Metal Strip Processing

INNOVATIVE PROCESS TECHNOLOGY FOR HEATING, DRYING, CURING, COOLING, NON-CONTACT TURNING AND POLLUTION ABATEMENT
**METAL STRIP PROCESSING**

**Spooner Industries Ltd**

Spooner Industries offers unrivalled worldwide experience in the drying, curing, cooling and non-contact handling of coated and impregnated web materials, whether the substrate be heavy metal strip, paper, film, foil or textiles.

A thorough understanding of heat transfer, air flotation technology and pollution abatement allows the company to design and effect solutions for a wide and growing range of industries and processes.

A comprehensive capability is offered from concept design, through manufacturing to full installation and commissioning. Sophisticated in-house Test and R&D facilities back up more than 70 years of experience, knowledge and customer satisfaction.

**Typical products:**

**Coil Coat Paint Lines**
- Catenary Prime and Finish Ovens
- Airfloat Prime and Finish Ovens
- Chemical Coat Ovens
- Air coolers
- Water quenches
- Oxidisers and heat recovery systems

**Galvanising Lines**
- Post-pot airfloat coolers
- Impingement coolers
- Heat retention zones
- Combined heat retention/cooling zones
- Chemical Coat Ovens

**Stainless Steel**
- Airfloat coolers
- Impingement coolers
- Flotation tables

**Aluminium**
- Flotation annealing furnace
- Catenary/airfloat dryers
- Airfloat/impingement coolers
- Non-contact air turns

**Company Philosophy**

Spooner is dedicated to a culture of creativity and innovation to maintain its position at the forefront of strip processing technology.

**Coil Coat Paint Lines - Thermal Systems**

A unique integrated thermal systems solution is offered by Spooner providing flexibility, simple operation and low maintenance, combined with advanced performance process technology. For high quality ‘white goods’, Spooner offers clean air-direct fired or totally indirectly heated systems.

**Key**
1. Chemical Coat Dryer
2. Coater Rooms and Air System
3. Prime and Finish Ovens
4. Air Impingement Coolers
5. Water Quenches
6. Pollution Abatement and Integrated Heat Recovery

**Spooner Catenary Ovens**
- Simple, flexible design and operation
- Suitable for low and medium speed lines
- Good heat transfer rates
- Impingement system
- Low maintenance requirements

**Spooner Airfloat Ovens**
- Suitable for medium and high speed lines
- High heat and mass transfer rates, resulting in shorter ovens
- Ideal for upgrade of lines for increased throughput using same oven ‘footprint’
- Flotation on full gauge range
- Unaffected by tension changes
- Superior strip stability
- Control of strip position for consistent and even paint cure

Combined systems for increased line flexibility using forced air convection with IR or induction technology.

**Oxidisers**
- Spooner has supplied and installed:
  - Recuperative
  - Regenerative
  - Catalytic oxidisers

Complete with integrated heat recovery systems for increased line efficiency.
**METAL STRIP PROCESSING**

**Hot Dip Metal Coating Processes**

The demands for higher quality, higher speeds and lower costs in hot dip metal coating processes has never been greater. Spooner has developed a range of innovative equipment designed to help producers meet and exceed these diverse demands.

**Spooner Steelfreeze Airfloat Coolers**
- High cooling rates
- Air flotation system imparts ‘clamping’ force on the strip to reduce strip vibration
- Improved coat weight control and product quality
- Open or totally enclosed design for reduced noise and dust
- New nozzle design permits operating nozzle-to-nozzle gap of 50 - 200mm
- Operation independent of tension

**Spooner Steelfreeze Impingement Coolers**
- Good heat transfer
- Perforated plate or slot nozzles
- Simple design and operation
- Low maintenance requirements

**Spooner Airfloat Stabiliser**
- Air pressure pads ‘clamp’ strip and restrict vibration
- Non-contact operation
- Utilises air flotation technology
- Improved coat weight control and product quality
- Eliminates touch rolls
- Ambient or heated air
- Independent of tension
- Compact units

**Spooner SteelSoak Heat Retention Zone**
- Maintains temperature of strip and increases soak time following galvanneal furnace
- Can be combined with air cooler system for flexibility
- Installed in multiple zones for optimum soak times

**Spooner Orbit Non-Contact Air Turn**
- Based on proven technology
- Eliminates roll contact
- Potential to reduce tower and building height
- High performance cooler
- Impingement cooler over top of air turn for enhanced cooling on both sides of strip

**Stainless Steel Processing**

For stainless steel Anneal and Pickle Lines Spooner offers both conventional impingement coolers or new air flotation tables combined with high performance air flotation coolers.

