



MasoneilanTM SteamFormTM

Turbine Bypass and Steam
Conditioning Systems

Masoneilan

a Baker Hughes business



Features and Benefits

Masoneilan 84003 Series SteamForm is a reliable steam conditioning valve for high temperature, high pressure drop and erosive steam applications in power plant and process industry applications.

With Masoneilan SteamForm, **Baker Hughes™** offers:

Broad Industry Applications

- Control and shut-off valves for wide range of Power, Oil Refineries, Petrochemicals, Chemicals, Paper, Food and other industry applications
- High rangeability of 50:1 turndown for a wide range of process conditions

Reliability

- Robust pressure boundary design meeting or exceeding industry standards
- Thermally compensating trim design for frequent thermal cycling

Performance

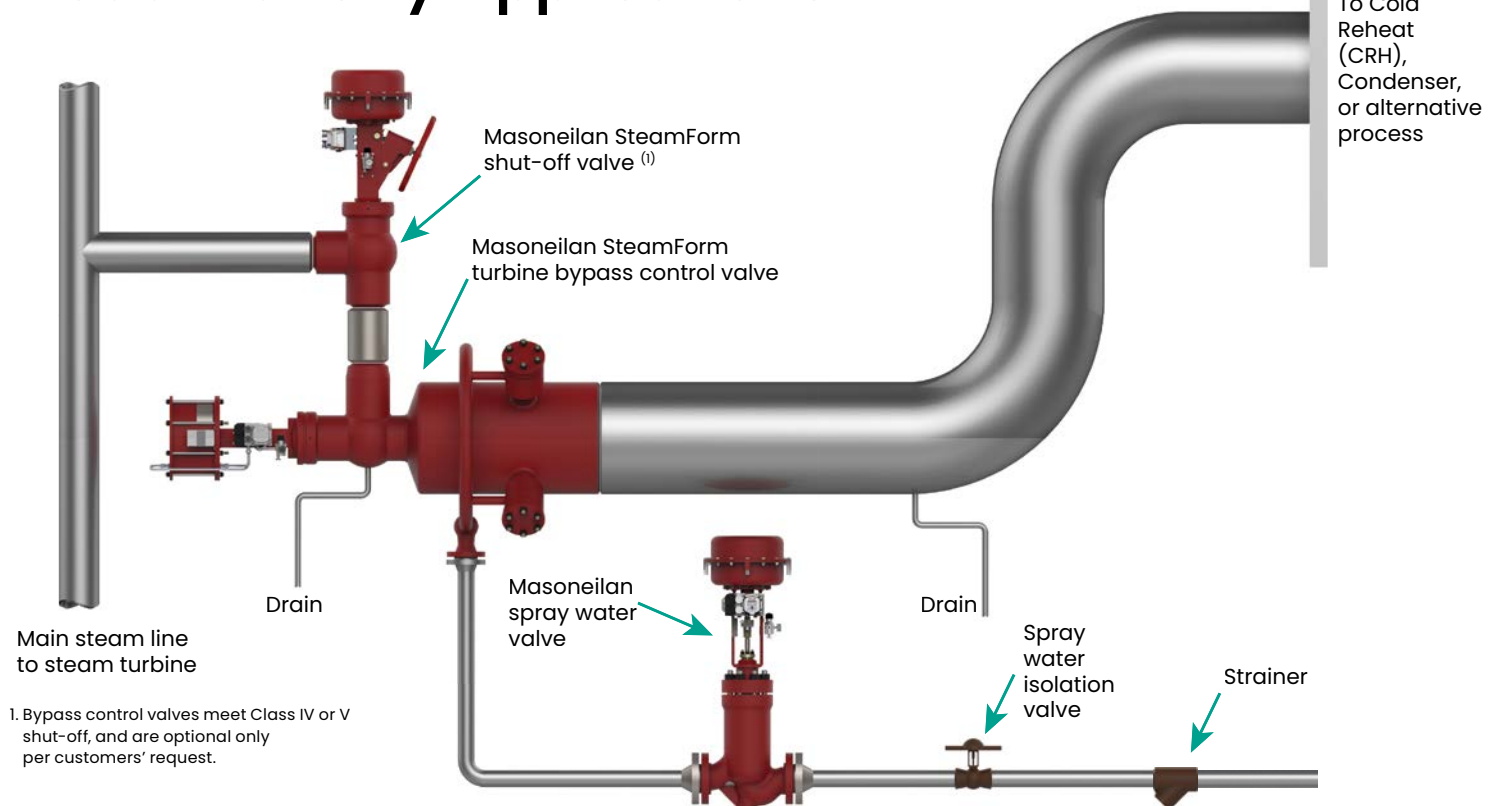
- **Lo-dB™** drilled hole technology for optimized noise attenuation
- Tight shut-off trim for reduced leakage and increased plant efficiency
- Fast responding automation for steam turbine protection in turbine bypass applications
- Patented Flow Profiler design for enhanced desuperheating that reduces steam pipe damage

