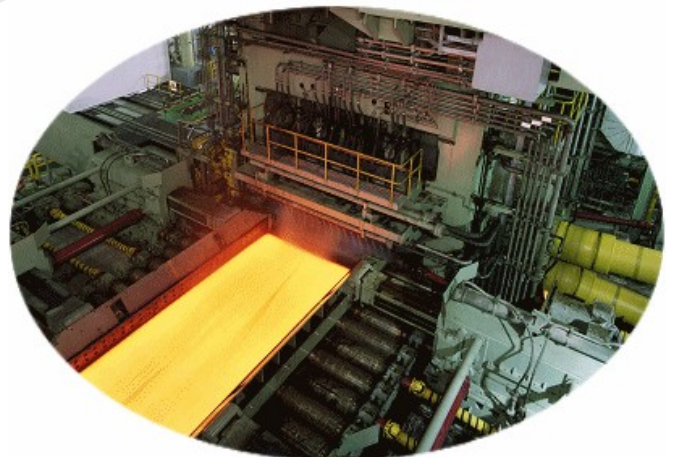


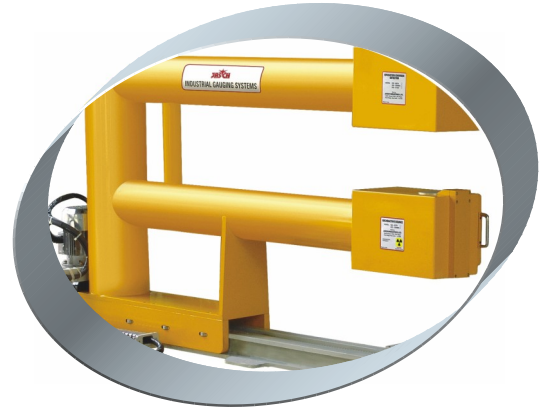


Your Partner for Online Instrumentation

Gauges for the Steel Industry



For all rolling machines used in the steel industry, the basic measurement required is the thickness of the sheet. The measurement is displayed as microns (or mm), which is the basic parameter the operators are using to ensure that their production is always within the acceptable thickness range.



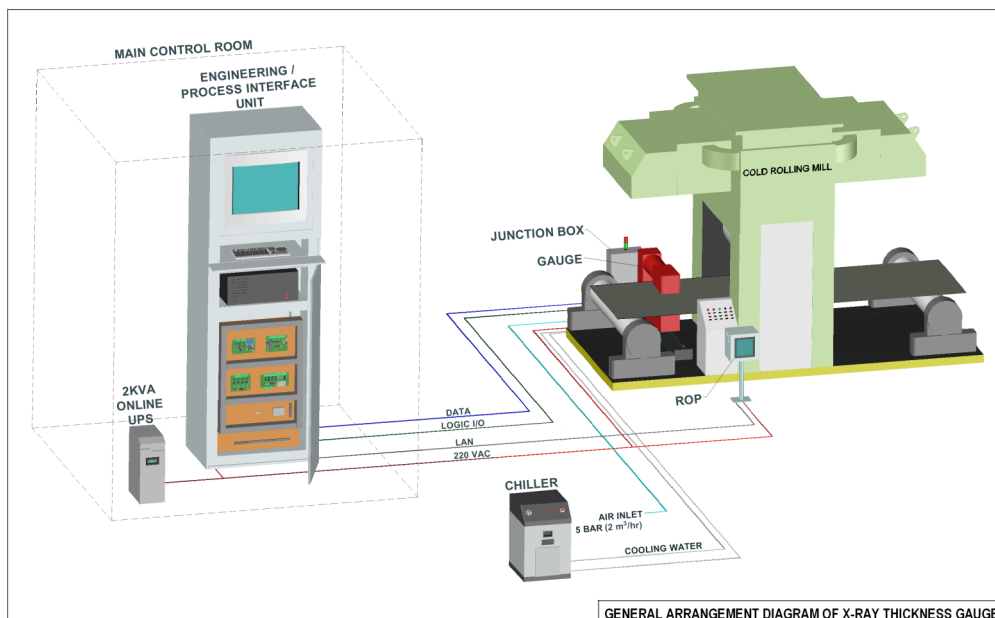
Measuring principle

Our systems for thickness measurement are based on the attenuation of either β -rays or X-rays radiated by the source of known intensity, as it passes through the material. The thickness is determined by sensing variations in the residual energy, compared to reference samples (calibration and alloy correction).

The gauges are designed to be flexible and with open software architecture, without compromising on system reliability, availability ($\geq 99,8\%$) and ease of maintenance: our systems are using the latest in electronic technology and proven heavy duty mechanical components.