**Impingement Coolers**
- Perforated plates or slot nozzles
- Simple design and operation
- Good heat transfer

**Flotation Table**
- Catches strip on exit of annealing furnace
- Eliminates exit contact roll
- Transfers strip into flotation coolers

**Flotation Coolers**
- High performance cooling
- Non-contact operation as strip is floated on air cushions
- First contact with roll is at very reduced surface temperature

**Aluminium**

- Flotation Annealing Furnaces
  - Superior strip stability
  - Non-contact operation
  - High heat transfer rates
  - Even pressure and temperature distribution

**Air Coolers**
- Conventional impingement coolers
- Air floatation coolers

**Lithographic**

- Air floatation ovens
  - High heat transfer rates
  - Gentle on sensitive coatings
  - Non-contact operation

**Air Coolers**
- Conventional impingement coolers
- Air floatation coolers

**Impingement, ovens**
- Catenary
- Roller support
**Metal Strip Processing**

Spooner has considerable experience working with clients to provide control systems optimised to meet specific business requirements.

Spooner Industries Limited offers you:
- Quality Assurance through ISO 9001 accreditation and extensive internal and external auditing for complete customer satisfaction.
- A comprehensive international network of experienced representatives backed up by Spooner sales and technical engineering teams.
- Full installation and commissioning services worldwide, with supervisory or full team erection and operator training.
- A rapid response at all times to service requirements, anywhere in the world; preventative maintenance and inspection contracts.
- Spare parts back-up that offers a prompt, reliable and knowledgeable service.
- A dedicated R&D Test Centre facility, that allows in-depth study and demonstration of new processes and equipment design.

**Air Flotation Technology**

Spooner has designed and built ‘State-of-the-Art’ Flotation Systems for more than 30 years. Constant development of special air bar systems provides unique solutions to continuous strip processing requirements.

The Spooner family of air bars includes a range of nozzles with specific advantages for the metals industry, offering operating distances of 10 to 200mm.

Spooner Air Flotation nozzles offer:
- **Non-Contact Web Handling:** The strip is supported throughout on a dynamic air pressure pad with high clearance. This makes the system effective for a wide range of processes and substrates.
- **Superior Strip Stability:** Ensuring constant flotation performance.
- **Maximum Performance:** High heating and cooling rates.
- **Energy Saving:** Minimal energy consumption.
- **Wide Operating Tension Range:** Providing optimum operating flexibility.
- **Sine Wave Flotation:** Reduces strip crossbow.
- **Wide Width Capacity:** Nozzle widths over 9m.
- **Robust Construction:** Offers consistent performance.
- **Even Pressure Distribution:** Gentle on coatings.

**Air Impingement Technology**

Spooner offer a full range of high efficiency non-flotation impingement nozzle systems for all areas of the Metals Industry incorporated into catenary, vertical and roller support ovens. Typical Spooner nozzle designs include:

- **Hole based designs** giving high heat transfer rates, consistent performance and low maintenance.
- **Precision slots**, which give even heat transfer across the strip width and are gentle on sensitive coatings.
- **Laminar flow needles**, which blow air at 90° to the strip to give effective drying whilst protecting very sensitive coatings.
- **Combination nozzles**, which can be converted from slots to laminar flow designs automatically to give maximum flexibility for a range of coatings.

**Control Systems**

Spooner offers a wide range of control options including:

- Fully integrated PLC or DCS and SCADA solutions with instinctive operator interface mimics, full fault diagnostics and algorithm enhanced recipe systems.
- PLC controller with operator dialogue terminal for machine configuration and alarm display.
- Hardwired panels with discrete instruments and controllers.

---

**Image Description:**

- **Air Flotation Technology Diagram:** Shows a cross-section of an air bar with pressure distribution areas labeled.
- **Control Systems Diagram:** Depicts a flowchart of a control system with various process steps and components labeled.
- **Air Impingement Technology Diagram:** Illustrates nozzle systems with labels indicating pressure, area, strip, etc.
- **Spooners Industries Limited Logo:** Featured prominently on the page.

---

**Technical Specifications:**

- Maximum Flow Rate: 10 to 200mm.
- Energy Consumption: Minimal.
- Control Options: Various PLC, DCS, SCADA solutions.
- Application Areas: Metals Industry, Roller Support Ovens.
Typical References

Corus, Shotton - Galvanising Line
Two airfloat coolers
Heat retention zone
Two combined heat retention/cooling zones
New penthouse roof and tower structure

Euramax, UK - Coil Paint Line
Prime & Finish Airfloat Ovens
Airfloat Coolers
Catalytic Oxidiser

Bronx for Tubisud, Italy - Coil Paint Line
Prime & Finish catenary ovens
Oxidiser and Heat recovery

Corus, Llanwern - Galvanising Line
Two Airfloat Coolers
One Heat Retention Zone
Three combined heat retention/cooling zones

Avesta Polart, UK - Stainless steel
Two impingement air coolers

Techint for Dufalco, Belgium - Aluminium/Film Laminating
Airfloat ovens
Heated air turn

LLL, Italy - Aluminium
Airfloat annealing ovens

Corus, Shotton - Coil Paint Line
Prime and Finish airfloat ovens
Chemical coat oven
Re recuperative oxidiser

Agfa, UK - Lithographic
Airfloat ovens
Catenary ovens

Cockerill Sambre, Belgium - Galvanising Line
Airfloat coolers
Impingement pre-cooler
Mini-spangle rig