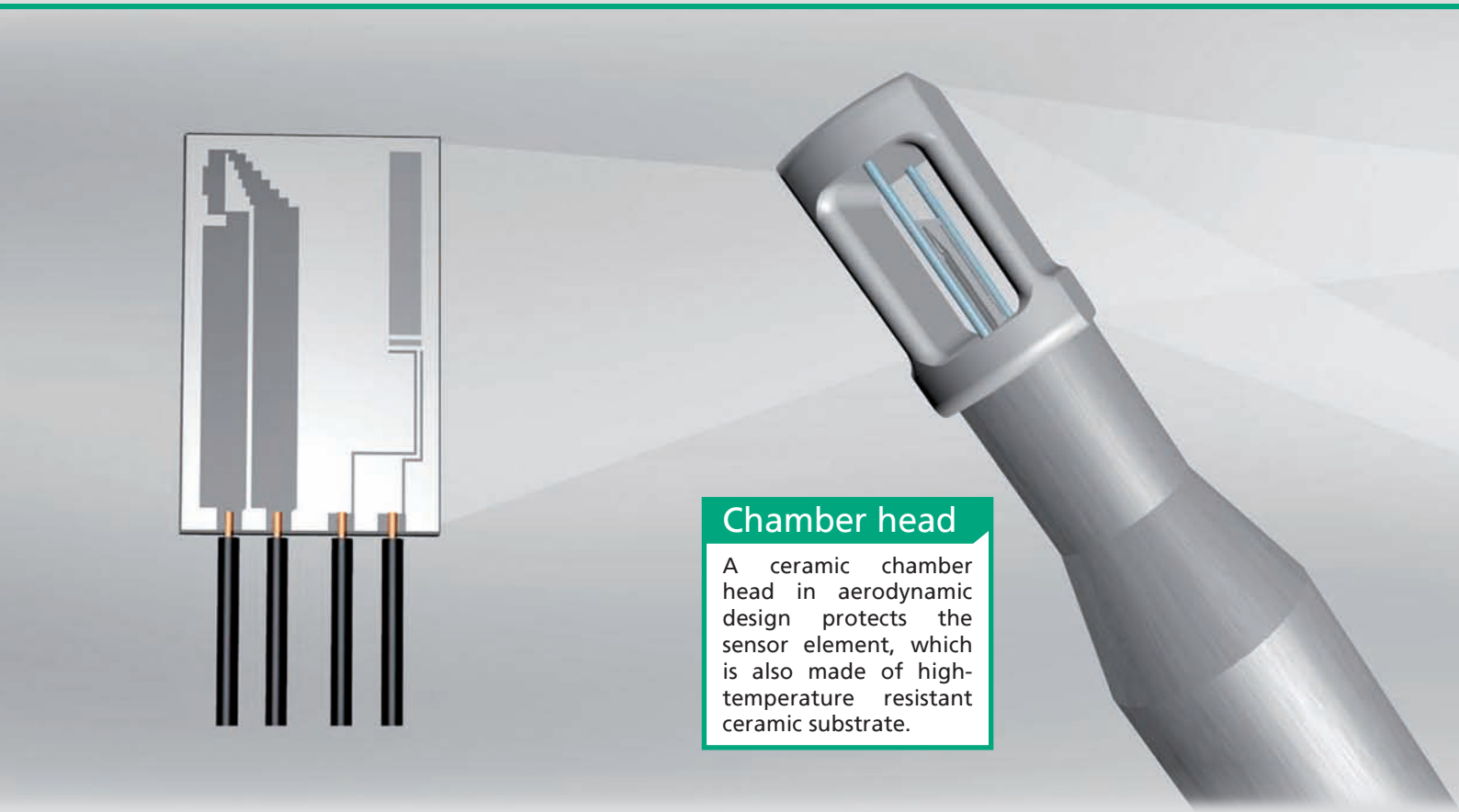
Measurement of volume flows over large temperature ranges

During the manufacture of ceramics, it is imperative to keep defined time periods both for drying and burning and to create an appropriate atmosphere. Otherwise, there is a risk of increased inner tension, faults on the workpiece or insufficient properties. Flow sensors provide optimal control of the burner of a process oven and, consequently, of the atmosphere. One of the latest innovations by Schmidt Technology now enables flow measurement at temperatures up to 350° C, thus representing a universal solution for all the different temperatures prevailing during ceramics manufacturing processes.

During the manufacture of ceramics, the temperature profile within the burning process must be varied according to the raw materials and the desired final product. Moreover, it is necessary to perform the process under reduced atmosphere in order to avoid, for example, discolorations caused by ferrous contamination. This requires precise control of the burner, based on the measurement of flow velocity and volumetric flow rate of the process gases.

In practice, various methods are provided for this purpose. One of them is based on the thermal anemometer principle. With this method, a sensor element is continuously heated to a temperature which is maintained, via a regulating circuit, at a constant value of about 40 °C above the medium temperature. Immersed in a medium to be measured, the sensor element cools down by the air or gas flow. The heat transition from the heating element to the medium is a measure of the medium's flow velocity.

The advantages of this method lie in the measurement of the actual volume flow, without additional measuring variables such as pressure for compensation of measured values, and in the simultaneous measurement of the important variable temperature. Moreover, a thermal flow sensor is very robust, maintenance-free and quick-acting.



Chamber head

A ceramic chamber head in aerodynamic design protects the sensor element, which is also made of high-temperature resistant ceramic substrate.