System Architecture

The system is designed to concentrate on the most important task of accurate and stable thickness measurements. The sensors are mounted on a precision platform (C-frame) which carries the sensors to the desired position of measurement. The C-frame has all the function control and signal conversion/processing electronics included in a junction box. All measurement data from the gauge is sent digitally via RS485 link to a PC based engineering unit, which processes all measurements, generates running displays, implements calibration tools, display maintenance data and machine operations.



High Quality Construction

The movement platform (tracks) carries the sensors on a C-frame type mounting and continuously measures the sheet thickness. Frame precision and stability are crucial for obtaining proper measurements from the sensors.

The design is based on O-Beam structures welded together to form a "C" shape construction. The resulting C-Frame structure is very strong, rigid and mechanically stable. It is only with this rigid structure that makes it possible to mount sensors and maintain high precision alignment while measuring.

During the manufacturing process, the source and detector boxes are precisely aligned to within $\pm 0.5\text{mm}$ in x, y and z directions. The materials used are chosen for precision and reliability under heavy duty daily use.

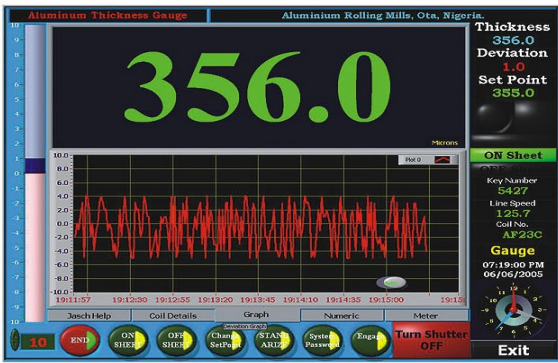
With the rigid C-Frame design, this precision alignment is mechanically locked into the system. The track movement is on heavy duty linear motion system, based on customer requirement of either motorized or pneumatic drive mechanism.



Typical Specifications

- Thickness range: 150 μm to 12 mm
- Source type: X-Ray, 40 kV, 60 kV, 80 kV and 120 kV
- Response time: 10 ms
- Reproducibility: 0,2 %
- Statistical noise: $\pm 0,15\%$ (2σ)
- Drift: $\pm 0,2\ \mu\text{m}$ or $\pm 0,2\%$ in 8 hours

Operator Online Display



The Operator interface is implemented on another PC based system which is connected to the processing system through Ethernet link. The Operator interface is based on Labview™ which is highly user customizable and adaptable to varying mill requirements. Comprehensive production reports are generated for storage and hard copy.

Coating Weight Measurement



The measuring principle is based on the fluorescence produced by reflection from the coated material on which radiation emitted by the X-ray source is projected. The coating weight is determined by sensing variations in the energy radiated by the surface compared to the measured and known pure form of sample value.

Both sensing head contains the source and the detector, which ride above the moving sheet without any friction, mounted on air bearings of special patented design, maintaining an ultra stable cushion gap thickness thus providing accuracy level of that of contacting sensors but without contact type problems.



Coating thickness gauge is a perfect solution for optimizing zinc consumption at any steel coating line. The line trend and value displays, along with control feedback of both sides independently, provide all necessary data for Level 2 interface.





When product fluttering is present, split frames (U-shaped) are designed, for mounting at bridle rolls. Typical location is after the cooling section, but warm and hot gauges are also available upon request. In particular, the hot gauge consists of fixed measuring heads, mounted centerline immediately at the exit of the coating bath, and usefully combined with a classical cold location gauge, to improve the process control significantly.

Typical Specifications

- Coating range: up to 350 g/m²
- Coating type: GI, Galfan, Galvalume, Galvanneal, Aluminium, Tin
- Source type: X-Ray, 28 kV/3W
- Substrate: steel, 120 µm to 4 mm
- Resolution: 0,1 g/m²
- Reproducibility: ± 0,25 % or ± 0,25 g/m²
- Pass line sensitivity: max. 1% for pass line deviation of ±2mm
- Minimum Update Time : 10msec

GalvControl System for Air Knives

GalvControl is a high-speed, adaptive coating weight closed loop control system for Galvanizing, Galvalume and Galvanneal. GalvControl actively monitors and manages the process; reducing coat weight variation between and within coils, and producing a more uniform coating. More uniform product provides a way of reducing the “insurance” margin applied with overcoating and can save significant amounts of zinc.

