Application report: Temperature detection at rolling mill stands

Today's demand for product quality poses an ever increasing challenge to producers of iron and steel goods. To satisfy requirements, manufacturers must strictly comply with those production parameters so crucial to quality control. In addition, sheet metal manufacturers have in recent years further reduced rolling mill process temperatures.

Rolling mill

To monitor these temperatures in compliance with current industrial requirements, it is imperative that the latest temperature measuring instruments be employed. These instruments must be particularly suitable for this specific application.

The lower threshold of the rolling temperature has been reduced to such an extent that instruments today must be able to reliably detect temperatures as low as 600 °C. Pyrometers are used to accurately detect the slab temperature. The relevant measuring points are subjected to steam and smoke in the atmosphere. To obtain reliable temperature data, two-colour pyrometers must be used. However, not every two-colour pyrometer is appropriate for this task. It is essential that a pyrometer be selected which features a suitable sensor – one that will not be affected by atmospheric disturbances such as steam or smoke.

A two-colour pyrometer detects the intensity of the infrared radiation emitted by an object's surface at two distinct wavelengths. A temperature reading is calculated from the ratio of the two intensities. When the path of radiation between the target and the pyrometer is impaired due to atmospheric smoke, dust or water vapour, the sensor cannot detect the total amount of emitted energy, thus resulting in a weakened signal. A ratio (or two-colour) pyrometer compensates for this interference. The accuracy of the temperature reading will remain unaffected, even when signal attenuation is as high as 50%.

By integrating state-of-the-art sensors, modern signal processing and special optics, KELLER HCW has developed a pyrometer which can reliably detect temperatures as low as 500 °C at rolling mill stands. Due to the spectral sensitivity of its sensor, CellaTemp PZ 40 AF 20 yields accurate temperature readings despite the presence of atmospheric influences such as water vapour. This pyrometer dynamically adapts to the atmospheric conditions so that even when the infrared radiation is obstructed to 90%, it will still be possible to detect temperatures as low as 580 °C.

CellaTemp PZ 40 AF 20 yields highly reliable temperature readings for today's reduced processing temperatures at steel rolling mills and is thus in step with the latest industrial requirements.