SIROLL\textsuperscript{CIS} DAK
Dynamic air knives for galvanizing lines

Ultra-high quality wiping solution at the lowest operating cost

Metals Technologies
Highest standards of coating quality with SIROLL® DAK

Your challenge
Production costs have to be kept rigorously under control so that they can be cut to the minimum. This is now more important than ever. Zinc price is a key component of the total production cost for a hot dip galvanizing line with a share up to one third depending on the economic situation. Surface aspect is also a quality criterion for the finished product.

Our solution
The SIROLL® DAK® air knife features the highest standards of quality in terms of surface aspect and zinc coating thickness deviation for all coating applications: automotive, appliance and construction. This implies being able to control coating with very high accuracy under the different strip and line conditions. SIROLL® DAK integrates Siemens-engineered automation systems which, associated with the coating gauge, provide a top level performance in terms of coating accuracy, ensuring enhanced regularity and minimized coating weight deviation. The control mode dynamically acts on the lip shape.

In the past 10 years more than 20 clients worldwide chose SIROLL® DAK as the best solution to produce galvanized steel. The latest technological improvements of the system include:
- Non-contact baffle system for thin strip products
- Heavy duty automatic lip cleaning device to remove zinc particles on the lips
- Continuous improvement of our zinc coating control by efficient after-sales service

Main benefits of SIROLL® DAK:
- User-friendly operation
- Convenient diagnostic
- Optimized maintenance
- Complete workshop testing
- Longitudinal and transverse coating distribution divided by 2 to 3 compared with most systems
- Differential coatings of 3 to 1
- Automatic contactless edge control device
- SIROLL® DAK can be used for a wide range of applications:
  - Product mix: GI, GA, GL
  - Large coating range: 20 to 400 g/m²/side
Good reasons for SIROLL™ DAK

The benefits of our dynamic air knife system are emphasized by our approach as an equipment builder to serve our clients and give them a substantial advantage in their market.

■ Zinc Saving –
Saving through reduced zinc deposit onto the strip surfaces and smoother zinc layer.

■ Operational Safety –
Safe use for the operator as everything is managed through the HMI (Human Machine Interface). Running mode can be selected from the operator PLC to operate the SIROLL™ DAK in fully automatic or manual control modes.

■ Real time quality monitoring –
Scrutiny of zinc coating data to allow tracking of the coating all along strip length and, of course, providing great advantage for production plan and convenient diagnostic. The data logging system is particularly helpful to achieve the zinc coating analysis.

■ Simplified maintenance –
Dedicated test cabinet for simplified equipment maintenance with easiest access to the lip gap profile set up.

■ Energy savings –
Powerful control system allows reduced energy consumption through efficient blower speed control and lip gap adjustment.
SIROLL® CIS DAK

The new way for zinc savings

SIROLL® CIS DAK technology has been defined from the early stage of design and research on the basis of fundamental principles that guarantee quality and regularity of zinc coating thickness. With this approach Siemens VAI has acquired perfect control of:

- Strip stability
- Zinc wiping
- Zinc coating thickness
- Energy consumption
- Energy savings

Strip stability
Stability is also essential to secure a high level performance in terms of coating thickness control and zinc homogeneity on strip surfaces. Taking immersed components into account together with the stabilizing roll concept were instrumental in achieving this.

Zinc wiping
Blowing profile control (unique and patented system) ensures excellent coating quality.

The automatic lip cleaning system removes zinc splashes from the dynamic air knife lips.

The zinc wiping beam positioning system ensures a 0.1 mm positioning accuracy and strip visibility allowing the operator to monitor the coating quality.

A noncontact baffle system ensures low noise level and strip edge quality optimization (patent pending).

Zinc coating thickness
The most suitable solution is selected on the basis of our experience and of our relationship with our zinc coating gauge suppliers. Integration of coating gauge into our automation system is also one of the keys to system performance.
Energy consumption
SIROLL® DAK control loops allow power consumption to be kept within limits. The speed of the blower motor producing the zinc wiping pressure is controlled to optimize energy consumption. The lip gap can be adjusted to strip width, which reduces the wiping medium consumption, especially for nitrogen wiping (patented system).

Zinc bath mechanical equipment
The SIROLL® DAK features excellent resistance to zinc likely to guarantee a production campaign duration longer than what was known to date. Our design is based on new solutions to decrease operational maintenance by using novel materials as ceramic. Geometry and slight changes in immersed components avoid negative effects on the strip.

Control automation systems
Siemens electrical equipment provides the following benefits:
- Monitoring systems are designed to:
  - Simplify operations: via HMI operators are able to visualize zinc wiping parameters, to calculate system operating parameters and visualize the zinc coating properties in real time
  - Reduce zinc consumption by optimizing the amount of deposited zinc through pilot control models with performance data validated on our clients’ sites (patented system)

Manufacturing and test facilities

Siemens VAI workshop in Montbrison
Our SIROLL™ DAK® system is assembled and tested in our workshop in Montbrison, France. Since 1994 the Siemens VAI workshop has been compliant with international quality standards (ISO 9002 then, ISO 9001 today). Since 2007 our workshop has also been compliant with the international environmental standards and obtained ISO 14001 registration.
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 SIROLL™ DAK is fine-tuned for smoothest and fastest integration into your facility.

