

# ISV SPRAY SYSTEM

## FLATNESS ERROR CORRECTION SYSTEM FOR THE ROLLING INDUSTRY

The Integral Solenoid Valve (ISV) is the metal industry's most advanced thermal modelling spray system. Supplied to the rolling industries worldwide for more than 25 years, the technology addresses residual flatness errors in sheet and foil material.

Product flatness is of utmost importance. Flatness errors can lead to non-uniform tension distribution across the strip width, resulting in product breaks. In addition, residual stresses in the material can have a detrimental impact on downstream processing, leading to increased waste material and extensive rectification work.

The ISV technology is designed to apply zone cooling and lubrication to the work rolls. This in turn, addresses the residual flatness errors and controls the bulk temperature of the mill during the rolling process.

Used in both the ferrous and non-ferrous industries and is suitable for all mill types.

### MAIN DESIGN FEATURES

- ISV valves with stainless steel construction
- Diaphragm technology - no sliding seals
- Pulse width modulation, providing 10:1 flow level turndown ratio
- Low pressure drop across valve < 1 bar
- ISV valves, removable from the front face of the spray headers providing easy maintenance
- Fully integrated or remote mounted headers

PROVEN  
TECHNOLOGY  
**OVER 650  
REFERENCES**

## CONSTRUCTION

ISV spray bars comprise of spray valves that are mounted in spray headers, which are available manufactured in either aluminum or stainless-steel. Although designed to interface with AFC systems, ISV's can also be used via a manual spray control panel controlled by the operator.

## SPECIFICATION

Valve material	Stainless steel
Diaphragm material	Fabric reinforced Viton
Diaphragm life	> 20 million cycles
Flow rate (max)	67 litre/min at 5 bar
Solenoid switching time	approx. 12 ms
Solenoid power	24V DC 2W, 0.083A
Coolant temperature	75°C maximum
Coolant pressure	2 to 12 bar
Electrical contacts	Gold plated for ultimate protection
Valve pitch	25 mm minimum
Coolant medium	Mineral oils and water-based coolants

## OPERATING PRINCIPLE

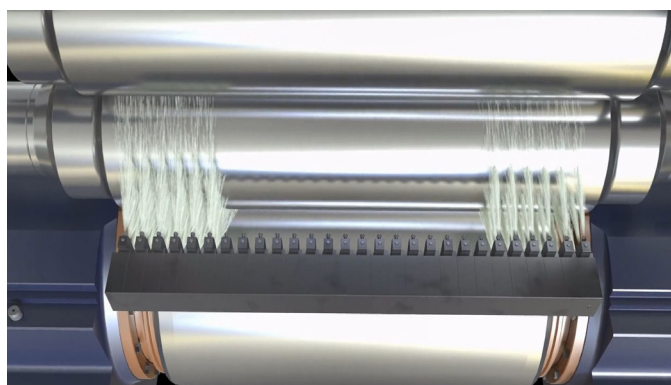
Each valve supplies coolant via a process optimized nozzle plate to the mill rolls. The valve has its own 24V DC driven solenoid mounted within the valve body, which in turn is controlled by the signals from the mill flatness control system. Compressed air from a common supply and applied via the electrical solenoid, deflects the diaphragm, blocking the coolant flow through the valve. When this air pressure is vented, the diaphragm relaxes and again allows the coolant to flow through the ISV.

Temperature control is achieved by modulating the coolant through the valves thereby, controlling the thermal profile of the work rolls. Level control is achieved by Pulse Width Modulation (PWM) enabling 10 levels of cooling from a single valve.

Nozzle configurations are specifically designed using advanced thermal modelling; optimizing the spray patterns and coolant flow rates to suit the individual requirements. The optimal thermal performance may be achieved for each application regardless of the rolling duty or individual pass schedules.



Spray valve



Optimized spray patterns

## OPTIONAL FEATURES

- Stainless steel spray headers
- Manual spray control system
- Hot edge spray system to spray hot coolants, outboard of the strip edge – reducing the work roll thermal gradients
- Coolant pressure and temperature monitoring

## MAIN BENEFITS

- Full stainless-steel valve construction suitable for all mill types
- Zone widths from 25 mm
- Advanced thermal modelling
- Increased tolerance to dirt and coolant contamination
- Compatible with kerosene and water-based coolants
- Low power solenoid
- No external wiring harness
- Small installation envelope and easy maintenance

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