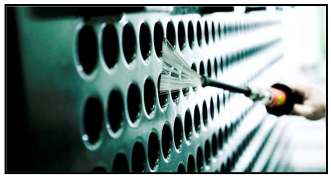
Environment // SNOX™



Are you interested in SNOX™? Perhaps not. Do you know what SNOX™ stands for? Probably not. But don't worry, there are people who do. SNOX™ refers to the substances which are released when energy is produced from coal, oil and waste materials. ”S” stands for sulphur and ”NOX ” for nitrogen oxides.

In Denmark 18% of our electricity is generated by wind power. Meaning that 82% comes from other sources. Some of it is sourced from Swedish water power, but the vast majority of the electricity generated in Denmark comes from fossil fuels: i.e. coal, oil and natural gas.

Only natural gas is completely free of sulphur as it is possible to remove the sulphur before the gas reaches the consumer or is used at the power plant. Unfortunately it's not possible to just remove sulphur from coal before combustion!

That means that the only way to remove sulphur is to clean the flue gases after coal combustion. There are two basic ways of doing this; one involving limestone, the other sulphuric acid (SNOX™). Both methods are well suited to removing sulphur from power station flue gases but each results in a different end product.

The limestone method generates plaster which can be used in construction or disposed of at waste sites. The sulphuric acid generated by the other method is 99% pure and can be sold. This is a useful bi-product as sulphuric acid is one of the most widely used basic chemicals in the world. At the same time the SNOX™ method gives better energy efficiency and less CO_2 emissions than the limestone method.

Sulphuric acid is probably familiar from school science lessons; it's also one of the most important ingredients in artificial fertilizers. No sulphuric acid, no artificial fertilizers and no cheap agricultural products. Sulphuric acid also has a number of other uses including third world sugar production and uranium manufacture for the nuclear industry.

In Denmark there are several power plants that use both methods. Accoat are able to ease the process where sulphuric acid results.

The sulphuric acid method entails oxygenating the sulphur dioxide (SO_2) generated by coal combustion to form SO_3.

The SO_3 thus generated then reacts with water to form sulphuric acid. This last stage of the process take place in a chamber that's heated to between 120 °C and 250 °C. As it's a very strong acid heated to high temperatures, protecting the chamber in which this process takes place is quite a job.

The chamber consists of two thick steel plates coated with Accoat's high-resistance fluoroplast coatings. Between the two steel sheets there are up to 1,000 glass tubes in which the sulphuric acid forms. Altogether an extremely testing environment - unless you're fluoroplast that is.

The sulphuric acid generated runs down the glass pipes and is collected in a tank ready for further transport.

In relation to other processes, coated plates sulphuric acid method has the following advantages:

- The coating means that there is no need for expensive high alloy steels. Accoat make the process possible with less advanced steel types.
- By reducing the cost of SNOXTM processes the chances of additional SNOXTM uptake are improved. If the machinery used wasn't coated far more expensive precious metals would be required.
- When SO3 and water react heat is generated. The heat generated by the SNOXTM process is used to pre-heat combustion air improving power plant efficiency. This improvement reduces CO2 emissions and this reduction is significantly greater than the CO2 emissions generated by the process of manufacturing and applying Accoat's coating.
- Surface coatings improve plate lifetimes in the SNOXTM facility by countering steel plate corrosion such that the facility's individual parts no longer need to be changed so frequently - thereby saving on materials and man hours.

The sulphuric acid method is important in other industrial processes around the world:

- Some specialised metal manufacturing generates large amounts of SO2, especially copper, tin and zinc. Although we might be able to manage without these metals it's hard to imagine a home without lights.
- Petroleum often contains sulphur and increasing numbers of refineries are introducing measures to reduce the sulphur content of their final products. Amongst other things, this reduces levels of SO2 emissions from diesel-powered vehicles.