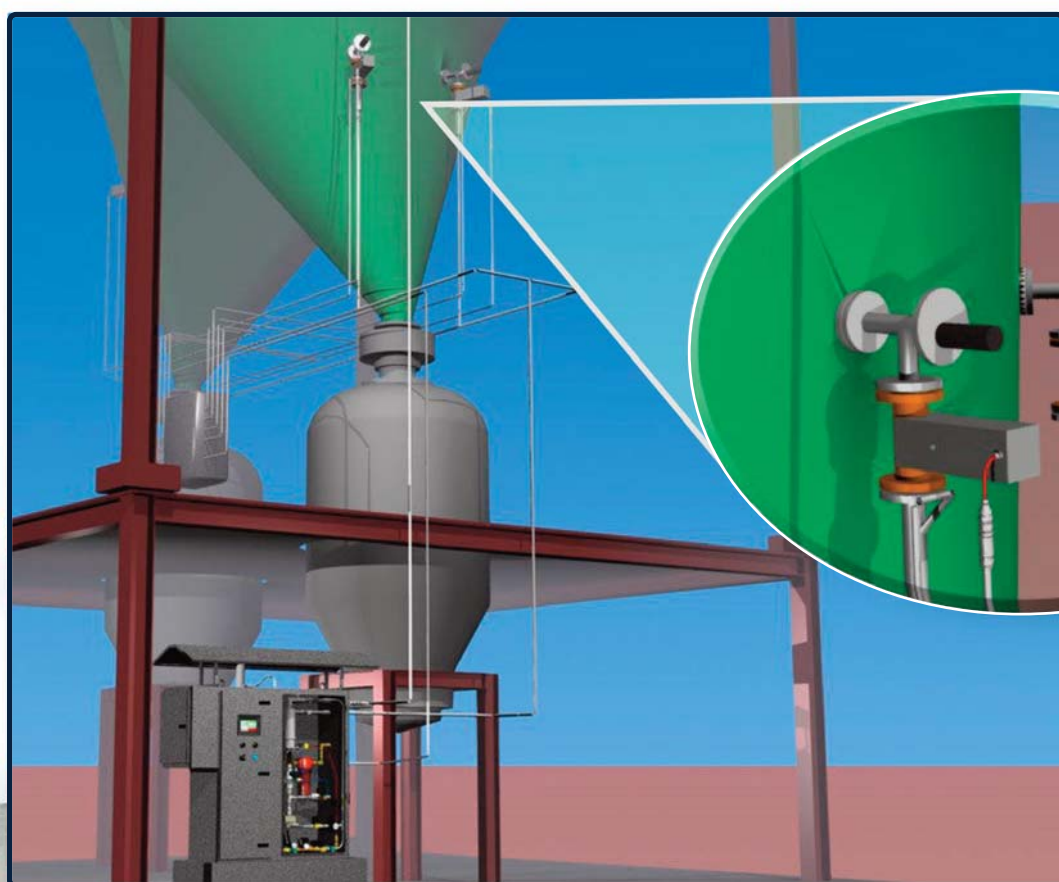


H-CAM[®]

Carbon-in-Ash Analyser

Accurate and reliable carbon-in-ash measurement for optimising plant fly ash sales



“Enhancing the performance of our customers' plant & equipment”

Product Overview

Greenbank's H-CAM[®] carbon-in-ash monitoring system is used by plant operators to monitor, control and optimise fly ash for resale.

The H-CAM[®] will enable plants to minimise waste and prevent the disposal of 'good' fly ash, helping reduce the impact of any land refill taxes where applicable.

The system uses screw samplers to take samples from the fly ash storage hopper through a trace-heated pipe to the H-CAM[®] cabinet. This process keeps the ash flow fluid as the system will automatically and sequentially draw each batch of flyash through for analysis.

The H-CAM[®] uses a large reception hopper below the cyclone that is fitted with level detection to positively detect the amount of ash and continues sampling until sufficient ash has been collected to give a consistent and relative measurement.

Using a unique and patented control process, the ash is fed into the microwave waveguide. The system uses microwave attenuation and phase shift with air compression over a range of 2 to 3GHz to determine the level, in percentage terms, of unburnt carbon of the sampled fly ash.

The H-CAM[®]'s unique ash compression technology and density compensation measurements allow the equipment to accurately measure high carbons in fly ash when co-firing with coal such as biomass and petroleum coke.

Once measured, the sampled ash is then purged from the cabinet back through the system to another hopper or into an optional sample jar for lab analysis.

