



Roll coater for Galvanizing Lines and Color Coating Lines

High performance coating for top-class results

High technology for a world on the move.

YOUR CHALLENGE

Markets are much more demanding in the current century than in the previous one mainly due to a high competition and numerous potential sourcing options. As the demand is moving to highest quality standards due to new coating materials, producers have to rank among the world's best to satisfy the high-level requirements at the lowest product cost. Producers attempt to optimize coating layer thickness, improve surface gloss and surface smoothness at minimized amount of material applied during coating operation and hence deliver more substantial cost savings. In addition, plant operators have to fulfil constantly stricter environmental and safety regulations at a minimum impact on production costs.

OUR SOLUTION

The key of roll coater is the newly developed servo-hydraulic roll adjustment called DynaCoater®, which offers a high precision roll coater setting combined with fast reaction time. The servo-hydraulic adjustment system eliminates the disadvantage of common roll adjustments for roll coaters (high maintenance efforts, slow and approximate adjustment of rolls). Clecim has developed this technology based on its high knowledge of hydraulic process control in the cold rolling mill activity. Technology transfer from the Cold Rolling Mill to the coating application was possible utilizing in-depth experience in similar fields of automation, and the implementation stage was facilitated by extensive knowledge in closed loop control.

The results of this development are a combination of Clecim expertise:

- In mechanical aspects: high stiffness of the roll coater base frame and reliable and accurate sliding pads supporting the roll heads for both pickup roll and applicator roll
- In hydraulic field for the actuation system: low friction seals in the hydraulic cylinders and servo-control valves
- In automation control: closed loop control and drive system management



GOOD REASONS TO CHOOSE CLECIM ROLL COATER:

The advantages of our roll coater are emphasized by our approach as an equipment builder to serve our clients and give them a substantial advantage in their market.

- **High productivity** – the fully automatic roll coater reduces set up time, providing high efficiency during transient stages such as paint changes, line speed changes, etc. The quick roll change system ensures minimum maintenance time
- **Reduced operating costs** – the dynamic roll coater is a 'must' in terms of paint saving as the technology provides roll eccentricity compensation, tightest thickness tolerances by hydraulic force control and reduction of uncoated strip on weld passage
- **Highest product quality** – machine stiffness, roll eccentricity compensation, PLC-based fast roll coater head set up, closed loop force or roll position control modes provide optimum coating thickness and surface quality with constant gloss
- **User-friendly operation** – all of our roll coaters have been designed for safe and easy use. Operations are managed through the HMI (Human Machine Interface) or local pulpit. Running mode can be selected from the operator PLC to operate the roll coater in fully automatic or manual control modes
- **Complete workshop testing** – our roll coaters are assembled and tested in our workshop in Montbrison, France. Testing includes mechanical adjustments, hydraulic pressure tests and automation. Every roll coater is fine-tuned to ensure smooth integration into the line

Roll coater technology

innovative solution for high performance coating.

Market constraints drive roll coater technology development to supply state-of-the-art in coating process. Clecim is well aware of market evolution and keeps pace with client requirements.

To this effect, our roll coaters are designed as “mechatronic packages” including all technology aspects such as mechanical, fluids, electrical and automation functions. This modular approach offers the clients substantial benefits as completely integrated solutions.

| FEATURES

The roll coater technology has been defined from the early stage of design and research on the basis of fundamental principles which guarantee coating quality and thickness homogeneity.

To this effect, Clecim has acquired perfect control of:

- Stiffness of frames
- Guiding precision
- Fast hydraulic system
- Control automation

Stiffness of frames prevents extraneous vibrations likely to cause surface defects on the strip. Our design is based on solutions derived from our extensive experience in rolling mills and process lines.

Guiding precision is also essential to achieve top level performance in controlling the coating thickness and homogeneity of strip surfaces. Our technology substantially precludes hysteresis phenomena due to friction during movements of support arms.

