Our Passion –
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Strip Thickness Measurement:

X-Ray Gauges RX-90/RX-120

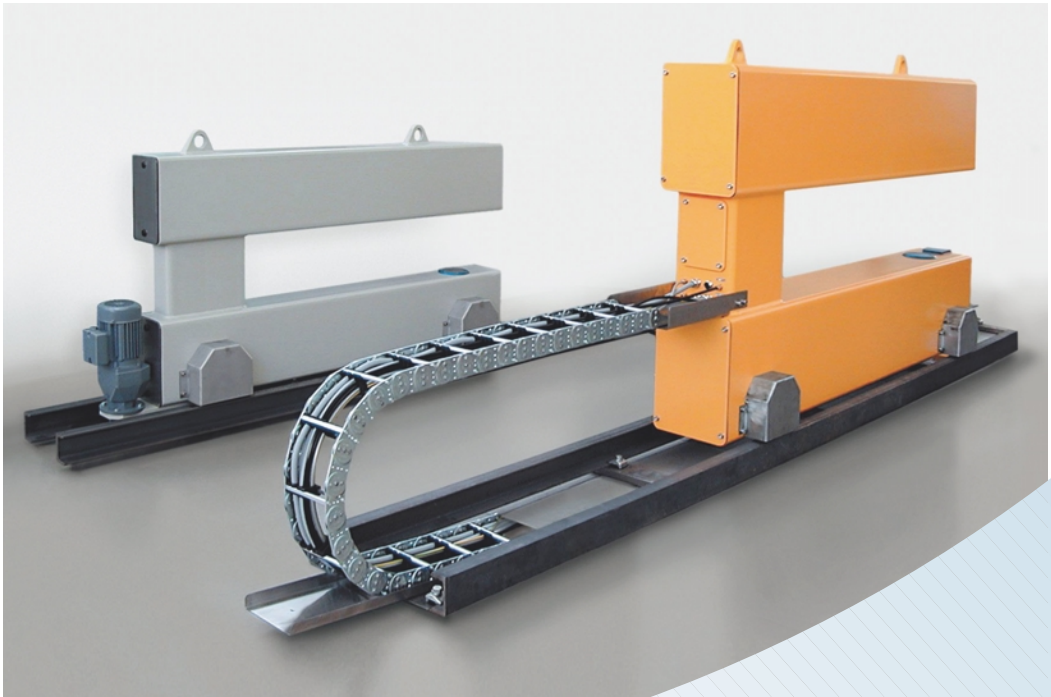
The RX-90/120 product line is the ideal solution for non-contact X-ray thickness gauging of flat products in cold rolling mills and processing lines of the steel and non-ferrous industries and in aluminum hot mills.

The X-ray sources (90 kV or 120 kV) continue the innovative Rayonic concept of integrating X-ray tube, high voltage generation, emission control and the sample magazine in a robust stainless steel casing.

High resolution and fast detectors and a ruggedized C-frame complete the thickness gauge. In the version for static centre-line measurement it provides the primary input signal for accurately controlling the rolling process. Alternatively the thickness gauge can be delivered with a scanning C-frame for cross profile measurement of the strip.

In its simplest configuration the thickness gauge consists of C-frame with X-ray source and detector and one operator station. Extended versions come with a visualization server for connecting several operator stations and for long term data archiving. For reversing mills and tandem lines up to five gauges are combined to a measurement system with common operation and line interfacing.