Maintenance Friendly Design

- Removable trim option for reduced downtime
- Robust valve internals for long service life



Broad Industry Applications



Shut-Off Valve

In many power applications, customers require shut-off valves upstream of the turbine bypass valves as an additional fail-safe mechanism. The Masoneilan SteamForm high capacity shut-off valve is designed to achieve undisrupted full-area flow, while achieving reliable tight shut-off, when required.



Process Valves

The Masoneilan SteamForm control valve is used in various industries such as chemical, petrochemical, paper, oil refining, food, and many other process applications. For these applications, Masoneilan SteamForm valves are available in both angle and globe style configurations, with various options for end connections, materials, and installation arrangements to meet any application.



Power Industry Designs

SteamForm valves are designed to withstand the cyclic nature of today's peaking plants. The SteamForm valve is suited for high pressure drop applications such as turbine bypass in combined cycle and coal fired power plants. Each SteamForm valve is custom engineered, ensuring excellent pressure control, spray water control, noise performance, and actuation performance.

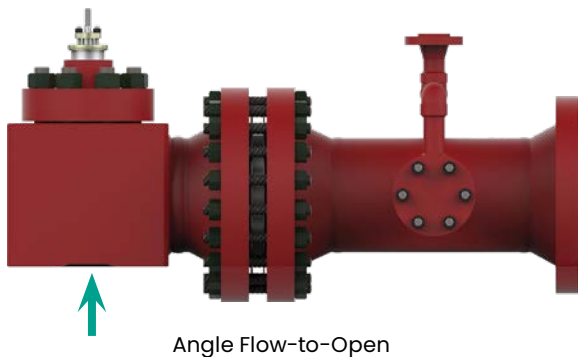


Full Range of Options for Spray Water Control

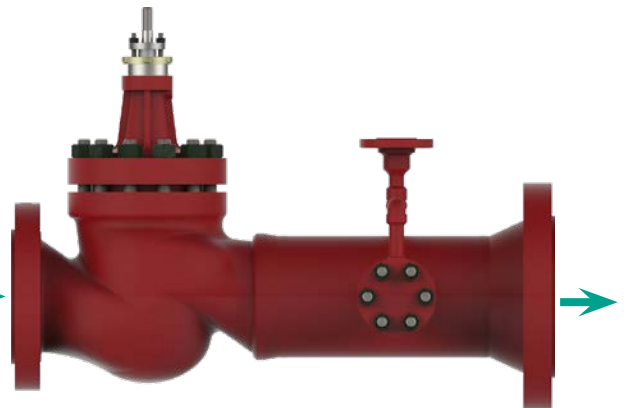
Baker Hughes complements Masoneilan SteamForm valve technology with a full line of spray water control valves ranging from single-stage pressure control of the Masoneilan 21000 Series valve, through the high-end, multi-stage Masoneilan **LincolnLog™** valve solution for anti-cavitation.



