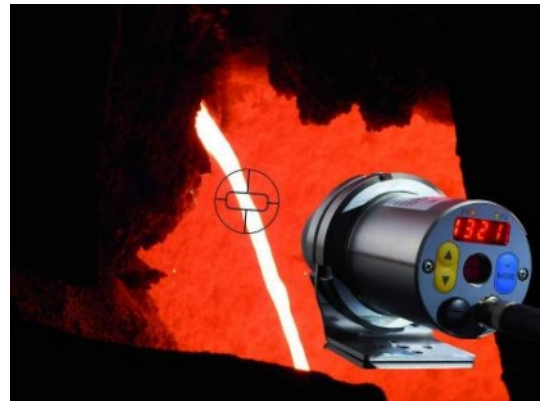


## Non-contact and wear-free temperature measurement of molten metals

Temperature is one of the most crucial process variables in foundry operations. Molten metal which is too hot will damage the sand cores. A temperature which is too low will lead to poor metal flow and may result in bubbles or cavities. The pour temperature also has an impact on the physical properties of the resulting workpiece. Problems often arise during subsequent welding or machining. Even worse is when flaws are not identified until the cast parts have been integrated into other products. These parts will break or wear out prematurely due to material fatigue. That is why, in metal casting, strict compliance with process parameters is so important. This requires precise temperature monitoring and control.



Molten metal temperature is most commonly detected using sensor probes, which are immersed into the liquid mass. Data accuracy is subject to the precision with which the foundry operator performs the measurement, including the depth and position of immersion. Slag deposit on the sensor element may also lead to false temperature readings. The main problem is that the probe is dipped into the molten metal before casting even begins. With the immersion method, a foundry cannot supply proof of temperature for the actual time of pouring.

The CellaCast system is based on a newly designed two-colour (ratio) pyrometer, the CellaTemp PA 83. This technique yields highly reliable temperature readings even in harsh industrial environments with dust or steam. A pyrometer detects the temperature of the stream of liquid metal at a key moment: just as it fills the mould.

CellaTemp PA 83 is unique in that it features a rectangular measurement area. This is achieved by optical means—not by moving parts. When the position or the diameter of the pour stream varies, this will not affect the measurement, because the pyrometer will always capture the target. CellaTemp PA 83 can be factory-equipped with one of four lens options, depending on the requirements of the application. The screw-thread lenses can be precisely focused to the target distance.

CellaTemp PA 83 also features ATD (Automatic Temperature Detection), an integrated function which enables the pyrometer to automatically produce a temperature reading for each mould. Thanks to ATD, interferences such as flames or molten metal drip will not impair the signal. When the measurement process is finished, CellaCast displays the temperature readings and transmits the data via analogue output and digital interface. A visual alarm indicates temperature limit violations.

In sharp contrast to immersion probes, pyrometers do not have parts subject to wear and will thus not generate costs for expendable parts.

With their new CellaCast system, KELLER MSR has made it possible to monitor and document molten metal temperatures – precisely, continuously, automatically, and without wear and tear. The system is employed at the casting channel, at the blast furnace or cupola furnace, at the reheating furnace when the hot metal is transferred into the ladles, and at the casting line when the moulds are being filled.

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