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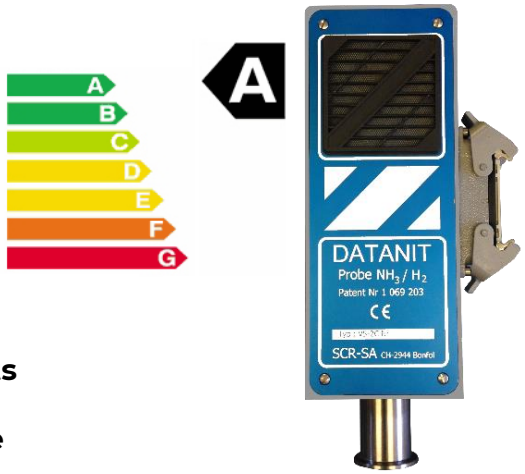
DATANIT Probe



With atmosphere control
Reduce your gas consumption up to 50%

- **For all nitriding and nitrocarburizing treatments**
- **For all types of furnaces including low pressure**
- **Automatic calibration**
- **Reproducibility and traceability of your production**

Description

The Datanit probe has been designed to accurately and continuously measure the following:

- k_N characteristic of nitriding atmospheres
- k_N and k_C characteristic of nitrocarburizing atmospheres

It also measures k_O when oxygen is present, as well as post oxidation.

It works on all types of furnace, including low pressure, and requires no maintenance.
Reproducibility of measurements is ensured by automatic calibration.
The Datanit probe can be used as a measurement system as well as for monitoring by tracing and alarming when the gas composition is dangerous for the load or the installation.
In combination with a PLC, it can also be used to regulate characteristic values for reproducible and reliable metallurgical results.

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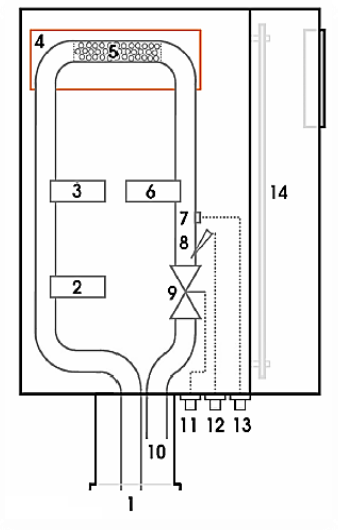
Measurement principle

The Datanit probe consists of several measuring cells that complement each other to measure the composition of the gaseous atmosphere (see figure below).



1. Gas inlet
2. Hydrogen sensor (residual)
3. Oxygen sensor
4. Cracker
5. Heating element
6. Hydrogen sensor (cracked)
7-13. Calibration gas inlet
8-12. Venturi
9-11. Valve

The gas is drawn into the probe by injecting a small amount of nitrogen at high speed (Venturi effect).

A lambda probe determines its oxygen partial pressure.

Then, it passes through a hydrogen sensor, then a cracker and finally a second hydrogen sensor. The difference in hydrogen partial pressure between the two sensors is used to calculate the partial pressure of ammonia.

The partial pressures of the other gases (CO, CO2, N2, H2O), which are - unlike ammonia - in equilibrium in the furnace, are calculated from the measurement of hydrogen after cracking and oxygen.

These measurements, together with the pressure in the furnace, allow the calculation of the characteristic quantities:

where xi is the molar fraction of gas i and P the total pressure in the furnace. The calculations take into account the treatment temperature.

$$k_N = \frac{x_{NH_3}}{x_{H_2}^{3/2}} \cdot \frac{1}{\sqrt{P}}$$

$$k_C = \frac{x_{CO}^2}{x_{CO_2}} \cdot P$$

$$k_O = \frac{x_{H_2O}}{x_{H_2}}$$

Technical specifications

Accuracy

k_N	± 0.01 bar-1/2
k_C	± 0.01 bar
k_O	± 0.01

Measurement area

Hydrogen	0 % Vol – 90 % Vol
Ammonia	0 % Vol – 90 % Vol

Power supply

24 VDC

Fluid

Nitrogen: 4L per calibration
25L per hour of treatment
H_2 / N_2 mixtures: 4L per calibration

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