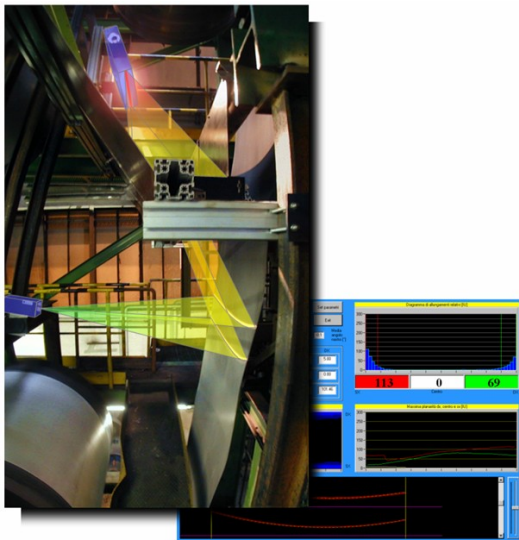
GalvControl utilizes the most up-to-date process control adaptive modeling available to the industry. This unique model allows you to improve and maintain your ability to control, resulting in a more uniform coat weight across all coated products.

GalvControl is available for all major Air Knives systems: Köhler, Fontaine, Posjet,...

ISISS has developed with Italy-based Centro Sviluppo Materiali S.p.A. an agreement to manufacture under license various optical systems dedicated to the steel industry.

Flatness Gauges

The technique of flatness measurement is based on the direct measurement of fibers stretch, expressed in I-UNITS, avoiding the approach based on strip shape determination. The StripPLAN for flatness assessment is based on the direct measurement of fibers stretch, expressed in I-UNITS, avoiding the approach based on strip shape determination.



Two arrangements have been developed, one for matt surfaces (hot rolled steel) and the other for bright surfaces (cold rolled steel). In case of mixed production both solutions can work at the same time.

Main advantages

- Reduction of errors due to material displacement and vibrations
- Complete report of un-flatness for all surface fibers, edge included
- High sensitivity

SurfROUGH is a new technology to detect the profile optically and to measure roughness across materials, even in case of large process speed. System structure is absolutely simple, rugged and reliable.

Output values: Ra, Rq, Rp, Rv, Rsk, S, Sm, Rk, Rpk, Rvk

Roughness range: 0,1 to 20 μm

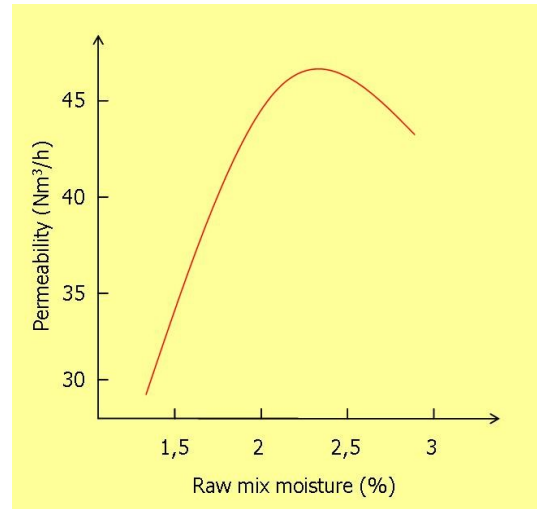
A special version of the SurfROUGH gauge is available for on-line working roll inspection.





ISIS is the exclusive worldwide distributor of the Belgium-based AdvIS gauges, developed for the sinter process.

The **SINWAD** gauge helps at optimizing the water addition to the raw mix, by measuring the sinter permeability. The permeability is related to the raw mix moisture and shows a maximum value depending on the actual raw mix composition, thus enabling the quantity of water to be constantly adjusted to its optimum level. The positive effect on the burn-through point position is also obvious.



The gauge is usually installed in the strand feeding hopper, but it is also available as an off-line instrument, continuously fed by a representative sample of the raw mix.



The **SINCAD** gauge is detecting the iron oxides in the sinter cake, before it is transported to the blast furnace. The level of iron oxides being linked to the proportion of coke in the raw mix, the gauge will help to optimize the coke consumption and control the sinter properties, such as reduction strength (500°C, % < 5 mm) or chemical reducibility.

The SINCAD is the only gauge available on the market for on-line measurement of the FeO content, essential process parameter of the blast furnace operation.

The combined use of the **SINWAD** and **SINCAD** gauges ensures a smooth and efficient operation of the sinter process, bringing significant improvement in the line parameters. Typically, the coke consumption is reduced by 1-3 %, sinter reducibility is increased by 1-3 % and reduction strength is improved by 5-10%.



ISISS can design and implement any solution including laser speed and length gauges, in particular special mounting brackets or cooling jackets for harsh environments (continuous casting, hot strip mills).

ISISS has also specialized in the integration of speed gauges in C-frames used for thickness measurement, thus offering to the customer huge mounting and maintenance cost savings.

In cooperation with partners, ISISS has developed custom made software solutions for elongation (accuracy better than 0,1 %) or mass flow control.

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