

Gas Density Sensor optimizes furnace efficiency



Enables manufacturers to comply with CQI-9 and NADCAP requirements by measuring H₂ concentration and monitoring furnace hot zone nitrogen-hydrogen atmosphere composition



Benefits

- Optimizes H₂ concentration required for quality parts
 - Eliminates the need for excess hydrogen as a “processing cushion”
- Reduces scrap
- Improves quality control through continuous monitoring and data archiving
- Allows for additional capabilities such as process advisor, local alarms on upset process conditions, and predictive maintenance
- Enables CQI-9 and NADCAP adherence
- Installs easily in furnace or in sample line

Air Products has developed and patented a novel gas density sensor. Heat treaters are using it successfully, reaping production efficiencies in a variety of furnaces for hydrogen concentration measurement on the hot zone and cooling zone for nitrogen-hydrogen atmospheres.

Atmosphere measurement innovation

A nitrogen-hydrogen atmosphere is the most popular atmosphere for continuous sintering furnaces and is also utilized extensively in annealing and brazing applications. However, rarely is the H₂ percentage of the atmosphere verified analytically. A nitrogen-hydrogen atmosphere ensures the reducing potential of a hot zone atmosphere and avoids oxidation and de-carburization of parts at high temperature. In a furnace, continuous measurement and control of the furnace atmosphere is increasingly important to improve quality control, reduce costs and comply with regulatory requirements and industry standards, such as NADCAP and CQI-9. The Air Products gas density sensor compact design allows it to be installed in minutes in-situ or in sampling lines together with other sensors.

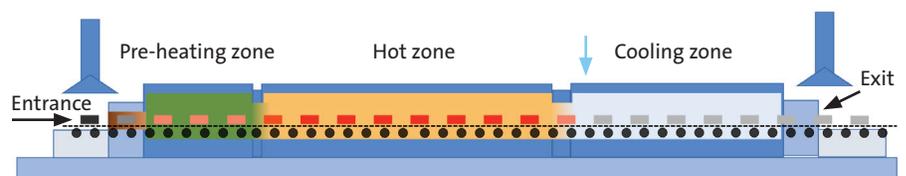


Figure 1. Typical design of a continuous sintering furnace

Wireless data communications and monitoring

Air Products' wireless data communication system can combine temperature, dew point and oxygen signals with the gas density sensor readings. This data can be fed to your own data management system or to the secure Air Products cloud server where you can directly access the data and receive scheduled e-mail or text summaries on your computer or mobile device. Figure 2 illustrates an installation featuring a wireless/cloud-server data storage function.

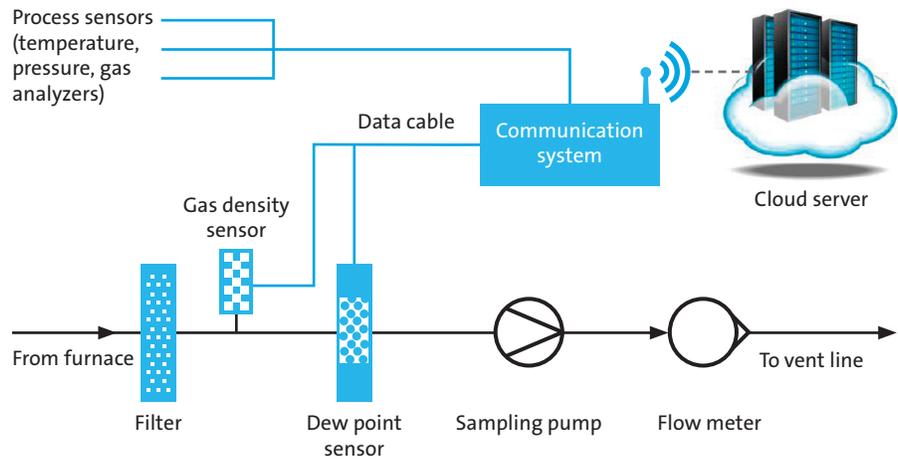


Figure 2. Schematic of hot zone atmosphere monitoring system

Real time reducing potential measurement

The gas density sensor can also complement a dew point and/or oxygen sensor which together can provide a real time value for the total reducing potential of the atmosphere (pH_2/pH_2O). Additionally, the gas density sensor measurements can enable operators to optimize hydrogen flows by providing a continuous atmosphere control function to automatically adjust flow rates of process gases.

Indicates potential maintenance needs

In addition to the process need to measure the H_2 percentage, there are equipment maintenance reasons as well. Continuous monitoring of the exit end H_2 composition between exit end curtain boxes can provide confirmation of good furnace flow balance and provide an indication of curtain wear or condition. Continuous and accurate hydrogen gas concentration measurement is essential to receive high H_2 level alerts at the exit end which may help prevent the risk of an explosion or indicate the need to replace the curtains.

Optimizing your production efficiency for today and tomorrow

Air Products' heat treating experts will work hand-in-hand with you to improve cost-effectiveness and quality standards in your operations, positioning your company to compete in the global marketplace. Audits are available to help our customers realize all the benefits of industrial gases in their operations. Our team has the experience to conduct process reviews and gas supply system sizing evaluations, as well as provide safety recommendations.

Depend on a worldwide leader

For 75+ years, customers around the world have come to rely on Air Products' industrial gases, gas atmospheres, equipment, and technical support to help improve product quality, reduce operating costs, and increase productivity. To learn more about how Air Products can help sintering and heat treating manufacturers optimize their processes, visit: airproducts.com/sensor.

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