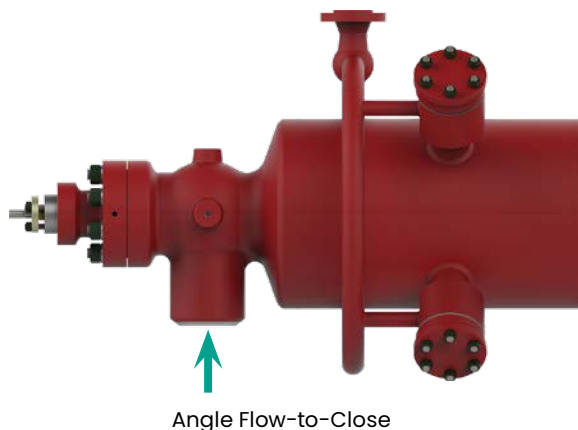
Flexible valve body designs



Angle Flow-to-Open



Globe Flow-to-Open or Flow-to-Close



Angle Flow-to-Close

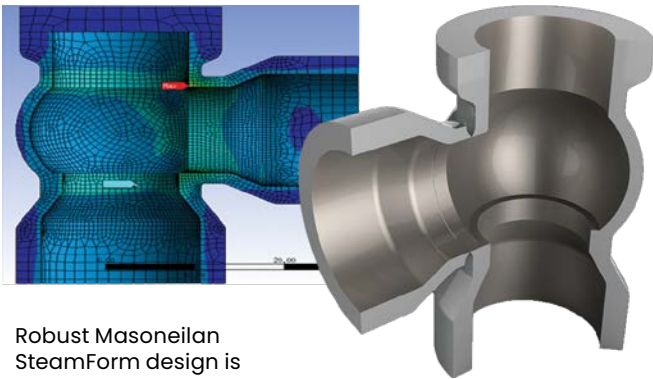


Globe Custom Offset (Z-Body)
Flow-to-Close

Reliability

Robust Pressure Boundary

Masoneilan SteamForm valves are designed to meet or exceed industry design standards such as ASME and PED. Baker Hughes pressure boundary design practices are developed with emphasis on thermal and pressure stresses, creep analysis, and external pipe loading. Baker Hughes design engineers use comprehensive Finite Element Analysis (FEA), combined with decades of industry experience, ensures the valve is properly designed for the application.



Robust Masoneilan SteamForm design is validated with FEA analysis.

Application Specific Design

Masoneilan SteamForm is a true engineered-to-order solution. Masoneilan SteamForm is treated as a custom designed product, and is optimized for each application according to customers' specifications, to ensure high reliability and performance.



Thermal Compensating Design

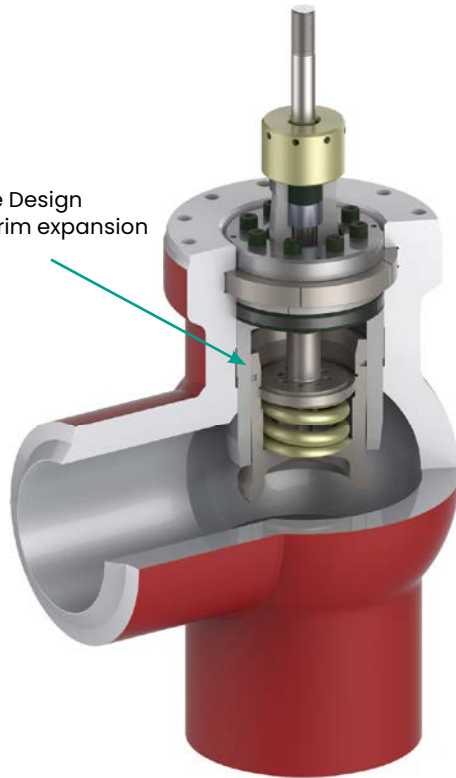
Masoneilan SteamForm valves are offered with a thermal compensated trim design that allows for trim expansion, thus supporting long life and trouble free operation.

The hung cage design, or thermal compensating spring, relieves the potential stress associated with thermal growth of the cage. This helps avoid trim sticking issues tied to thermal expansion during the operation.

