Oxygen / Nitrogen / Hydrogen Analyzer ELEMENTRAC ONH-p

General Information

The ELEMENTRAC ONH-p determines oxygen, nitrogen and hydrogen in inorganic samples by inert gas fusion in an impulse furnace with temperatures in excess of 3.000 °C.

The ELEMENTRAC ONH-p guarantees precise and fast sample analysis. The analyzer covers a wide range of applications such as metal, ceramics and other inorganic materials.

The ELEMENTRAC ONH-p can be supplied with up to two infrared cells with different path lengths, accommodating both high and low level oxygen analyses. Nitrogen and hydrogen concentrations are determined in the ELEMENTRAC ONH-p by a robust and sensitive thermal conductivity cell.

Application Examples

alloys, cast iron, ceramics, copper, refractory metals, steel, ...

Product Advantages

- simultaneous oxygen/nitrogen or oxygen/hydrogen determination with inert gas fusion technique
- NEW: closed gas management and optimized gas circulation for sensitive ONH determination
- NEW: use of cost efficient argon as carrier gas possible
- NEW: powerful catalyst furnace for precise oxygen measurement
- NEW: gas flow system with electronic gas flow control and new leakage test
- NEW: water-cooled sample port system for effective removal of atmospheric gases
- flexible configurations and measuring ranges for O, N and H
- high sensitivity IR and TC cells with low detection limits
- short analysis time
- powerful 8,5 kW* impulse furnace for temperatures in excess of 3,000 °C
- economic analysis of grains without capsules
- NEW: chemicals and tubes are hidden behind a door (removable)
- NEW: powerful software (supporting data and application export, comment fields, and many more)
- single and multipoint calibration (linear regression)
- NEW: cooling via tap water or heat exchanger or chiller
- New design allows operation in production control and laboratory

Features

Measured elements	hydrogen, nitrogen, oxygen
Samples	inorganic
Furnace alignment	vertical
Sample carrier	graphite crucibles

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Field of application	ceramics, engineering / electronics, steel / metallurgy
Furnace	electrode impulse furnace (max. 8,5 KW*), temperatures in excess of 3,000 °C
Detection method	solid state infrared absorption for oxygen thermal conductivity for nitrogen and hydrogen
Typical analysis time	120 - 180 s
Chemicals required	copper oxide, magnesium perchlorate, Schuetze reagents, sodium hydroxide
Gas required	compressed air, helium 99.995 % pure, nitrogen 99.995% pure, argon 99.995% pure (if required), all gases with (2 - 4 bar / 30 - 60 psi)
Power requirements	3~ 400 V, 50/60 Hz, max. 8,500 W
Dimensions (W x H x D)	57 x 77 x 63 cm
Weight	~ 161 kg
Required equipment	balance (resolution 0.0001g), monitor, PC
Optional accessories	carrier gas purification, external chiller, gas calibration unit
-	* limited to 6.8 kw in application settings

Function Principle

Operation ONH-p

Operation of the ELEMENTRAC ONH-p is simple and safe. The samples are weighed on the interfaced balance and the weight is transferred to the linked PC. Manual weight entry is also possible.

Depending on the application the sample has to be placed in a nickel basket or capsule. Granulates or pins made of steel can be placed directly on the sample port without any other tools. Some applications require additional fluxes like tin or nickel, which have to be given in an empty graphite crucible. This graphite crucible is placed on the lower electrode tip and then the analysis is started. Typical analysis time is about 2.5 minutes.

All cell outputs and analyzer parameters are displayed in real time and are saved in a data base along with the results. Of course the results and application settings can be exported. The ELEMENTRAC ONH-p requires minimum maintenance and all particle filters and chemicals which need to be maintained are easily accessible. During daily work a door hides chemicals and filters. It can be removed easily to observe these during analysis.

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Measuring Principle ELEMENTRAC ONH-p

The measuring principle of the ELEMENTRAC ONH-p allows for a wide measuring range. To analyze the sample, it is weighed and placed on the sample port. Flushing with carrier gas prevents atmospheric gas (oxygen and nitrogen) from getting into the furnace.

The graphite crucible is outgassed in the impulse furnace to reduce possible contaminations (e.g. residual hydrogen). After a stabilization phase the sample is dropped into the crucible and melts. Carbon monoxide is produced by the reaction of carbon in the graphite crucible and oxygen of the sample. Nitrogen and hydrogen are released in its elemental form. The carrier gas (helium) and sample gasses pass through a filter before entering a copper oxide catalyst which converts the CO to CO2.

The CO2 is measured by the infrared cells to determine the oxygen content. CO2 and water are removed chemically and the nitrogen content is measured in the thermal conductivity cell. In the case of hydrogen analysis the nitrogen carrier gas and the sample gas passes through a Schuetze reagent instead of a copper oxide catalyst. As an option the less expensive Argon can be used to determinate the oxygen and nitrogen content.