

## Monitoring and optimizing aluminium production with the **emission measuring instrument testo 350.**



Thanks to numerous advantages such as its infinite ability to be recycled, aluminium is one of the most commonly used raw materials worldwide. However, the production of pure aluminium is very complex, and because of the harmful emissions, is subject to various environmental protection guidelines. In order to be successful in this field, the use of the most modern measurement technology is indispensable.

On the next pages, you can find out how you can use the testo 350 to:

- Record all relevant measurement parameters with one instrument
- Measure even very high CO concentrations
- Efficiently adhere to limit values
- Easily document measurement data

**The challenge.**

The production of aluminium by electrolytic smelting is an extremely energy-intensive process which causes an accordingly high level of emissions. In addition to dust and fluoride (also fluoride compounds), these include SO<sub>2</sub> and CO, which occur due to carbon electrode consumption.

All these parameters must be regularly monitored, analyzed and, if necessary, optimized by those responsible. This is the only way to adhere to the stringent environmental stipulations and to ensure the efficiency of the smelting furnace.

In Germany, the specifications of the "Technischen Anleitung zur Reinhaltung der Luft" (TA Luft) are applicable for the monitoring of emissions in aluminium production. This general administrative regulation defines that the particle emissions in the exhaust gases from the electrolytic smelters must remain below 10 mg/m<sup>3</sup>, and that in addition to this, a mass ratio of 2 kg per mg of aluminium may not be exceeded – including the exhaust gases which are extracted from the furnace house.

For emissions of fluoride and its gaseous, anorganic compounds (hydrogen fluorides), the TA Luft regulates that these may have a maximum level of 1 mg/m<sup>3</sup> in the smelting furnace exhaust gas. With regard to the mass ratio, an upper limit value of 0.5 kg per mg of aluminium is defined. Here too, all exhaust gases which are extracted from the furnace house are included in this value.

In addition to CO, SO<sub>2</sub>, fluoride and hydrogen fluorides, the high combustion temperatures in aluminium production can also lead to high nitrogen oxide values. These must also be monitored and analyzed using a suitable measuring instrument.



Molten aluminium.



Cast and piled aluminium ingots.

### The solution.

The portable emission measuring instrument testo 350 is the ideal tool for professional flue gas analysis. It allows the optimum operation of the anode furnace, the monitoring of the sorption reactor and the control of relevant limit values.

The following parameters are measured on anode furnaces: O<sub>2</sub>, CO<sub>2</sub>, CO and SO<sub>2</sub>. The testo 350 has six slots. There is the possibility of freely placing the gas sensors for CO, SO<sub>2</sub>, CO<sub>2</sub>IR, COlow, NO, NOlow, NO<sub>2</sub> and H<sub>2</sub>S. The O<sub>2</sub> sensor has a fixed position at slot four. That allows this most important measurement parameter to be permanently recorded. This is significant because at low O<sub>2</sub> values, soot formation would influence the quality of the aluminium. All gas sensors can be easily exchanged by the user, as can other wearing parts.

The high dust component in the exhaust gas make the use of industrial probes with pre-filters necessary. They protect the measurement technology from contamination. High CO concentrations which could damage other measuring instruments, are measurable with the dilution option of the testo 350.

Depending on the duration of measurement and the moisture content of the fuel (e.g. natural gas in aluminium production), the testo 350 offers the option of gas preparation. This minimizes the influence of high humidity in the exhaust gas on the measurement results.

#### Flexible and robust

The testo 350 consists of the control unit and the analyzer box. The control unit is the removable control and display unit of the measuring instrument. The measurement values are clearly presented in the colour graphic display of the control unit. The measurement technology is situated in the analyzer box. In the analyzer box itself, the sensors and other components can be exchanged. Thanks to the internal memory, measurement data can be transferred from the analyzer box to the control unit. If required, several analyzer boxes can be simultaneously operated and controlled with one control unit. The robust housing of the testo 350 has an integrated impact protection. Downtimes due to instrument contamination are almost completely eliminated by the durable design. Closed chambers also protect the interior of the instrument from contamination from the surroundings.

As an alternative to the control unit, operation can also be carried out in direct connection with a PC or notebook. After programming, the analyzer box can conduct measurements and store data independently. This increases the efficiency of your measurement routine.

All measurement values can be stored in the instrument and then transferred to the computer and saved for documentation purposes. All this takes place via the practical testo EasyEmission software. All data can of course also be printed out on site.



testo 350: robust and convenient for use in tough surroundings.



**testo 350 – all the advantages at a glance:**

- Guided operation with helpful instrument pre-settings – for even easier measurements
- Large colour graphic display – for increased convenience in bad light conditions
- Insensitive to impact and dirt – ideal for use in tough surroundings

**More information.**

More information on the testo 350, and answers to all your questions concerning emission measurement at [www.testo.com](http://www.testo.com).



The emission measuring instrument testo 350.