Quality Assurance Systems

Save money!

Optimise your processes and increase your quality!

Satisfy the ever-growing customer demands in the long-term!
EMG Automation GmbH —
Your partner for perfect quality and processes!

The Company:
EMG is the specialist when it comes to intelligent and complex automation solutions and, in our capacity as a technological leader, we are the supplier of choice for our customers.

The main areas of application for series products, individual components and complex system solutions from EMG include continuous production processes in the metal industries.

As a long-established company and global market leader with more than 70 years of experience, EMG’s Automation division offers its customers complete solutions for their individual requirements. The consultation, joint planning and intensive support measures we provide for our customers right up to the commissioning phase play a decisive role in addition to our purely technical products. In this respect, we focus on process automation and visualisation, as well as on process control and monitoring aspects.

EMG Strip Guiding Solutions:
With our high quality strip guiding systems we provide our customers with safe, low-maintenance and technically advanced components, as well as complete solutions which optimally support their respective technological manufacturing process.

Due to ever increasing quality demands and high availability in combination with reduced operating and maintenance personnel, however, requirements are constantly increasing which has a great impact on the quality of strip guiding systems and their components.

Together with our quality assurance systems EMG Automation provides solutions to increase your process and product quality - all from one source!

EMG Quality Assurance Systems:
The innovative quality assurance systems from EMG Automation continuously optimise our customers’ manufacturing processes and consequently increase production and product quality. We thereby enable our customers to satisfy the ever-growing demands on their end product.

- EMG IMPOC: Online measurement of tensile and yield strength
- EMG SORM 3plus: Online roughness measurement
- EMG eMASS®: Strip stabilisation
- EMG eBACS: Edge mask control
- EMG SOLID®: Online oil layer measurement
- EMG hotCAM: Position measurement on hot strip
- EMG BREIMO: Strip width measurement

Find out more about our strip guiding solutions!
Find out more about our quality assurance systems!
Online measurement of tensile and yield strength
EMG IMPOC

Fields of application:
EMG IMPOC is a tried and tested, magnetic-inductive measuring system for automatic, non-destructive online determination of the mechanical properties (tensile and yield strength) of ferromagnetic steel strip material.

Areas of application include the production of cold-rolled and surface-coated steel strip material, for example, in:
- Hot-dip galvanising lines
- Continuous annealing lines
- Tinning lines
- Continuous pickling lines*
- Processing lines*
*on request

Customer benefits:
- Safeguarding of product quality
- Cutting optimisation
- Increase in yield and material output
- Reduction of destructive material testing
- Statements regarding the degree of recrystallisation

Online roughness measurement
EMG SORM 3plus

Fields of application:
SORM 3plus is an online measuring system that is used for detecting roughness parameters on running strip material. The roughness parameters are an important quality feature of uncoated and surface-refined strip material.

SORM 3plus is a contact-free, online measuring system that can be used for metallic and many non-metallic surfaces at production speeds of up to 2400 m/min.

Customer benefits:
- Safeguarding of product quality
- Control and optimisation of the skin pass and/or rolling process
- Reduction of complaints thanks to an early detection of deviations from the requested roughness range
- Excellent coating results due to a homogeneous surface roughness
- Cost savings in comparison to manual stylus measurement

Measuring accuracy
- **IMPOC value**: +/- 5 % [A/m²]
- **tensile strength**: +/- 5 % of measuring value [MPa]*
- **yield strength**: +/- 10 % of measuring value [MPa]*
  *this accuracy will be reached at 90 % of the measured values

Measuring range
- **strip thickness**: 0.15 – 3.0 mm
- **strip width**: > 500 mm
- **strip speed**: 6 – 900 m/min

Measuring accuracy
- **Ra**: +/- 1 σ = +/- 10 % from measuring value (acc. to gaussian distribution)
- **RPc**: +/- 20 % from measuring value (absolute)

Measuring range
- **Ra**: 0.1 – 3.0 µm
- **RPc**: up to 120 peaks/cm

Find out more about our IMPOC system!
Find out more about our SORM 3plus system!
Online oil layer measurement EMG SOLID®

**Fields of application:**

EMG SOLID® is a system that is used for the online measurement of oil layers on running strip material (SOLID = Surface Oil Layer Inline Determination).

