G8 GALILEO

- High-End Melt-extraction Analyzer

Inert Gas Method

Innovation with Integrity

Determination of O, N and H

The market demands

Metals, minerals, and inorganic compound markets demand high-quality products. But all solid materials are influenced in their reactivity and mechanical properties by certain specific chemical elements, either positively or negatively. Therefore there is a need for continuous and rapid monitoring of specific elements, from raw material to finished products. User specifications, standards and product liability all demand the highest level of product monitoring, including ppm levels in:

- Metal production and processing
- Automotive industry
- Chemical and pharmaceutical industry
- Coal processing and oil refinement
- Semiconductor
- and many other industries.

Besides production control, research and development of new materials is of particular significance.

Bruker Elemental analyzers throughout the world optimize control and assurance of precision manufacturing through highly accurate measurements, short analysis times, highly reliable operation and user friendliness. The analyzer with integral processor and external PC for control and evaluation, as well as the peripheral equipment (e.g. balance, printer, extension modules), can be set up individually.

Steel plants and other demanding metal industries require high-perfomance ON/H analysis

Important features

- Fast and accurate analysis, automatic operation
- Precise gas calibration
- Dual IR detector for Oxygen, thermal conductivity cell for Nitrogen and Hydrogen with high resolution and reproducibility
- Melt extraction and optional hot extraction with one analyzer
- Adjustable analysis time for hot extraction
- User defined temperature regulation up to 2500 °C
- Optical temperature measurement and control
- Automatic zero adjustment of all detectors/Automatic Level Control (ALC)
- Automatic optimum range selection for data evaluation
- Automatic furnace cleaning and crucible removal (option)
- Operation and analysis via PC
- Storage of sample information
- Data storage for follow-up assessment of all analyses
- Transfer via FTP or local network connection
- Software-controlled switchover between ON and H analysis

Analysis Software

The analysis software of the G8 GALILEO is structured clearly and simply. All tasks to be performed by software are clearly divided into four different screens.

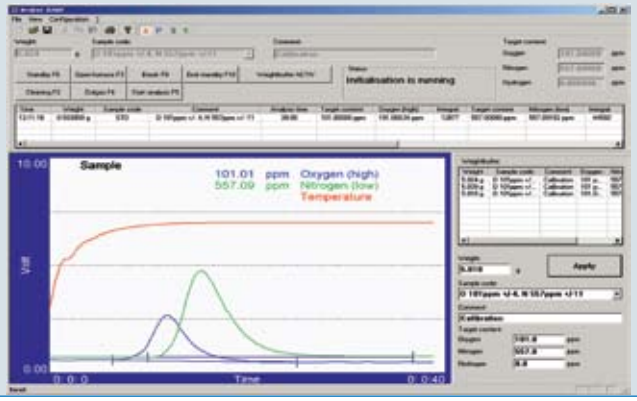
In order to have the most important information available in one view, we separate all necessary information into four major screens. Three of those four screens: Analysis screen, Program Settings and Statistics screen are shown at the right side of this page. Changing views or entering information can be done by mouse or keyboard. Shortcuts support the mouse-less use of the software.

The software supports various brands of balances. Sample weight can be entered manually or transferred directly from the balance to the ONH analyzer via serial interface. An optional autoloader for either 20 or 40 samples is available for automated operation.

At your service

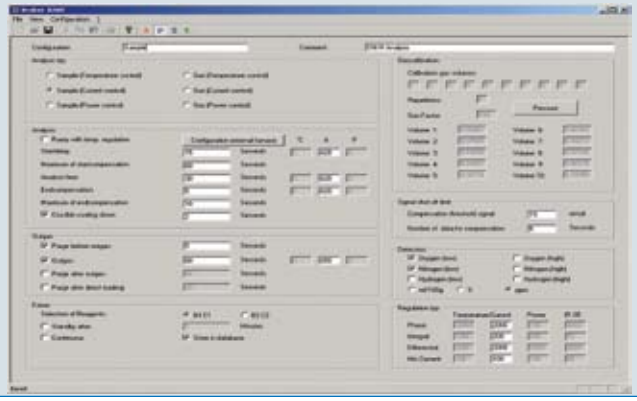
For further information regarding the G8 GALILEO or any of our other instruments please call our local office in your region. We will be glad to assist you with all questions you might have.