Fast hydraulic system used for force control allowed to compensate roll eccentricity of applicator roll and pick-up roll and to reduce paint consumption by reducing vibrations. Control automation is similar to our control used for special equipment as welder, air knives Dynawipe. The conception simplified the operations for operator and are very easy to integrate in a line due to the standardisation of the equipment.

| ROLL ADJUSTMENT CONFIGURATION

- Manual via screw jack gears
- Servo-hydraulic DynaCoater® force and position control

| COATING HEAD CONFIGURATION

- 3 rolls [V or in-line layout]
- 2 rolls
- Nip feeder
- Forward or reverse coating
- Doctor blade

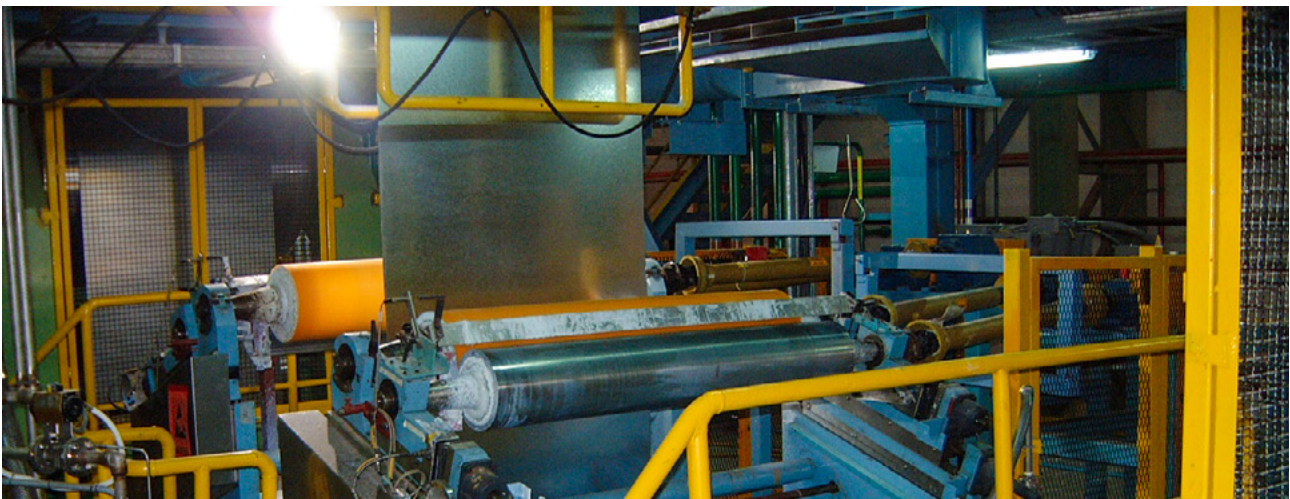
AUXILIARY EQUIPMENT

- Chemical Supply
- Paint Supply
- Roll change equipment

TYPES

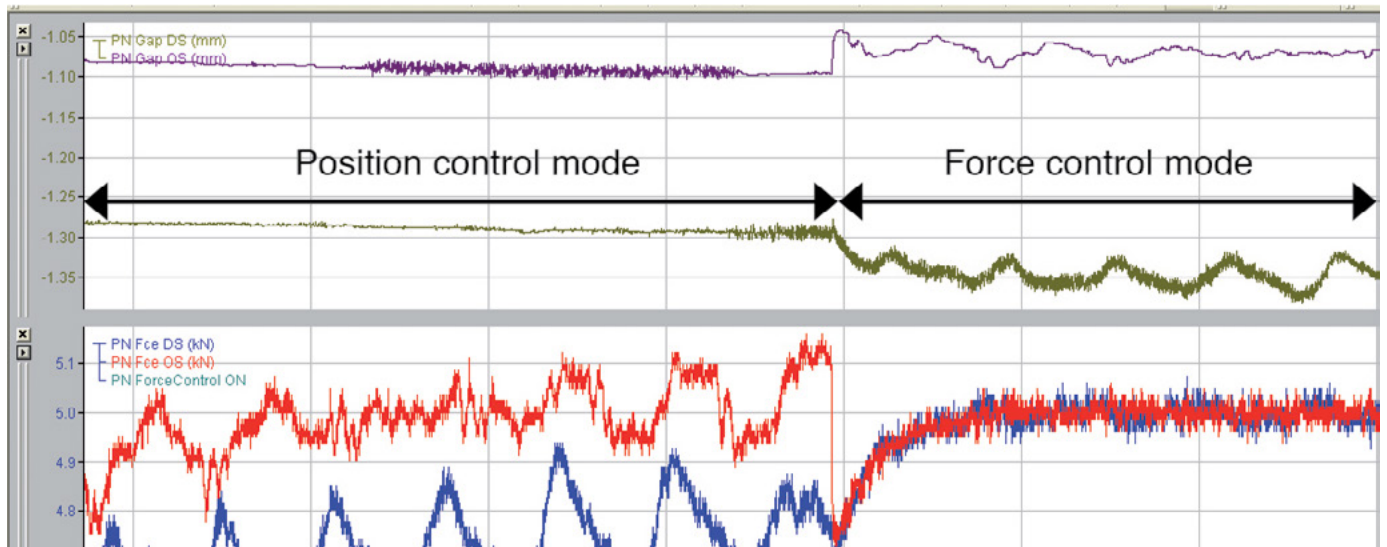
Clecim offers different types of roll coaters with steady or shuttle frame:

