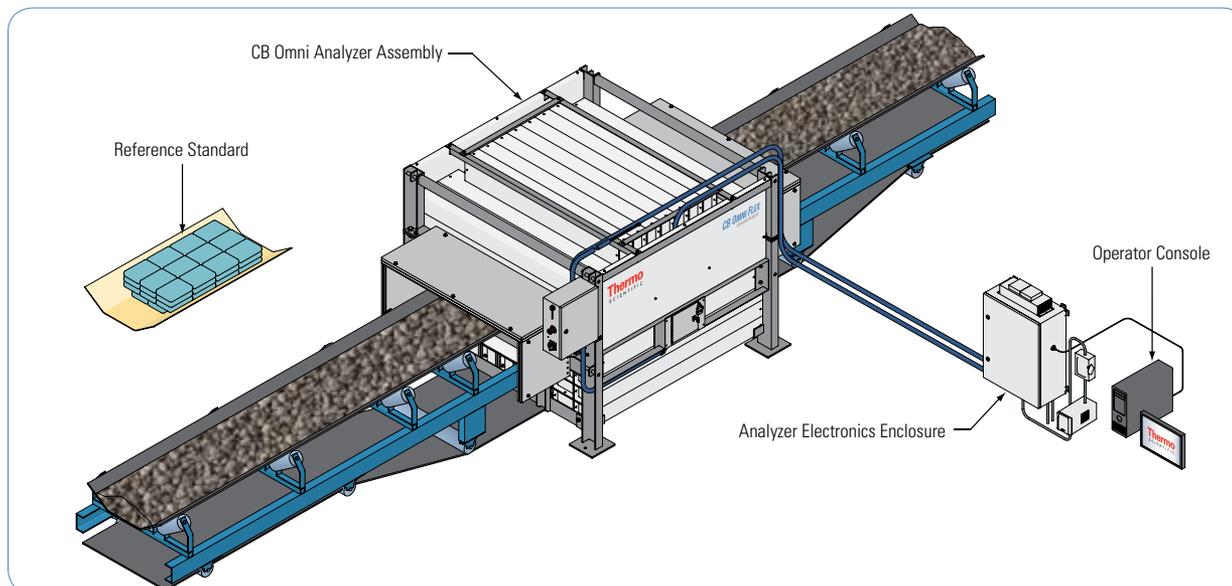
The CB Omni Fusion system measures and reports the following

- SiO_2
- Al_2O_3
- Fe_2O_3
- CaO
- MgO
- K_2O
- Na_2O
- SO_3
- TiO_2
- Mn_2O_3
- Cl
- Moisture (optional)

The CB Omni Fusion computes the following:

- Lime Saturation Factor
- Silica Ratio
- Alumina—Iron Ratio
- Loss On Ignition
- Basicity
- C_3S
- C_2S
- C_3A
- C_4AF
- Total Alkali
- Percent Liquid
- Burnability Index
- Burnability Factor
- Custom Quality Formulas (customer defined)

Analyzer Components



Thermo Scientific CB Omni 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 2 (79 in)	103 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	1590-1740 mm (63-69 in)	1630-1780 mm (64-70 in)	1650-1800 mm (65-71 in)	1670-1820 mm (66-72 in)	1710-1860 mm (67-73 in)	1750-1900 mm (69-75 in)	1830-1980 mm (72-78 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 4 enclosure 762 mm tall x 610 mm wide x 305 mm deep (30.00 in tall x 24 in wide x 12.00 in deep)
Electronics Connection to Analyzer	Standard 25-meter cable provided; Configurable on request
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



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