The typical application spectrum of EMG SOLID® ranges from the rolling mill, where the initial application of oil is implemented, to metal processors, for whom sufficient lubrication in the forming process and an oil-free surface before coatings or paintings are applied, are essential.

EMG SOLID® performs an online measurement within the production line to determine the layer over the entire width and length and then visualizes it over the entire measured surface.

**EMG SOLID® IR:**

Within the infrared spectroscopy with EMG SOLID® IR the system emits an infrared light that passes through the oil layer, is scattered back from the strip surface and passes through the oil layer again. In doing so the intensity of specific wavelengths of the oil layer is attenuated. According to the Lambert-Beer law, the layer thickness is then calculated from the logarithm of the absorption.

The used measuring head has been developed by our partner Infralytic GmbH.

**Customer benefits:**

- Unaffected by oil mixtures
- Easy calibration of new oil types and clear oil type classification due to group calibrations
- No falsification through unevenly applied passivation coatings
- Special EMG solution for keeping the lens clean
- High measuring accuracy
- Detection of dry parts and over-oiling

**MEASURING ACCURACY**

- Measuring range 0.1 - 0.5 g/m²: +/- 0.1 g/m²
- Measuring range 0.5 - 2 g/m²: +/- 0.2 g/m²
- Measuring range > 2 g/m²: +/- 10 % from measured value

<table>
<thead>
<tr>
<th>Measuring accuracy</th>
<th>Measuring range 0.1 - 0.5 g/m²: +/- 0.1 g/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetition accuracy</td>
<td>&gt; 0.0015 g/m²</td>
</tr>
<tr>
<td>Measuring resolution</td>
<td>0.01 g/m²</td>
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**EMG SOLID® LIF:**

Via laser-induced fluorescence spectroscopy the system measures the coating weight of the oil layer and visualizes it over the entire measured material surface:

- Special solid state laser delivers 10,000 single pulses per second.
- Robust and flexible quartz fibre bundle transmits the light energy to the measuring spot.
- A second quartz fibre bundle transmits the fluorescence signal to the counting system, in which a photo multiplier detects single photons in a time-resolved manner and analyses them in nano seconds statistically.
- A micro controller controls the analysing system, manages the system calibrations and calculates the results.

**Customer benefits:**

- Low influence of roughness, textures, oil droplets, hotmelt structures, therefore no homogenisation rolls necessary
- Proof of very thin layers < 20 mg/m² in principle possible, therefore usable for cleanliness measurements
- Only very small space required
- Special EMG solution for keeping the lens clean
- Very high measuring frequency (10 kHz) and high definition of measuring spot (Ø = 8 mm)
- Detection of dry parts and over-oiling

**MEASURING ACCURACY**

<table>
<thead>
<tr>
<th>Measuring accuracy</th>
<th>+/- 10 % of upper measuring range value (e.g. measuring range: 0.5 - 2 g/m²: +/- 0.2 g/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetition accuracy</td>
<td>&lt; 0.1 g/m²</td>
</tr>
<tr>
<td>Measuring resolution</td>
<td>0.01 g/m²</td>
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</table>

Infralytic inside

Find out more about our EMG SOLID® systems!
Typical installation positions of EMG quality assurance systems in the process line

- Strip width measurement with EMG BREIMO
- Online measurement of tensile and yield strength with EMG IMPOC
- Online roughness measurement with EMG SORM 3plus
- Electromagnetic strip stabilisation with EMG eMASS®
- Edge-ready control with EMG eBACS
- Position measurement with EMG hotCAM in hot-rolling mills
- Oil layer measurement with EMG SOLID® LIF
- Oil layer measurement with EMG SOLID® IR
Electromagnetic strip stabilisation
EMG eMASS®

Fields of application:

EMG eMASS® is a turnkey system for stabilising high-speed ferromagnetic steel strip material based on electro magnets. The main area of application is to optimise and economise the use of the metal coating at the blow-off nozzle of a hot-dip galvanising line for zinc coating, GALVALUME®* and aluminisation processes.