Thermal Compensating Spring
relieves stress from cage growth
during thermal transients



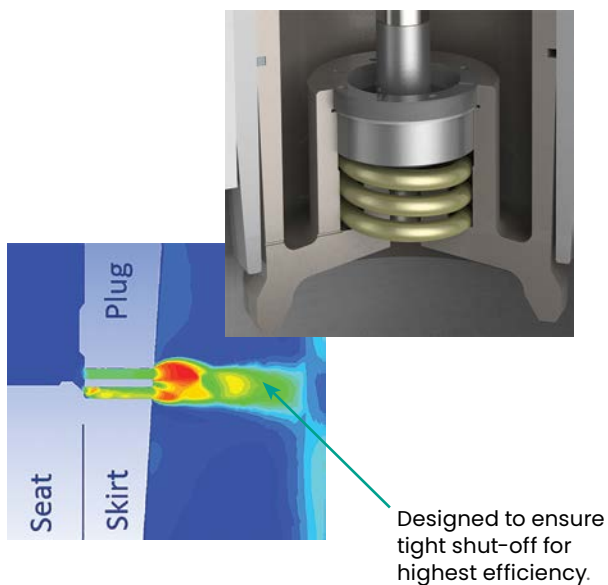
Hung Cage Design
allows for trim expansion



Performance

Plant Efficiency

Masoneilan SteamForm valves are designed with hardfaced seats and secondary leak paths to provide seat integrity, to ensure long-term shut-off integrity, positively impacting plant efficiency. The SteamForm valve achieves tight shut-off consistent with ANSI/FCI and IEC Class IV, Class V, and MSS-SP-61.

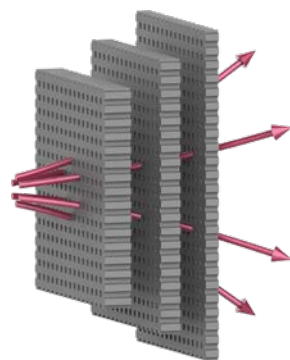


Fast Response and Precise Control

The Masoneilan SteamForm valves can be equipped with a rapid stroke actuator, capable of achieving fast stroke open and close time on the valves. This is a critical feature, necessary for protecting plant equipment during an upset condition, such as a turbine trip. Masoneilan actuators are equipped with a Masoneilan **SVI™** digital positioner, which provides best-in-class control accuracy and response.

Low Noise Technology

Often, power plants are located close to residential areas. Therefore, noise can pose substantial nuisance to the residents and noise attenuation is a key factor during turbine bypass operation. SteamForm control valves are equipped with Masoneilan's proven Lo-dB technology. Optimally designed and engineered drill-hole and staging ratios combined with decades of experience enable us to achieve desired noise attenuation for our customers.

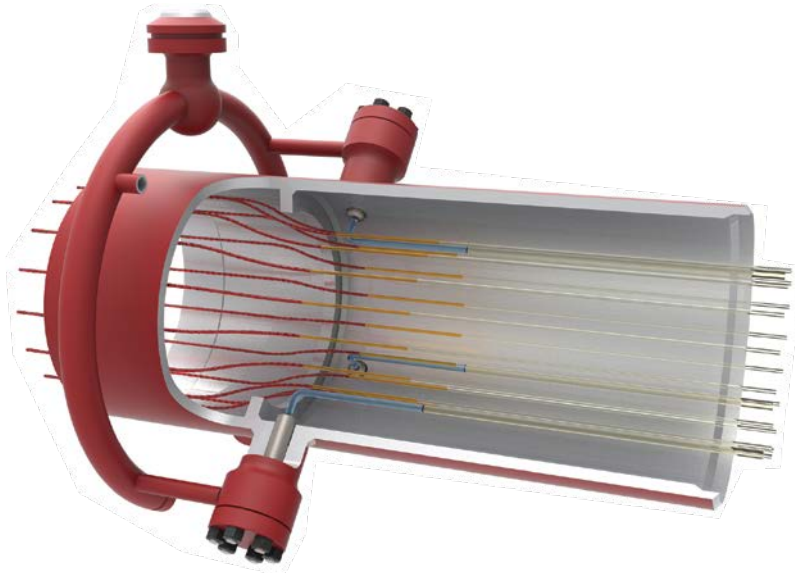


Optimized drilled-hole patterns and staging ratios provide best noise attenuation.