Line	Colour Coating Line			Galvanizing Line	Annealing Line
	Chemical post-treatment	Prime paint	Finish paint	Chemical post-treatment	Chemical post-treatment
Vertical	Y	Y	Y	Y	Y
"S" wrap	Y	Y	Y	Y	Y
"C" wrap	N	Y	Y	Y	Y
"U" wrap		Y	Y	N	N
Single roll	N	Y	Y	N	N
Backer	N	Y	Y	N	N



DynaCoater, innovative solutions

for prime and finish paint coaters.



Dynamic compensation of roll eccentricity

FULL CONTROL OF ROLL COATER (FORCE & POSITION)

- Servo hydraulic roll adjustment with dynamic force and position control

BENEFITS

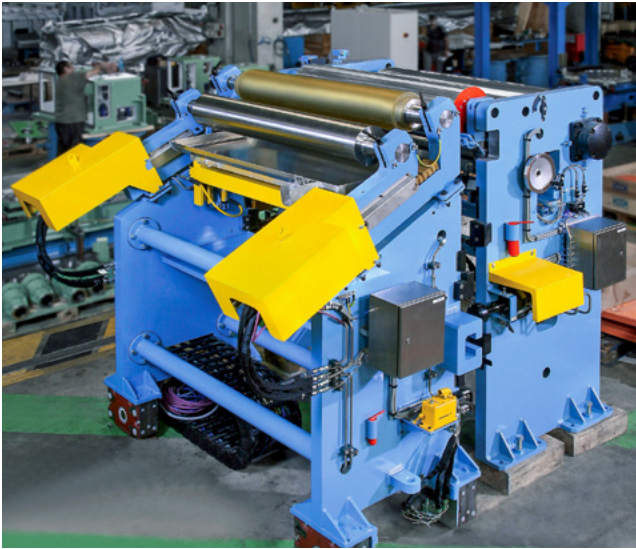
- Fast force control loop [5 msec] through a dedicated S7-Fast CPU and high performance analog input and output boards
- Dynamic compensation of roll eccentricity
- Quick retracting and positioning of coating heads
- Quality improvement due to setting values stored in PLC
- Tightest thickness tolerances by hydraulic force control
- Reduction of uncoated strip length on weld passage
- Closed loop control via paint thickness measurement

CONTROL AUTOMATION SYSTEMS

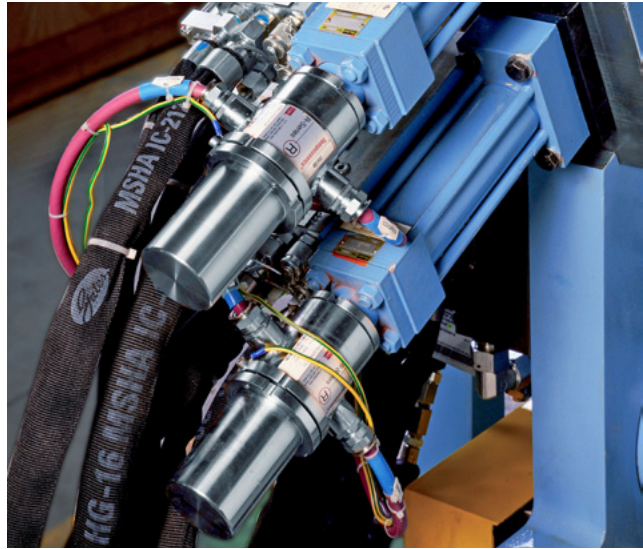
- Siemens electrical equipment as PLC S7 and SIMATIC drives and motors

BENEFITS

- Simplified operations: via HMI, operators are able to visualize force and roll speed parameters, calculate system operating parameters and see technical data in real time
- Reduced coating product consumption by optimizing the deposited amount through pilot control models with performance data validated on our clients sites
- Fast gap opening for applicator roll change



Servo hydraulic controller



Servo hydraulic controller

CLECIM WORKSHOP IN MONTBRISON

Our roll coater is assembled and tested in our workshop in Montbrison, France. Clecim has complied with international quality standard for more than 25 years and has implemented an Integrated Management System (IMS) that covers ISO 9001 [Quality Management], ISO 14001 [Environmental Management] and ISO 45001 [Occupational Health and Safety Management] certifications.