New materials resist high temperatures

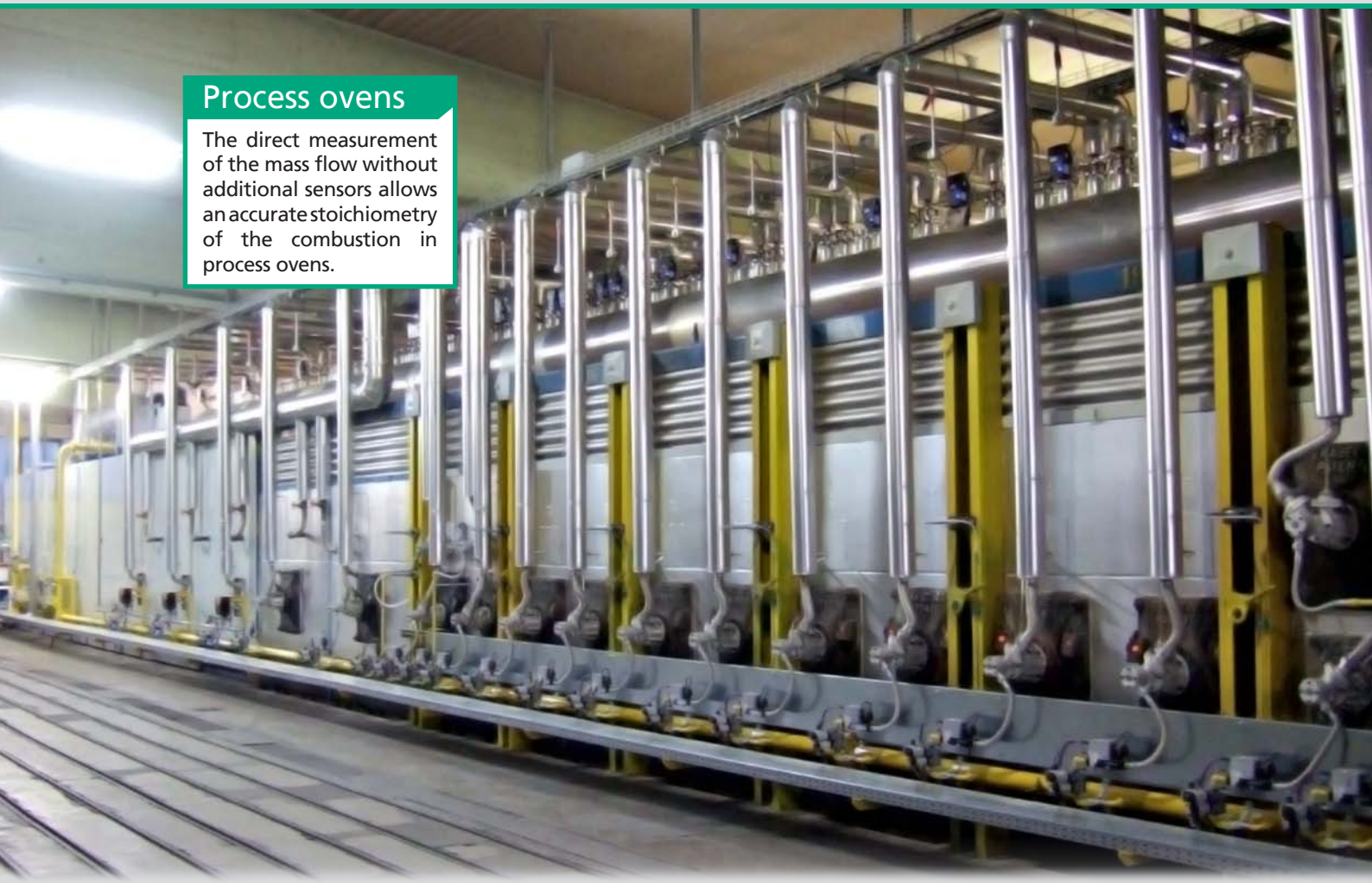
At high temperatures, the use of thermal anemometers has been limited so far. By combining long experience in manufacturing flow sensors with latest technologies and materials, Schmidt Technology has now been able to present a new generation of sensors enabling measurement of the actually prevailing volume flow even at high temperatures.

SS 20.650 is the name of the new product which features special connecting elements and a sensor element made of high temperature resistant ceramic material. The chamber head, which is also made of high-temperature resistant ceramic material, protects the sensor element against mechanical strain or high pressures.

Mounting lengths at customer's option

With a pressure resistance of 16 bar, the flow sensor can now also be used for measurements at a maximum temperature of 350° C. The mounting lengths range from 400 mm to 1000 mm; customer-specific lengths are also available to cope with any installation situation.

Upon request, the sensor can be supplied with high-precision calibration. For this purpose, Schmidt calibrates each sensor against reference measurement channels and records precision and reproducibility in an ISO calibration certificate.



Process ovens

The direct measurement of the mass flow without additional sensors allows an accurate stoichiometry of the combustion in process ovens.

No drift and no maintenance

The SS 20.650 sensor's ability to measure the operating volume flow without using auxiliary variables and calculations and its high dynamic measuring range from 0.2 m/s to 60 m/s extends the application range and ensures high long-term stability without risk of drift and without requiring maintenance. Furthermore, it is the perfect choice for measurements at spots difficult to access.

The fast-acting properties of the high-temperature-resistant SS 20.650 make this sensor the ideal solution for ceramics manufacturers as it can be used universally for the different temperatures prevailing during the burning and drying processes.

More information

http://www.schmidttechnology.com