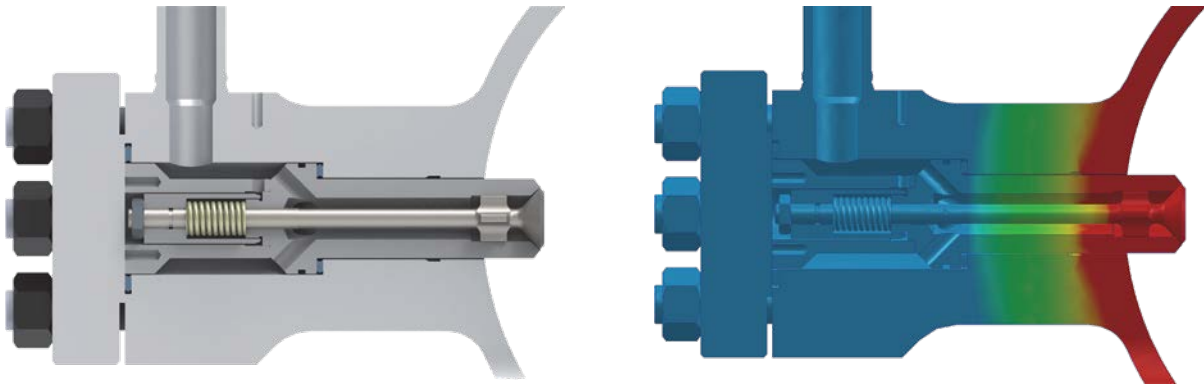


Enhanced desuperheating – improved efficiency

Masoneilan's desuperheaters are designed to maximize the water absorption into the steam. Enhanced desuperheating is achieved through Masoneilan patented Flow Profiler and spring loaded spray nozzles. The Flow Profiler design introduces turbulence upstream of water inlet, which improves the mixing of spray water droplet into the steam. The spring loaded spray nozzles introduces a fine aerosol-grade spray of the water inlet into the steam line which provides proper atomization of the spray water and efficiently manages steam cooling. These desuperheater enhancements permit users to reduce straight pipe, and therefore reduces the system level cost. It also prevents water fallout and impingement on the pipe wall, and improves system efficiency.



Water Injection with Flow Profiler



Spring loaded spray nozzles designed to move springs away from high temperature/high cycling areas for extended operating life.

Digital Technology for Improved Process Yields

Baker Hughes offers award winning HART® communicating Masoneilan Smart Valve Interface (SVI) and Smart Valve Interface Fieldbus Foundation® (SVI FF). These leading micro-processor based field instrumentation technology help maximize plant operating margins by improving process yields, while reducing plant operating and maintenance costs.

Masoneilan digital positioners help users realize improved asset effectiveness resulting in higher returns on investment. These digital positioners deliver improved process yields through patented tuning algorithms that optimize valve control performance.



Maintenance Friendly Design

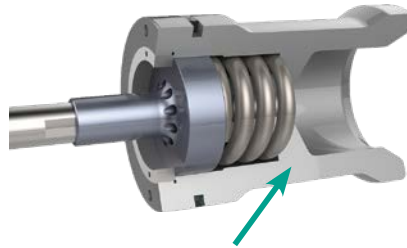
Easy to Install

Masoneilan cartridge style trim and custom installation tooling promote fast and trouble-free servicing, reducing downtime.



