

GTA – Series

Gamma Transmission Ash Analysis



Dual-Energy-Method

To determine the ash content of coal on a conveyor belt, the transmission of two gamma-rays with different energies is measured. As radioactive sources ^{241}Am with 60 KeV and ^{137}Cs with 660 KeV are used. The transmitted radiation is detected with high sensitive szintillation-counters.

The absorption of the low energy gamma radiation of ^{241}Am increases strongly with the atomic number of the absorbing material.

The ash consists of elements with a higher atomic number compared to the elemental composition of the clean coal. Therefore the absorption of the ^{241}Am radiation depends on the ash content of the coal.

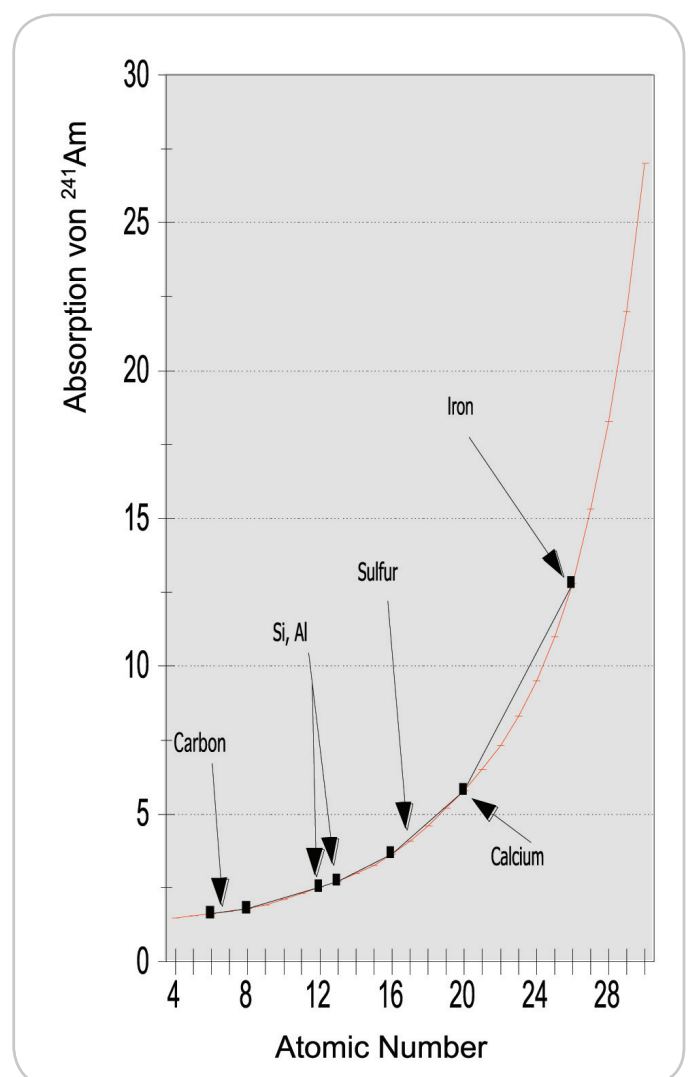
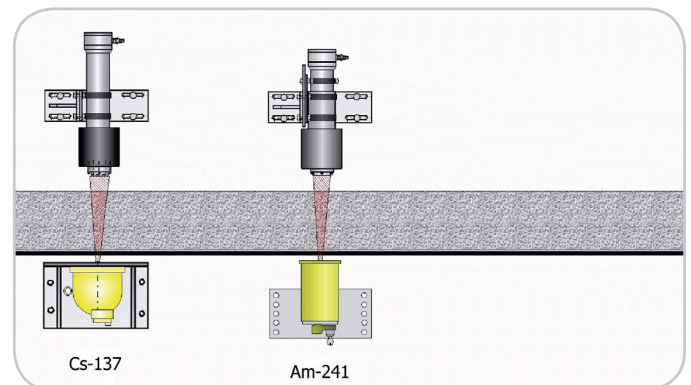
In general the absorption of the radiation depends on the irradiated area weight, i.e. the bulk density and the layer thickness of the material on the conveyor belt.

The area weight is measured by the second gamma ray transmission line with the high energy radiation source ^{137}Cs .

The combination of both signals called "Dual Energy Method" allows to compensate the low energy ^{241}Am -signal for bulk density and layer thickness and to get a measure for the ash content of the coal.

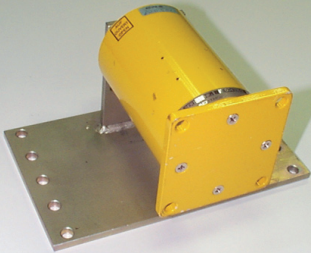
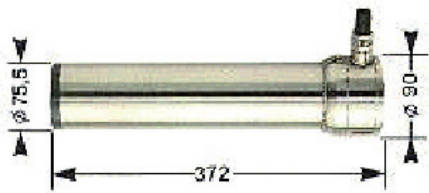
The dual energy method works exactly only if the elemental compensation of the ash is constant. Especially changes of the iron- and calcium content generate remarkable measuring errors.

To compensate these errors, InduTech has introduced several compensation methods. Separate information sheets are available.

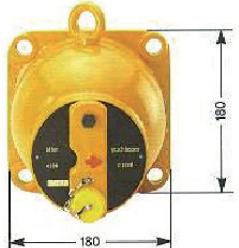



Components

Am measuring path

shielding container Americium		weight approx. 14 kg shielding container equipped with 3.7 GBq (100 mCi) ^{241}Am OPTION: 11.1 GBq (300 mCi) ^{241}Am
szintillation-detector Sz A1 44/5		weight approx. 6 kg front end radiation window OPTION: radial radiation window

Cs measuring path

shielding container LB 7440		weight approx. 31 kg shielding container equipped with a ^{137}Cs source (typ. 370 MBq 10 mCi)
szintillation-detector Sz 5 D1 40/35		weight approx. 14 kg radial radiation window OPTION: front end radiation window

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