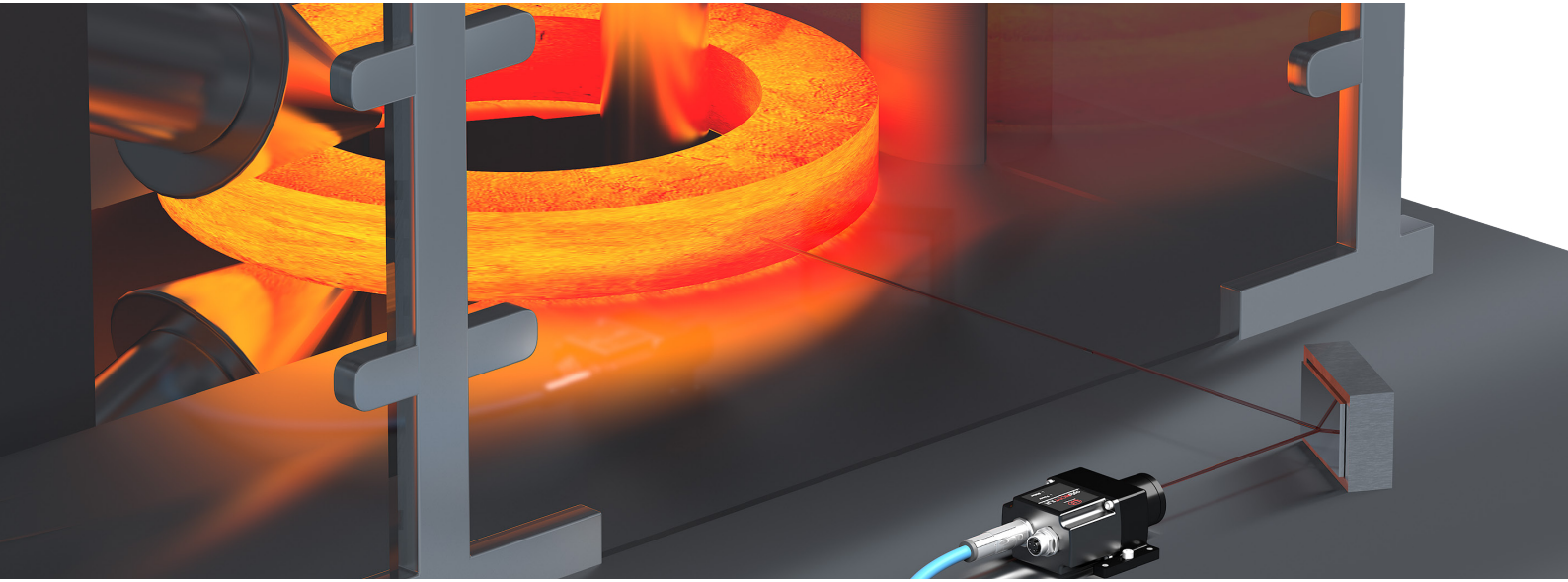




## Diameter monitoring on seamless rolled rings

In the metal processing industry, different materials such as stainless steel or titanium are used. They are seamlessly rolled into large rings at temperatures of up to 1,100 °C by forming. For this purpose the red-hot blank is placed in a ring rolling mill. The diameter of the ring increases continuously due to the rolling process. As only minimal tolerances are permitted, the rolling process must be continuously monitored and the diameter must be measured precisely. Conventional sensors that are mounted close to the measuring object cannot withstand the extremely high temperatures, flaking scale and steam. Therefore, measurements from a large distance are necessary.

optoNCDT ILR3800-100 laser distance sensors from Micro-Epsilon are used for this measurement task. They operate on the phase comparison method, which provides reliable results even on red-hot glowing measuring objects. The sensor is mounted at a safe distance from 1 m to 10 m and precisely measures the distance to the rolled material during rolling. During the production process, the diameter of the ring constantly increases, which reduces the distance from the sensor. The sensor detects this difference reliably and to millimeter accuracy. The generated measurement values are transmitted directly to the production control system via the digital interface. Now the diameter can be calculated as well as the remaining rolling path, which is comprised of the actual volume and the resulting actual dimensions. The results are then transmitted to the control room for visualization.

Laser distance sensors from Micro-Epsilon enable computer-controlled process monitoring with reliable detection of the diameter change during the production process. The excellent linearity in combination with the high resolution makes the sensor ideal for this and similar applications. In addition, its compact design enables simple and fast integration into existing systems.

### Requirements for the measurement system

- Measuring range: 1 ... 10 m
- Resolution: 0.1 mm
- Linearity: < ±1 mm
- Measuring rate: 20 Hz
- Temperature compensation

### Ambient conditions

- Production plant
- Steam and smoke
- High pressure descaling
- High temperatures in the production plant
- Tool cooling

### System design

- optoNCDT ILR3800-100 sensor
- Supply/output cable PC3800
- Protective glass ILR-PG3800

### Advantages

- Non-contact and reliable diameter monitoring during rolling
- Reliable measurement on glowing objects
- Simple and inexpensive integration of the sensor into existing systems
- The sensor is not exposed to high temperatures, scale or steam due to the large distance
- Enables automated production control