Long Service Life

SteamForm pilot balanced plugs are constructed from high-quality materials and designed with hard-faced guides to achieve long service life. Our robust pilot system is designed with active pressure engagement resulting in excellent plug stability. All Masoneilan plug designs are offered with Stellite® hard-faced seating surfaces allowing for multiple seat cutting, thereby, extending the service life of the trim. Masoneilan SteamForm valves are designed to achieve long service life in both vertical and horizontal valve orientation.



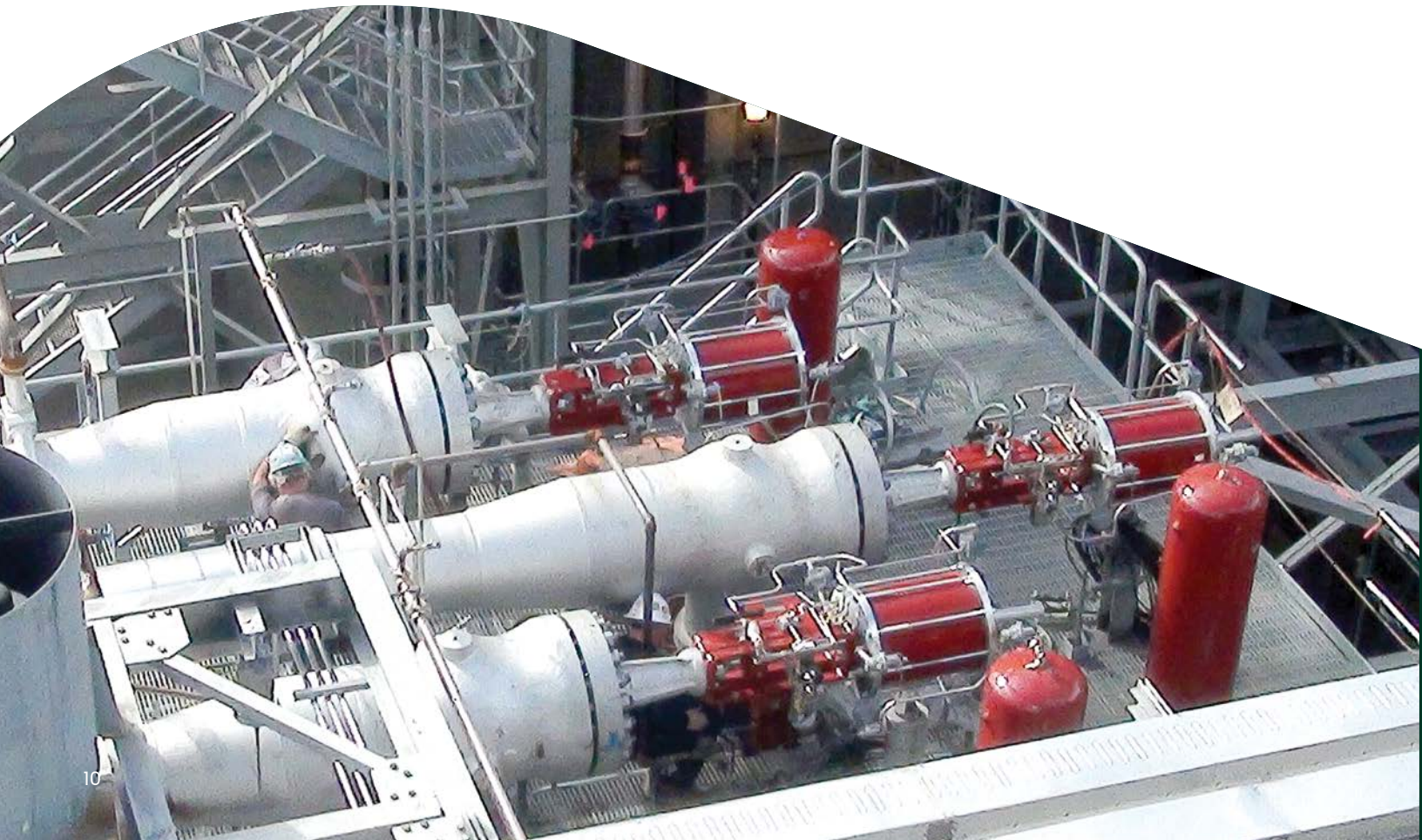
Robust plug design extends service life.