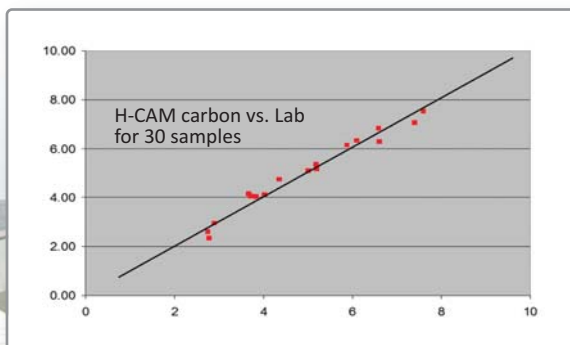


"It is our vision to excel and lead the world in our area of expertise"

H-CAM® Benefits

H-CAM® Benefits and Advantages

- Very low annual maintenance, backed up by optional full service contracts on an annual or multiple year basis.
- Bulk samples can be typically turned around in under 5 minutes, allowing high resolution for process control of varying fly ash quality in ash transport systems.
- Screw samplers have a low duty cycle and only run in one rotation, which significantly reduces wear.
- Convenient sample output on side of machine for laboratory to perform secondary measurements, for example, ammonia content.
- Full PLC controller and control cards allow for hot swap and ruggedness.
- Fully automated cabinet heating, cooling, and intelligent monitoring of bulk sampler operation.
- Ash flow and system temperatures allow H-CAM® technology to monitor itself and keep the process moving.
- Latest microwave absorption and phase-shift technology with accommodation for ash density variations, deals with all coal types and biomass additions including petroleum coke.
- Ash compression technology with density measurements gives a target accuracy of under +/- 0.5% absolute, for multiple fuel types.
- Fully heated stainless system with level sensors, vibrators and intelligent control keeps ash moving and system operational.



**H-CAM®
carbon vs.
Lab for
30 samples**

H-CAM® - Leading Carbon-in-Ash Measurement

The microwave technology and process was developed, in 2007, at one of the largest European power stations on a boiler used for both biomass and petroleum coke additives.

The goal was to accurately measure carbon in ash from complex fuel variations having minimal maintenance and maximum reliability.

The technology was proven to be superior to, and more accurate than, all competitor/comparative products.



H-CAM® - How much ash?

The H-CAM® is designed to accept up to 400g of fly ash from a bulk sampler and analyse it in a few minutes.

H-CAM® is designed to connect to multiple samplers, although the recommended base configuration is 3.

Standard Specification

Maintenance

The system is designed to have an annual service with minimal user intervention. The service includes replacement of the cyclone vibrator, internal pinch valves, air filter and reconditioning of the waveguide. The ash sampler's maintenance schedule would depend on duty cycle and technology chosen by the user, typically inspected every year.

Specification

Accuracy:

For 0-10% carbon: $\pm 0.5\%$

For over 10% carbon: $\pm 10\%$ (relative)

Carbon-in-Ash Range: Up to 50% carbon

Ash Measurement:

Microwave absorption & phase-shift multiple frequencies, using patented process and ash compression. 3 processes give superior accuracy.

Sample Representation:

Multiple bulk samplers, each can present up to 400g sample to H-CAM[®] for measurement.

Sampling Rate:

Measurement process and ash handling in under 5 minutes. Total time dependent on bulk sampler operation.

Outputs to Plant:

Up to 4 x 4-20mA current outputs for % carbon per sampler. Typical 3 samplers per cabinet standard option. Or Modbus via TCP/IP for other features, e.g. alarm, sampler in operation.

Control System:

National Instruments industrial controller.

Sampling System



Air Consumption:

60-100psi service air at 60CFM usage max.

Layout of Samplers:

Up to 30 metres between samplers with centrally located cabinet. Can accept most bulk fly ash screw samplers.

Control Valves:

Long-life high temperature pinch valves isolating bulk samplers allowing sequential operation.

Ash Transport:

Samplers and transport controlled by cabinet PLC, using compressed air to move ash through a trace-heated pipe.

Heat Tracing:

Sample line bulk samplers to cabinet heat traced, typically 1000-2500W at 110-230VAC, lagged with 50mm ROCKWOOL type insulation and cladded. (Lagging and cladding not included, to be supplied by others.)

Sample Collection:

Option for samples to be automatically collected in sample pot.

Enclosure Dimension:

Typically W1105 x H1215 x D405mm, 2.5mm sheet steel rugged design to IP65.

Environmental:

Floor mount with cabinet cooling, 0-50 deg C, 95% RH.

HMI:

IP65 industrial colour touchscreen on door.

Cabinet Power:

110-230VAC2000VA



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