Heat Eye
On-Line CV Monitor

Bretby
Gammatech
The Heat Eye is a fully on-line instrument providing second-by-second measurement of the Ash, Moisture and Nett Calorific Value (Nett CV) of conveyed coal.

It comprises an Ash Eye fully integrated with a moisture meter (e.g. Callidan or Berthold)

The Heat Eye contains no Radioactive sources – it uses Natural Gamma and Microwave technology.

The new generation Heat Eye is fully modular. The basic Heat Eye is a conveyor mounted instrument providing real-time data to an existing computer control system. An optional Remote Display Unit is available for customers requiring a fully stand-alone system.

**Main Features of the Heat Eye**

- Simple, secure menu-driven operation, with automatic restart upon restoration of power.
- Real-time numerical displays of current ash, moisture and CV along with current shift averages.
- Real-time numerical displays the current tonnes per hour flow rate and the total shift tonnes.
- Up to four calibrations to handle different coal types.
- Up to eight different named coal sources can be accommodated.
- User-definable shift pattern with comprehensive end-of-shift reporting.
- Archival and retrieval of shift reports.
- Two 4 to 20mA Analogue outputs which can be set to any two of the measured parameters.
- Two Relay outputs (c/o contacts) which can be set to operate on a critical system fault, a non-critical system fault, the current ash content below a target band, within a target band or above a target band.
- User-definable quality parameters (target ash and moisture content and desired ash and moisture band).
- Downloading of information to Multi-Media-Card (MMC) or RS232 Serial port to allow more comprehensive user analysis (usually in conjunction with other user-supplied data).
- Optional serial output (RS232/RS485) of the measured parameters and various other house-keeping data for onward transmission to the customer’s computer control system or the optional Bretby Gammatech EyeGraffix software.

**Principle of Operation**

The Heat Eye combines the instantaneous ash and moisture measurements to obtain an instantaneous “total innerts” value. This total innerts value is converted into Nett CV by using a calibration based upon the correlation of total innerts with Nett CV previously measured by conventional means.
Additional Features of Optional EyeGraffix Software

- Connect to up to 25 Ash-Eye/Heat-Eye systems simultaneously
- Alerts user to levels outside of normal limits (ash content, calorific value, etc.)
- Shows a graphical representation of current and historical parameters
- Connects to systems over RS232/RS485 serial communications, Fibre-Optic or Ethernet
- Multiple EyeGraffix terminals can be used in a system using a LAN/WAN network to link together (only one physical connection to each Ash-Eye/Heat-Eye system is required)
- Generation of reports in Microsoft™ Excel or generic spreadsheet format.
- Multiple reports can be configured to be generated automatically at regular intervals and emailed to recipients
- System alerts can be notified to users by email, with the ability to define how long an alert must be active for before being emailed out
- Remote viewing and setting of Ash-Eye/Heat-Eye system parameters and sensor status
- Settings of user defined limits for monitored parameters

Benefits

In blending control systems the good use of the Heat Eye information enables suppliers to produce a more consistent product leading to higher financial proceeds. For example, this can be achieved by adjusting the ash content to counter uncontrolled changes in moisture to provide a product with a consistent Nett CV.

Furthermore, the Heat Eye information enables a supplier to adjust quickly and effectively the blend characteristics to meet the demands of customers requiring different Nett CV specifications.

In power station applications the Heat Eye information can be used to ensure the boilers are fed with fuel with a Nett CV falling within specification. This will ensure maximum boiler efficiency. In extreme cases, Low CV material can be diverted from the boilers, thereby reducing downtime and the associated costs.

Accuracy

The accuracy of the Heat Eye will depend upon the site and the performance of each component sensor. Accuracies of (1σ) better than 0.5% on final product and between 1 and 3 % ash with run-of-mine (ROM) have been achieved with production systems.

Precision

Precisions in the order of 0.5% are regularly being achieved with final product monitors (Measured to ISO 15239)

Applications

- Run of mine (ROM) or raw coal monitoring
- Control of diverting system for out of specification material
- Washed coal – for input to washing plant control system
- In blending control system
- Final Product Monitoring
- Monitoring of coal deliveries at Power Stations, Coking Plants and Cement works
Site Specifications
Conveyor Speed: No limit (usually 1 – 8 m/sec)
Conveyor Width: No limit (usually 800 – 1400 m)
Tonnage Rate: No upper limit*
Bed Depth: No upper limit*
*Mass loadings of <25kg/m should be avoided

Electrical Requirements
240 or 110 VAC, 50/60Hz single phase 5A at both Control Unit and Conveyor site

Environmental Requirements
Operating Temperature: 0 to 40°C
Moisture: 5 to 95% relative humidity (non-condensing)

System Inputs
Tonnage Rate: 0-10V, 0.4-2.0V or 4-20mA
Belt Speed: 0-10V, 0.4-2.0V or 4-20mA or <24V pulse per unit of travel
Or contact closure if constant speed

System Outputs
2 User configurable analogue outputs of any measured or calculated parameter (0.4 – 2.0V)
2 further analogue outputs of moisture (4-20mA)
2 User configurable High/Low Ash/CV alarms (voltage free contacts)
2 further digital outputs for High/Low moisture
Standard Serial output (RS232/RS465)

Shipping Details
Gross weight: 1700 kg (approximate, depends upon conveyor dimensions)
Gross Volume: 5.5m³ (approximate, depends upon conveyor dimensions)

Specifications are subject to change without notice