Digital Lifecycle Management

Baker Hughes has developed a holistic Valve Lifecycle Management (VLM) solution to help customers manage their valve fleet. The VLM solution can increase process plant efficiencies and decrease downtime with a seamless approach that integrates and deploys digital tools, Baker Hughes apps, diagnostic engineers and field technicians.

Ready for implementation in almost any plant worldwide, this innovative system can determine the health of a plant's control valves while the plant is online.

VLM can be integrated with most major distributed control systems (DCS), collecting data from almost any digital smart positioner. Using Baker Hughes Valve Lifecycle Management, plant operators can finally unlock the hidden potential of their field assets.

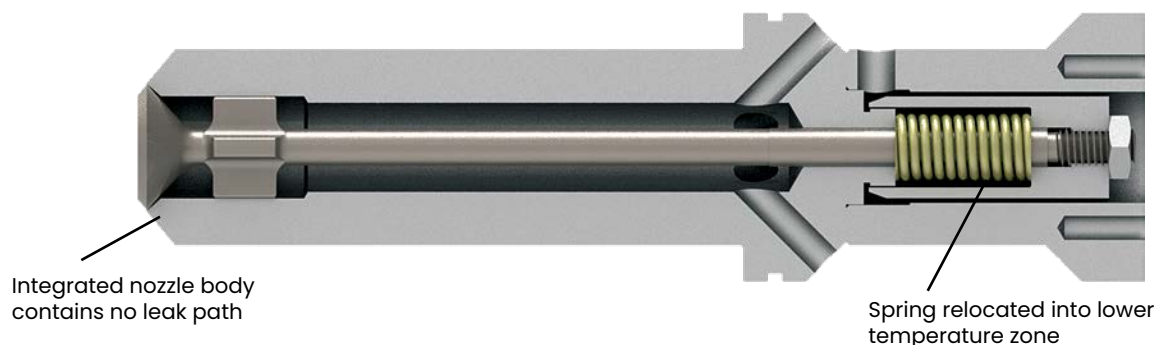


Masoneilan Spray Nozzle Technology

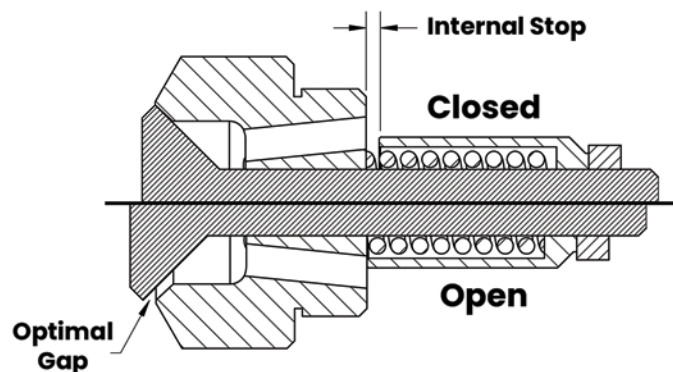
Masoneilan offers a full range of desuperheating options, ranging in pipe sizes from 4" through 48", customized to meet the application conditions for each installation, including steam flow/pipe size, water quantity and thermal differential.