DAK on off-line support
Lip gap actuator assembly
Life-cycle partnership
Unique solutions to improve the performance of your galvanizing lines

Siemens VAI life-cycle services
As zinc coating thickness control is one of the main stakes in yield management of coating strip production, the associated air knife system needs to be constantly operational and reliable.

Siemens VAI supports SIROLL™ DAK along its complete life-cycle from the installation phase and throughout the system operation to guarantee a consistent zinc coating thickness control, even in the case of uncompromising operating conditions.

A dedicated team of mechanical, electrical & automation and process experts is available to provide the customer with their technical advice on the basis of their extensive experience in onsite work execution.

The following services are available to SIROLL™ DAK customers:
- Spare parts management & supply from a set of standard spares with on-demand replacement and repair
- Preventive maintenance visits, organized periodically to prevent or detect any loss of efficiency of the equipment at an early stage, based on a thorough diagnostic
- Hotline & remote maintenance services, software updates
- On-demand on-site intervention

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

SIROLL™ DAK experts are also available to assist in adapting the system settings to any evolution in 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.

Investigation/inspections & feasibility study
- Design
- Layout
- Construction
- Installation
- Commissioning

Operation
Consulting | Planning | Financing
- Service contracts
- Spare parts and components
- Consulting and training
- Online and offline maintenance
- Maintenance contracting

Recycling
Modernization
- Migration packages
- Upgrading and modernization

Investigation/inspections & feasibility study
- Design
- Layout
- Construction
- Installation
- Commissioning
Putting our innovation to work for you

Modernizing can be an effective way of keeping in line with market requirements and reducing conversion costs. Siemens VAI’s approach ranges from incremental improvements to major revamps in a single stage. Ever increasing demands for higher product quality and lower production cost urge strip producers to constantly seek for equipment upgrades and more efficient operations. At a certain point, such adaptation cannot be done by the operator himself in the course of normal maintenance and a comprehensive review has to be considered. Generally, these targets can be subdivided as follows:

- Reduction of operating costs (energy, maintenance and consumables, operation personnel)
- Improvement of product quality (thickness, flatness, surface)
- Extension of the product mix in terms of steel grades and dimensional range

Siemens VAI has acquired extensive experience in upgrading and modernizing processing lines and works closely with its customers to develop a tailored modernization concept based on their individual needs taking all boundary conditions fully into account. The result is a solution which utilizes components of the SIROLL® PL processing line concept. The solution may be purely electrical, automated, mechanical or a combination. Based on the selected concept, modernization work can be carried out during several maintenance stops or during a plant shutdown.

**Principles**

- Constant link with the equipment through one secured log-in procedure in compliance with Customer’s confidentiality policy

**Functions**

- Fine tuning execution during commissioning phase to reach zinc thickness control performance targets
- Remote access for troubleshooting execution
- Software updates and software upgrades remote installation
- Parameter set-point adaptation in case of product-mix evolution

**Benefits**

- Fast return on investment due to shorter commissioning phase
- Improved maintenance indicators
- Operation downtime minimization
- Cost-effective and more rapid assistance for the customer due to minimized travel time and related expenses
- Renewable hours-package assistance

Focus on: « remote access » commissioning & maintenance services
# Excellence from experience

## Selected success stories with SIROLL CIS DAK

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<th>Customer</th>
<th>Line Type</th>
<th>Our solution</th>
<th>The result</th>
<th>Technical data</th>
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<td>BlueScope Steel, Rayong, Thailand</td>
<td>CGL #2 for zinc and zinc aluminium</td>
<td>SIROLL CIS DAK</td>
<td>High quality and cost efficient production, reduction of zinc consumption 4%</td>
<td>Width: 600 – 1,260 mm; coating thickness: 50/600 g/m²</td>
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<td>Benxi I&amp;S, Benxi, PR China</td>
<td>CGL #1 and CGL #2 for zinc and galvanneal</td>
<td>SIROLL CIS DAK</td>
<td>High quality and cost efficient production, reduction of zinc consumption</td>
<td>Width: 800 – 1,870 mm and 800 – 1,500; coating thickness: 60/450 g/m²</td>
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<tr>
<td>Steelscape, Shreveport, LA, USA</td>
<td>CGL for zinc and zinc aluminium</td>
<td>SIROLL CIS DAK</td>
<td>Simple system with high efficiency</td>
<td>Width: 600 – 1,370 mm; coating thickness: 60/450 g/m²</td>
</tr>
<tr>
<td>China Steel Corporation, Kaohsiung, Taiwan</td>
<td>CGL #2 for Zinc and galvanneal</td>
<td>SIROLL CIS DAK</td>
<td>High quality and cost efficient production, zinc coating target is reduced by about 5%</td>
<td>Width: 800 – 1,700 mm; coating thickness: 60/275 g/m²</td>
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For further information, please contact:

Siemens VAI
Metals Technologies SAS
51, rue Sibert
Po Box 154
42403 Saint-Chamond Cedex, France
Phone: (+33/4) 7729 8056
Fax: (+33/4) 7729 8390
E-mail: procesingline.metals@siemens.com

Headquarters:
Siemens VAI
Metals Technologies GmbH & Co.
P.O. Box 4, Turmstr. 44,
4031 Linz, Austria
E-mail: contact.metals@siemens.com

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