

## Press release

### **Miniature melt pressure sensor from Kistler – for measurements directly in the nozzle**

New ultra-compact pressure and temperature sensor for smart hot runner and 3D printing applications

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**The Type 4004A piezoresistive melt pressure sensor from Kistler opens up a new chapter in the evolution of measurement technology. Thanks to its front diameter of a mere 3 mm, this sensor can be operated directly in injection nozzles and small extruders: it can measure both pressure and temperature in direct contact with the plastic melt. The 4004A is equally ideal for use with hot runner systems in injection molding, and in additive manufacturing.**

The plastics processing industry is following a clear trend: intelligent molds, injection molding machines and 3D printers are supplying users with the maximum possible information about the process. As well as enhancing transparency, this allows ongoing optimization of the production process.

#### **Precise temperature-compensated pressure measurement**

But now, the measurement technology experts at Kistler have unveiled the innovative 4004A melt pressure sensor: with an operating and measurement range of up to +350°C, it can be used directly in the hot runner to deliver precise measurements of pressure and temperature in injection nozzles and extruders. Thanks to its ultra-compact dimensions – its frontal diameter is merely 3 mm – this sensor can also be installed in small nozzles with no critical changes to injection behavior.

For the two different applications, the 4004A features two separately calibrated pressure ranges that ensure high accuracy: up to 2,500 bar for the hot runner in injection molding, and up to 1,000 bar for additive manufacturing. "The measured melt pressure can be used to control the plant in order to optimize the flow behavior of the plastic melt," according to Dr. Robert Vaculik, Head of BU Plastics at Kistler. "If the process parameters remain constant but there are changes in the pressure signal, that would suggest possible anomalies – deposits in small nozzles, for example, wear in the mechanics or melt backflow. Process monitoring with this degree of accuracy was never possible until now."

## Intelligent hot runner and melt pressure control

The new sensor allows easy access to its internal key parameters via TEDS (Transducer Electronic Data Sheet). Thanks to a sensor diaphragm made of hardened steel and its IP65 degree of protection, the 4004A can be used for applications involving fiber-reinforced plastics. It can also be operated without problems in the medtech and food packaging sectors – no media such as oil or mercury are used to transmit the signals.

The temperature-compensated pressure signal can be accessed via the analog output or the sensor's RS232 interface, so it can be acquired and visualized with measuring equipment such as the ComoNeo process monitoring system by Kistler. Closing words from Dr. Vaculik: "With this innovation, we're offering our customers a digital measuring chain for hot runner and additive manufacturing applications – the key to smarter monitoring of the melt flow in hot runner systems as well as additive manufacturing systems."

## Image material (please name the Kistler Group as picture source)



The new 4004A miniature melt pressure sensor from Kistler allows for measuring pressure and temperature directly in the hot runner at up to 350°C.

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## About the Kistler Group

Kistler is the global market leader for dynamic pressure, force, torque and acceleration measurement technology. Cutting-edge technologies provide the basis for Kistler's modular solutions. Customers in industry and scientific research benefit from Kistler's experience as a development partner, enabling them to optimize their products and processes so as to secure sustainable competitive edge. Unique sensor technology from this owner-managed Swiss corporation helps to shape future innovations not only in automotive development and industrial automation but also in many newly emerging sectors. Drawing on our extensive application expertise, and always with an absolute commitment to quality, Kistler plays a key part in the ongoing development of the latest megatrends. The focus is on issues such as electrified drive technology, autonomous driving, emission reduction and Industry 4.0. Some 2,000 employees at more than 60 facilities across the globe are dedicated to the development of new solutions, and they offer application-specific services at the local level. Ever since it was founded in 1959, the Kistler Group has grown hand-in-hand with its customers and in 2021, it posted sales of mCHF 411. About 7% of this figure is reinvested in research and technology – with the aim of delivering better results for every customer.