Analysis screen



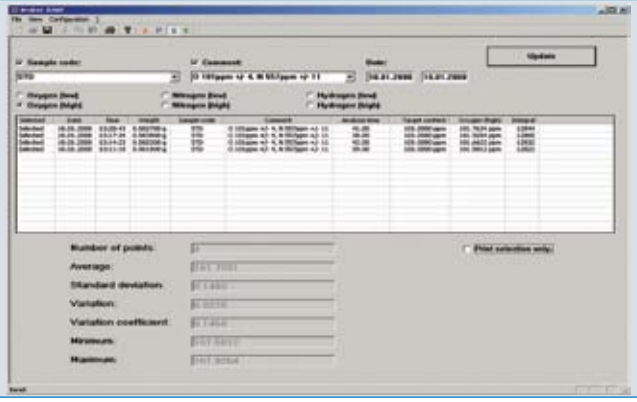
You can perform all analyses and signal performance tasks on the Analysis screen. Current signal data will be presented graphically and the final results will be shown numerically. The results of the last five analyses are shown simultaneously. Even at later times you can call up any information in the result manager on this screen.

Program settings



Program settings allows you to define all necessary analysis conditions, such as parameters for temperature and time for one specific application; which can be stored as user-defined names. It is easy to call up different configurations for each application.

Statistics



The Statistics screen shows the evaluation of all analyses: Values for average, standard deviation, variance, variance coefficient, minimum and maximum values will automatically be displayed on the screen. An attached printer allows the easy printout of all data.

Gas flow diagram

The carrier gas

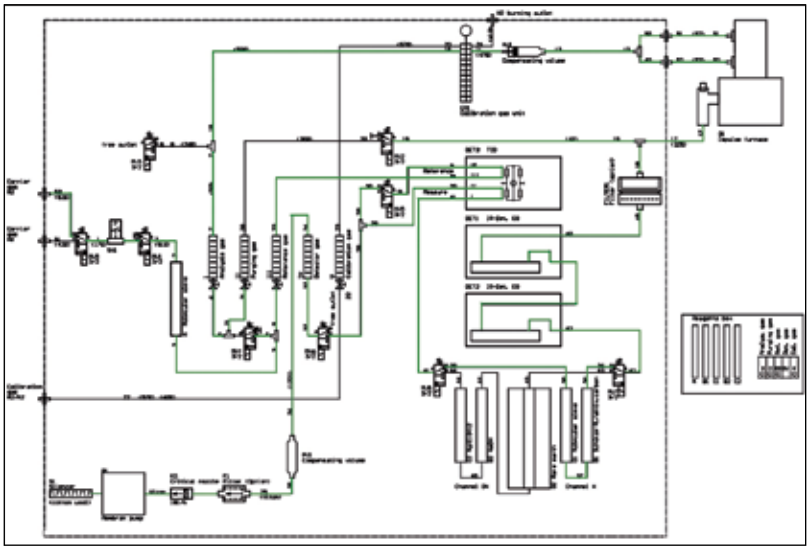
The appropriate carrier gas (Helium, Nitrogen or Argon) for each application is guided into the selected furnace after passing through pre-cleaning reagents and adjustable flow meters.

Using the integrated impulse furnace, the sample is melted and Oxygen, along with Nitrogen or Hydrogen, is analyzed simultaneously. The analysis temperature is user-defined and regulated automatically with temperatures up to 2500°C. The optical pyrometer allows an optimized regulation of temperature during melting process and analysis. Alternatively, other furnace controls, such as current control or power control are available for analyzing the sample.

G8 GALILEO - Applications

Material	O+N	H
Metals		
Steel, Cast Iron	●	●
Pig Iron	●	●
Alloys	●	●
Non Ferrous-Metals	●	●
Aluminium	●	●
Titanium, Ti-Alloys	●	●
Zirconium, Zr-Alloys	●	●
Welding seams		●
Minerals		
Ores	●	●
Ceramics	●	
Glass	●	●
Inorganic compounds		
Salts	●	
Oxides	●	
Nitrides	●	
Other Materials		
Welding additives	●	●

Over the years we have developed many methods for specific customer requirements in our application laboratory. We are pleased to offer you our support. Furthermore, new applications are constantly developed in cooperation with our customers. Due to modular structuring, software adaptations and instrument modifications are possible depending on each customers' specific requests.



The G8 GALILEO can be easily and quickly converted by software from the simultaneous analysis of Oxygen and Nitrogen to the determination of Hydrogen. As an option, an external furnace for determination of diffusible Hydrogen can also be implemented.