Advanced Spray Nozzle Design

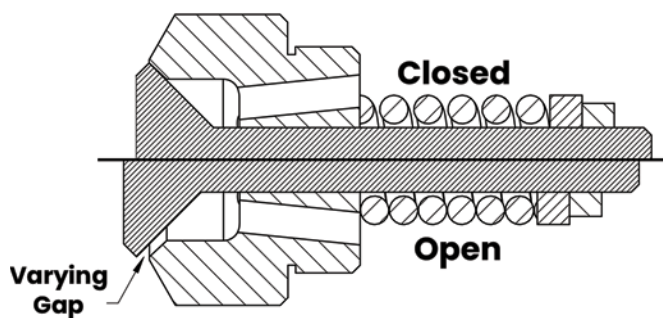
Masoneilan uses a traditional and well proven spring loaded nozzle design that throttles the spray orifice to maintain a conical spray distribution with a fine atomized spray mist as the volume of water varies. However, the state-of-the-art nozzle design also leverages many features unique to Masoneilan, including eliminating any potential spray nozzle leak path to avoid either water leakage into the pipe, or steam back-flow into the water lines. Additionally, the Masoneilan nozzles extend the Inconel springs away from the high thermal cycling zone into the steady state water region to reduce the thermal fatigue and extend product life. Mechanical stops within the nozzle are provided to differentiate against traditional nozzles that "chatter" in response to fluctuating water pressure.



Spring Loaded Spray Nozzle with Integrated Tip



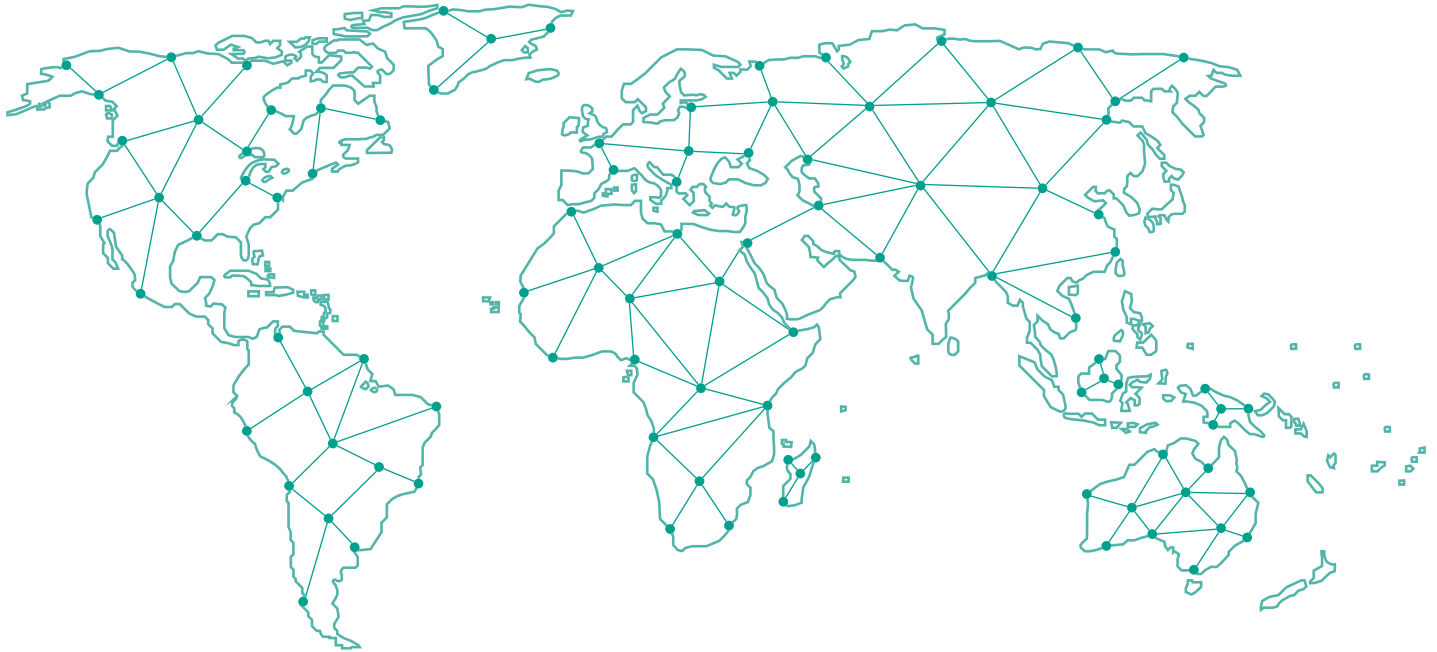
Masoneilan Nozzle Design



Competitors Nozzle Design

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