The system is installed above the air knife and as close as possible to the air knife lip, which wipes off the liquid metallic layer. Based on the experience of more than 60 installations around the world, EMG designs the integration of eMASS® systems for the air knife area in an optimal and customer-specific manner.

*GALVALUME® is a registered trademark of BIEC International Inc.

Customer benefits:

- Homogeneous zinc layer across the width and length of the strip
- Stable pass line of the strip and reduction of the "crossbow" effect
- Narrower air knife gap
- Zinc savings as a result of reduced overcoating
- Targeted and reliable production of low coating weights

Find out more about our eMASS® system!

Edge mask control
EMG eBACS

Fields of application:

In hot-dip galvanising lines the zinc coating thickness is determined by air knives. The metal strip passing through the system is enlarged by so called "baffle blades" in this area to avoid any form of air turbulence, which can lead to damage of the zinc layer around the strip edge. The baffle blades must continuously follow the strip edges, the position of which can change due to swarming of the strip or alteration of the strip width. The inductive edge sensors used with eBACS enable high precision and contact-free tracking of the baffle blades.

Customer benefits:

- Homogeneous zinc coating of the strip edge
- No chipping of the zinc layer
- No deformation of the strip edge
- Inductive, contact-free position measurement
- High-precision edge tracing
- Low maintenance requirements
- Compact integration
- Avoidance of mechanical contact rollers

Find out more about our eBACS system!
Strip width measurement
EMG BREIMO

Fields of application:

BREIMO is the contact-free, optical strip width measuring system for steel strip material in continuously running processes. Consisting of a measuring frame with two sensor positioning devices, the corresponding light emitters and a common linear stroke transducer, BREIMO is an extremely reliable strip width measuring system.

The BREIMO system offers a robustness to external malfunctions. Changes to the strip edge position are continuously detected and taken into account when calculating and displaying the strip width.

Customer benefits:

- Precise and reliable measuring accuracy
- High availability
- Minimum installation space required
- Sturdy, ready-to-install measuring frame according to individual customer requirements
- Reduction in the amount of scrap from trimming (in combination with Strip Width Optimisation EMG SWOp)
- Be sure about your incoming and outgoing material width

<table>
<thead>
<tr>
<th>Measuring accuracy</th>
<th>BREIMO: +/- 0.5 mm</th>
<th>BREIMO-h: +/- 0.2 mm</th>
</tr>
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<tbody>
<tr>
<td>Strip height variation</td>
<td>&lt; +/- 20 mm</td>
<td>&lt; +/- 10 mm</td>
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</table>

Find out more about our BREIMO system!

Position measurement in hot-rolling mills
EMG hotCAM

Fields of application:

The hot rolling process is typically a combination of a reversing stand (roughing stand) and a finishing line with several roll stands.

To ensure process reliability in a hot rolling mill, it is extremely important to maintain a defined position of the strip between the roll stands. The continuous measurement of the strip position enables an optimum adjustment of the rolling force and rolling gap.

In reversing stands this leads to a reduction of the camber of the strip and thus prevents collisions of the strip with the mechanical strip guiding rail.

Continuous control of the centre position in a finishing line also reduces strip guiding cobbles, which could otherwise result in serious damage and interruptions to the production process.

| Measuring accuracy | +/- 1.5 mm |

Customer benefits:

- After realising a closed control circuit (sensor and rollers) based on the measured values generated by EMG's hotCAM system, you, as the system operator, will be able to benefit from the following advantages:
  - Optimum strip positioning in the rolling mill
  - Control of the centre position through optimised adjustment of the rollers
  - Reduction of cobbles between the roll stands
  - Prevention of collisions between the strip and the mechanical strip guiding rail
  - Optimisation of coil quality

Find out more about our hotCAM system!