For diffusible Hydrogen applications, different models of external furnaces are available depending on the application. Samples up to a diameter of 29 mm (1.1") and a length of 100 mm (4") can be analyzed using the infrared furnace. This is of particular importance to the examination of welding seams according to EN ISO 3690. Since diffusible Hydrogen certified reference materials are not available, the G8 GALILEO offers an optional gas calibration device capable of producing a 10-point calibration curve.

The detection system

The detection system consists of a sensitive infrared detector for measuring Oxygen, with the option of a dual-range configuration, and a thermo-stabilized thermal conductivity cell for Nitrogen and Hydrogen detection. The measuring range is automatically selected and assures that the optimal signal will always be evaluated. All interfering components are filtered by reagents prior to reaching the detector systems. An optimized nozzle always maintains the flow of the carrier gas on a stable level.

Your Benefits

Working principle of the impulse furnace

Different types of crucibles

Cleaning device for G8 GALILEO

Benefits

See how your investment in G8 GALILEO will quickly pay back:

- No blank values of additives
- Less contamination of dust in the furnace
- Simple to use, due to comprehensive software package, including program settings, statistics and calibration
- Reduced operating expenses
- Reproducible analysis conditions
- Cost-saving maintenance
- Easy upgrade to automation
- Substantial time saving
- Different configuration settings for various applications, storable and accessible

Working Principle

Fusion extraction is achieved in a graphite crucible. The analysis is controlled either by temperature, current or power. The temperature is constantly measured by an inertia and contact-free optical sensor, assuring the accurate control of sample temperature throughout the analysis.

Oxygen and Nitrogen analysis is widely used in the steel industry, where small amounts of these elements can sig-nificantly affect product characteristics. Maintaining the quality of steel within production tolerances requires rapid and accurate Oxygen and Nitrogen analysis. Hydrogen has a severely negative influence on all mechanical properties of steel, especially due to pore formation and hot fracture sensitivity and is therefore removed by out-gassing, vacuum melting or vacuum casting.

Hot extraction for the determination of diffusible Hydrogen takes place in an external furnace with a quartz tube.

The G8 GALILEO is available as a single-element analyzer or in other element configurations.

Impulse furnace

The design of the sample port allows the analysis of pieces, chips and drillings without additives. The built-in optical pyrometer measures and regulates the real temperature of the crucible, maintaining constant analysis conditions during the analysis cycle.

Cleaning system and automatic crucible loading system

An integrated cleaning system for the impulse furnace, as well as an automatic crucible loader, is available as an option.

Crucibles

Different combinations of crucible carriers and crucibles permit simple adaptation for different applications.

Our Service to you

We would be pleased to examine your samples in our applications laboratory. We invite you to convince yourself in person of the high performance of our advanced technology analyzers.
Just call us and make an appointment for a demonstration in one of our facilities.

Technical data

G8 GALILEO

Measuring range
(Varying, depending on sample weight)
- Hydrogen:
  0.01 - 1000 ppm
- Oxygen:
  0.1 - 250 ppm
  200 ppm - 0.5 %
- Nitrogen:
  0.1 ppm - 0.5 %

Analysis time
- Approx. 50 sec. for total Hydrogen
  (depending on sample material and weight).
  Up to 60 min. for diffusible Hydrogen

Resolution
- 0.01 ppm

Reproducibility
- +/- 0.05 ppm or +/- 1 % rel.
  depending on sample material and weight

Power supply
- Analyzer 400 V, 7 KVA
- Peripherals 230 V, 800 VA

Carrier gas
- Nitrogen, Argon purity 99.999 %
- Helium purity 99.996 %
- Pressure 2 bar

Compressed air
- Dry, 5 bar

Water cooling
- approx. 4 l/min

Dimensions
- 700 x 830 x 600 mm / 27.5 x 32.6 x 23.6 " (W x D x H)

Bruker Elemental GmbH

Kastellstrasse 31-35
47546 Kalkar, Germany
Tel. +49 (2824) 97650-0
Fax +49 (2824) 97650-10
info@bruker-elemental.com

Bruker AXS Inc.

40 Manning Road
Billerica, MA 01821, USA
Tel. +1 (978) 663-3660 x1212
Fax +1 (978) 667-5993
elemental@bruker-axs.com

www.bruker.com/gas