

Summary

The properties of respirable dust emitted from the selected plants

Taking into consideration the effect on the environment, economic significance and stable prospects in the domestic economy, for our research we have chosen systems functioning in power engineering, coke, metallurgical and cement industries.

The technical condition was identified and arrangements were made regarding the scope of measurements and investigations as well as the manner of their conducting in the following facilities: PEC Gliwice, Ciepłownia Nowy Wirek (Heat Generating Plant *Nowy Wirek*), Power Stations in Opole, Siersza, Bełchatów, Cementownia Nowiny (Cement Plant *Nowiny*), Koksownia Przyjaźń (Coking Plant *Przyjaźń*) and Huta ArcelorMittal (Metallurgical Plant *ArcelorMittal*) (former Huta Katowice – Metallurgical Plant *Katowice*).

The grain size composition of dust emitted by power systems fired with hard and brown coal, the clinker production system in the cement plant and the coke oven battery was measured. Dust emitted by stoker-fired boilers and pulverizedfuel boilers equipped with appropriate dust extractors (cyclones, electrofilters and bag filters) and with flue gas desulphurization systems (majority) was examined. The coal burnt in boilers contained 16 to 20% of ash. The content of sulphur in coal was low: ranging from 0,6 to 1,0%. The analysis of coal ashes revealed (when converted into oxides) the dominant share of silica - from ca 47 to 55% and alumina trioxide – ranging from 22 to 27%.

In case of the power boilers and rotary kiln for clinker burning, a measurement of grain size composition of the emitted dust was taken by means of Anderson Mark III six-degree impactor, in the channel transporting the flue gas from the electrofilter or mechanical dust extractor to the chimney chute. The composition of dust emitted by the system for coke oven battery firing was measured in a similar way. The real grain ranges were converted into standardized grain size compositions, so that the grain size composition and the size of emitted dust fractions would correspond to the commonly applied fractions: PM₁, PM_{2,5} and PM₁₀. This enabled determining the emission factors: PM₁, PM_{2,5} and PM₁₀ in a kilogram of dust emitted due to firing a ton of coal in a particular boiler or producing a ton of clinker.