All special-process equipment is manufactured, assembled and tested in our workshop so as to ensure the best quality and performance from one single source. This not only provides our customers with the opportunity of pre-inspecting the equipment, but also allows for watching the machines in the course of manufacturing from project start to shipment.

TEST FACILITIES

Testing includes mechanical adjustments as well as individual and sequence tests. Every roll coater is fine-tuned for smoothest and fastest integration into your facility.

Lifecycle management

BDA way of working.

As a partner, we support you all along the lifecycle of your equipment through our BDA way of working:



- Before: define improvements and optimization solutions through Consulting Services
- During: deliver on our commitments with premium quality equipment and services to enable our customers reaching their targets
- After: support the operations and maintenance activities with on-site assistance and spare parts

LIFECYCLE SERVICES

As a roll coater user, you have conflicting needs. On the one hand, your performance is measured each quarter against short-term profitability expectations. On the other hand, you have to think on a totally different time scale compared with the capital market. Depending on the lifetime of your roll coater, you have to take 15 years or more into account. At the very least, that's 60 full quarters.

But thanks to our comprehensive expertise and integrated approach to solutions, you benefit both short-term and long-term from our lifecycle services.

In the short term: backed by our extensive experience with many reference plants, we provide you with the certainty of fast, dependable production start-up and shorter amortization periods.

In the long term: our master plan guarantees competitive performance for your plant and your roll coater in every phase of its lifecycle. Whether we are providing 24/7 technical support, optimizing maintenance, or making permanent plant improvements, we are always working to ensure the cost effective operation of your plant and products. Thanks to our lifecycle supports organized in clusters (Europe, America and Asia), you will benefit from our worldwide presence.

THE FOLLOWING SERVICES ARE AVAILABLE TO OUR ROLL COATER:

- Spare parts management & supply - genuine and up-to-date spare parts available in the shortest delivery time, as well as related repair services and replacement
- Preventive maintenance visits to anticipate any loss of efficiency of the equipment at an early stage
- Hotline & remote support services
- On-demand on-site intervention

The services are proposed on the basis of a complete yearly and renewable package that may be customized to the specific customer requirements.



U-Wrap paint DynaCoater

ON YOUR SIDE FOR CONTINUOUS IMPROVEMENTS

Roll coater experts are also available to assist in keeping equipment settings in line with production practices or customer requirements. This is done following a rigorous methodology, developed and enhanced through years of experience, and supported by highly efficient and user-friendly tools.

Our upgrade projects are mainly driven by:

- Reduction of operating costs (energy, maintenance and consumables, operation personnel)
- Improvement of product quality
- Adaptation of equipment in line with product mix extension

The solution may be purely electrical, automated, mechanical or a combination. Utmost attention is paid to seamless integration of the solution and to our flexibility in reducing the line downtime throughout work execution. For your convenience, the modernization work can be carried out during several maintenance stops or during a scheduled plant shutdown. Our team is available to assist you during restart operations and for performance ramp-up of your equipment.

Excellence from Experience

SELECTED SUCCESS STORIES WITH ROOL COATER



Tata Steel IJmuiden
BV, Netherlands

Product type: Vertical chemical DynaCoater

Clecim solution: Fully automatic system controlled by high-end PLC

Your benefit: Precise servo-hydraulic adjustment of rolls

Technical data: Width: 900 - 2.050 mm; Thickness: 0.6 - 2.5 mm; speed 180 m/min



Tata BlueScope
Steel, India

Product type: "S" wrap and "U" wrap DynaCoater

Clecim solution: Fully automatic system controlled by high-end PLC

Your benefit: Constant and precise painting directly from start of coating

Technical data: Width: 600 - 1.270 mm; Thickness: 0.25 - 1.30 mm; speed 100 m/min



BlueScope Steel,
Indonesia

Product type: Vertical chemical and print coater

Clecim solution: Fully automated system

Your benefit: Reduction of unequal-coated strip

Technical data: Width: 600 - 1.250 mm; Thickness: 0.2 - 0.4 mm; speed 180 m/min



HBIS Group Tangshan
Iron & Steel Company,
PR China

Product type: Vertical chemical Roll Coater

Clecim solution: Shiftable Roll Coater

Your benefit: Easy maintenance and fast exchange in limited space

Technical data: Width: 850 - 1.600 mm; Thickness: 0.18 - 3.00 mm; speed 180 m/min





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