

GTA – Series Gamma Transmission Ash Analysis



Triple-Energy-Method: Iron Compensation

The most popular method for online ash determination of coal is the dual energy gamma ray transmission method with the isotopes Am-241 (60 keV) as low energy and Cs-137 (660 keV) as high energy source. The absorption is for both energies proportional to the area weight. However, at low energies the absorption is additionally dependent on the atomic number of the transmitted material.

The elements of the ash have a higher atomic number, than the elements of the coal. Therefore the absorption of the americium transmission line depends on the ash content and the system can be calibrated in percent ash. The high energy transmission line is used for area weight compensation.

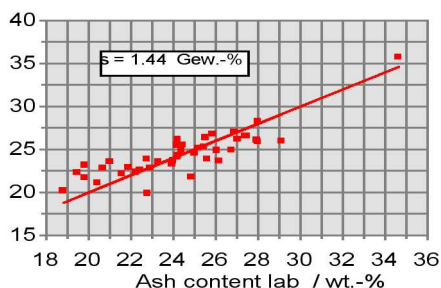
A Dual Energy Ash Meter works very accurate only, if the elemental composition of the ash is constant. However, usually the composition of the ash varies. Critical are variations of elements, with a high atomic number, as calcium and iron, e.g. a change of 1% iron in the coal ash moisture-mixture generates a misreading of 6 to 8 wt.-%, a change of 1% calcium causes a change of about 2 wt.-%

With Indutech's Triple Energy Ash Meter the influence of the iron or the calcium content on the ash measurement is reduced an additional transmission line with a third energy gives the additional information for the "Iron Compensation". This measuring path works with a X-ray tube as source and a scintillation counter as detector.

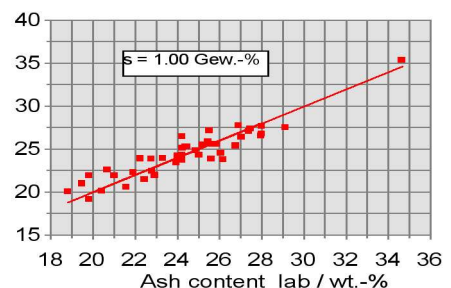
The example shows, that the accuracy of the Dual Energy Ash Meter is remarkable improved by the Triple Energy Method: The standard deviation is reduced from 1.44 wt.-% to 1.00 wt.-%.



Ash Content
without X-Ray measuring path



Ash Content
with X-Ray measuring path



If both, calcium and iron content are varying we suggest one of our OXEA® products, our Online X-ray Elemental Analyzer. Here the elements of the ash are quantitatively determined by using the X-ray fluorescence technique. With OXEA® 600 the exact compensation of all heavy elements is possible.

With one analyzer of the OXEA® thousand-series the complete elemental composition of the ash is determined.

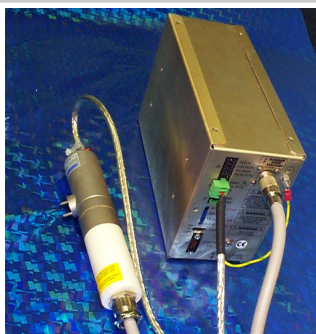
Additionally other elements, e.g. the sulfur content, can be measured.

This technique can be installed at the main belt or at a bypass with a sampling system. The big advantage of the bypass installation is a very easy calibration, as well as a fully overview and control over the accuracy of the analyzer, based on the samples regularly taken by the automatic sampling system.

Components

X-ray measuring path

X-ray tube



dimensions:
300 x 150 x 123 mm•5f

weight approx. 4 kg

cable length (HV) 5 m

Scintillation detector
Sz A1 44/5 X-Ray



weight approx. 6 kg

front end radiation window

OPTION:
side radiation window

X-ray tube control

weight approx. 15 kg

power supply:
230 V AC or 115 V AC

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