

HIPROFILE

Laser Profile Gauge
for hot & cold long products

HiPROFILE



DANIELI AUTOMATION

HiPROFILE

Applications

- > Hot & cold long products
- > Rod & bar mills
- > Light section mills
- > Medium section mills
- > Heavy section mills
- > Rail mills
- > Special profile mills

HiPROFILE is a family of laser based 3D measurement instruments providing non-contact on-line profile shape inspection and dimension measurement for either hot or cold rolled products. From simple rounds, squares and flats through angles, beams, channels up to sheet pile and other special profiles, HiPROFILE provides the optimum solution to improve production performance and quality.

Principle of operation

The HiPROFILE system is based on laser-sectioning optical measurement techniques and image processing algorithms. Geometries, components and design solution of the laser-sectioning heads and of the whole system are optimized to fulfil the requirements of hot steel detection and measurement.

HiPROFILE family is composed by several models, with different measurement head number, sizes and arrangement in order to cover the product mix of different rolling mills.

All the installed heads are synchronized to acquire, at high sampling rate, the contour of an extremely thin slice of the hot-rolled bar. This feature guarantees for a superior blur-free behaviour in presence of the vibrations and transversal bar movements typical of the hot rolling process.

The image of the profile is then real-time processed by sophisticated recognition techniques and software algorithms to obtain the desired shape and dimensional data. The thermal expansion due to the material temperature is compensated by a parametric model linked with steel and product properties, to provide on the fly measures on the hot bar as it will be in cold conditions.

The design of the system is focused to face all the side effects that the measuring of a 1000°C-steel bar involves. Heat managing is obtained by mean of water jackets and water-to-air thermal stabilization concepts, both integrated into the gauge main frame. Disturbances due to infrared radiation that comes with the bar are avoided by a specific optical design, to obtain minimum-noise measures. The lean system architecture that doesn't require installation of additional automation cabinets in control room, can be configured with variable number of accessories like additional operator supervision station, giant display, traffic light and more. A wireless connection is available nearby the gauge to aid during periodic maintenance.

Innovative defect inspection package

Thanks to the high sampling rate, this new innovative package is able to detect the major defects that can be present on bar surface. A graphical map, representing the rolled bar, shows in real time the surface defects when rolled product passes through the gauge. The flaws are highlighted in a real-time 3D representation of the bar.

Features

- > Blur-free profile acquisition and minimum-noise measuring
- > Fully integrated water supplied thermal management systems
- > Fully synchronized laser triangulation heads
- > Control points on the profile configurable by operator
- > No moving parts
- > Wide range of models to fit different product mixes
- > Proved sturdy construction to guarantee long life in harsh environment

Benefits

- > High accuracy with excellent repeatability
- > No physical contact with rolled product
- > Good tolerance to material position changes
- > Immunity to product vibration
- > Defect inspection
- > Immediate on-line dimension measurements
- > Improved rolling tolerances
- > 100% product Quality Certification
- > Fast return on investment

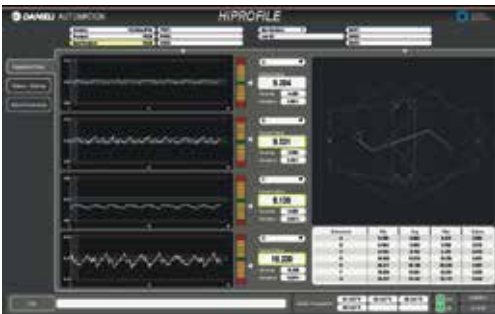
HiPROFILE - Technical specifications

Product dimensions	from 5 to 1,200 mm ⁽¹⁾
Accuracy	down to 0.015 mm
Points per profile	up to 9,200 points/ profile/frame every profile acquisition: up to 2,150,000 points per second
Profile sampling rate	up to 1,000 complete sections per second
Exposure time	down to 20 us

(1) according to gauge model and the number of head



HiPROFILE typical plant installation



System automation screenshots

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