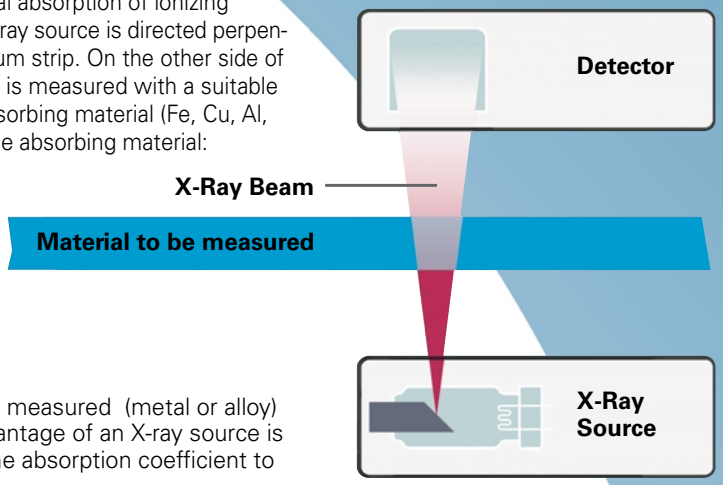
Technical Data			
	Steel	**Copper**	**Aluminium**
Application	Cold mill	Reversing mill	Hot mill
Gauge model	RX-90	RX-120	RX-90
Operating parameters	90 kV / 0.3 mA	120 kV / 0.6 mA	90 kV / 0.3 mA
Measurement range	0.2 - 8.0 mm	0.1 - 8.0 mm	2 - 70 mm
Sample rate	1 ms	1 ms	1 ms
Measurement gap	400 mm	400 mm	500 mm
Accuracy	±0.05 %	±0.05 %	±0.05 %



Principle of Radiometric Thickness Measurement

The radiometric thickness measurement is based on the partial absorption of ionizing radiation in matter. In X-ray thickness gauges the beam of an X-ray source is directed perpendicular at the material to be measured e.g. the steel or aluminum strip. On the other side of the material the intensity of the radiation that passes the strip is measured with a suitable detector. The measured radiation intensity depends on the absorbing material (Fe, Cu, Al, etc.), on the energy of the radiation and on the thickness of the absorbing material:

$$I = I_0 e^{-\mu d}$$



Where

- I is the intensity measured with the material present,
- I_0 is the intensity without material in the device,
- μ is the absorption coefficient and
- d the thickness of the material.

The absorption coefficient μ depends on the material to be measured (metal or alloy) and on the energy distribution of the X-radiation. A big advantage of an X-ray source is the possibility to adjust the radiation energy and thereby the absorption coefficient to the required measurement range and material properties.

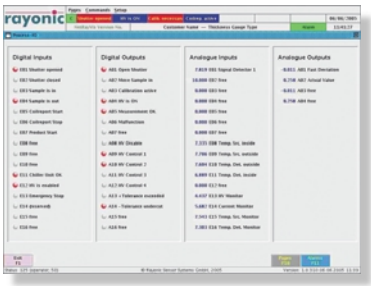
For this reason the radiometric non-contact measurement method provides very precise thickness values at a very high measurement rate for automatic control and quality assurance. X-ray thickness gauges are therefore the first choice for online non-contact thickness measurement in production facilities e.g. rolling mills in the steel and Aluminium industries.

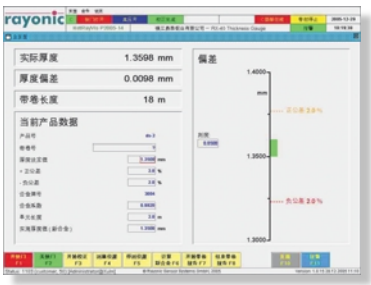
Cost Reduction through Rayonic Gauges

For a fast and precise automatic thickness control in the rolling process the thickness measurement in the strip centre-line position is the essential input value. Our sophisticated well-proven X-ray technology provides fast and highly-accurate thickness measurement for optimizing the mill control.

Advantages:

- Enhanced process stability
- Increased product quality
- Reduction of scrap and operating costs





State of the Technology at Rayonic

1. X-ray sources and sensors in sealed stainless steel housings with thermal insulation and cooling
2. Metal-ceramic X-ray tubes operated at about 30% of the maximum ratings (voltage and power consumption) guarantee high stability and lifetime
3. 24 VDC operation of X-ray sources and sensors because of internal generation and control of the high voltage
4. Electrical shutter for radiation with monitoring of stop positions and movement time
5. Electronic monitoring of the cooling system
6. Ionization chambers with noble gas filling for fast, stable and precise response, long lifetime and high availability
7. Digitizing of measurement signals directly in the gauge-head
8. Process electronics based on an Industrial PLC with all standard interfaces (Ethernet, Profibus etc.) facilitate a fast and cost effective adaption to the mill requirements and integration into the automation system
9. Client-server technology for visualization and long term data storage for the required plant and gauge configurations

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