

Modum Chem[®] chemical injection metering control system

Reduce chemical costs while maintaining optimal injection to maintain flow assurance

 **Standard flow rate:[†]**
0.07 to 26.4 galUS/h [0.25 to 100 L/h]

 **Max. working pressure:[‡]**
10,000 psi [69 MPa]

Applications

Onshore and offshore surface applications using chemical treatments to reduce or inhibit corrosion and manage crude oil flow assurance

How it improves wells

Modum Chem[®] chemical injection metering control system is a smart device that reduces chemical injection costs and environmental footprint—without increasing the risk of flow disruption. The smart valve system measures and controls the flow rate of chemicals passing through it to maintain an optimal target flow rate. The technology also enables remote adjustments to accommodate changing well, surface, and system conditions.

Conventional chemical injection operations use manually controlled valves. If conditions change, someone must visit the wellsite to adjust the valves to maintain the desired injection rates. For example, fluid viscosity varies with temperature swings from warm days to cooler nights. To avoid frequent site visits but still ensure production, operators often inject production chemicals at a rate that exceeds the optimal dosing required—protecting against the worst-case scenario even if it occurs only infrequently. This practice ensures production but increases chemical costs and environmental footprint unnecessarily.

How it works

Modum Chem system integrates an ultrasonic flowmeter, a flow controller, a needle valve, and an LCD. The ultrasonic flowmeter measures the rate of injected fluid by sending a signal between two transducers in both the direction of fluid flow and in the opposing direction. The flow measurement is achieved by determining the difference in the time taken for the signals to travel with and against flow. This is known as time-of-flight measurement and is calculated by the flow controller.

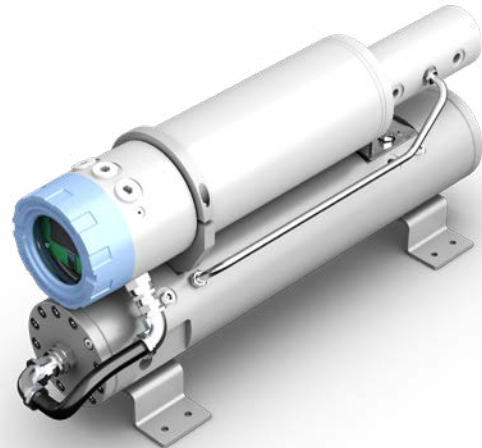
The LCD on the valve shows real-time flow rate, valve position, cumulative flow, voltage, and current.

The operator can select from three modes of operation:

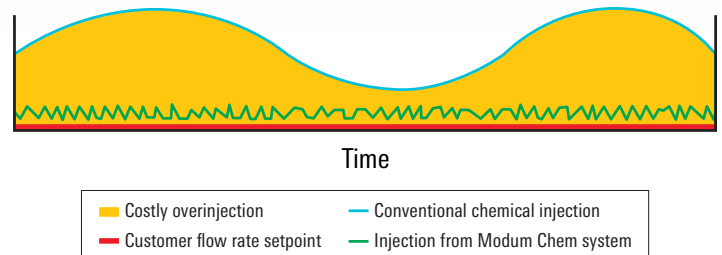
- In manual standby mode, the operator can jog the valve position by a relative position increment. Flow will be reported. It is recommended that this mode be used only for commissioning because it offers no control on the flow rate.
- In automatic position control mode, the operator sets a static valve position as with a conventional chemical injection valve. The system then reports the real-time flow rate but does not change it.

[†] Needle sizes can be optimized to suit the application up to a maximum of 158 galUS/h [600 L/h].

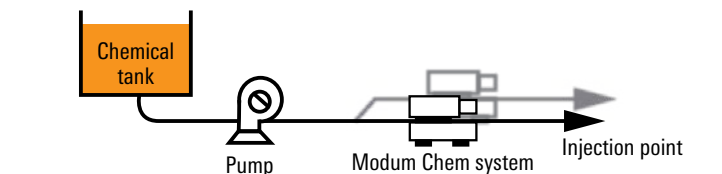
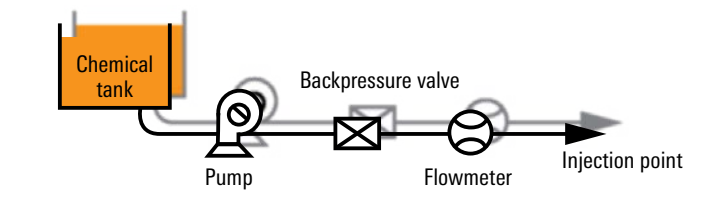
[‡] Valves can be qualified to 103 MPa [15,000 psi] on request.



Compact Modum Chem system reduces chemical costs and environmental footprint by helping operators maintain optimal injection rates.



Conventional chemical injection systems are unable to deliver at a constant rate, but Modum Chem system enables operators to automatically vary the rate in response to changing well conditions. The result: significant reduction in both flow assurance risks and expensive chemical waste.



Because of the accurate control from the Modum Chem system, operators can simplify and optimize injection into a multiwell system, saving time, money, and footprint on location.

Modum Chem

- In automatic flow control mode, the operator selects an optimal flow rate and an allowable drift range. If the rate falls outside of the drift range, the system modulates the integrated needle valve to maintain the programmed optimal flow rate target. If power is lost, the system maintains the valve position at the time of power loss, so chemicals continue to be injected until power is restored.

In all modes, if the system detects no flow—for example because of a failed pump or empty chemical tank—an alarm alerts the customer with a message on the LCD and sends a signal to the operator SCADA, if installed, enabling rapid remediation.

What it replaces

Conventional chemical injection applications typically require a chemical reservoir, pump, control device, and flowmeter for each injection point. Modum Chem system replaces both the control device and the flowmeter. The accurate control means operators can use a single

reservoir and pump to inject chemicals into a multiwell system, with smart valves regulating injection into each well.

Additional information

The system's flow controller can be connected to existing customer SCADA system or a Schlumberger AgoraGateway* ruggedized edge computing device to enable remote monitoring. Standard modules use MODBUS® protocol.

The compact design facilitates integration into skid packages or wellsite infrastructure without significant modifications to the existing chemical injection system.

System design is based on field-proven subsea chemical injection metering valve technology.

The technology requires no filtration and thus no filter-related maintenance.

Modum Chem System Specifications

Standard flow range, galUS/h [L/h]	0.07 to 26.4 [0.25 to 100]
Turndown ratio	400:1
Accuracy of reading	±2% over 0.5 galUS/h [2 L/h]
Min. differential pressure at 100 L/h, psi [kPa]	<50 [344]
Pressure rating, psi [MPa]	Standard, 10,000 [69]; available, 15,000 [103]
Temp. rating, seals, degF [degC]	Class S+U: 0 to 250 [−18 to 121]
Temp. rating, nonbore fluid-wetted components, degF [degC]	4 to 140 [−20 to 60]
Design codes	API Spec 6A, ISO 10423, NACE MR0175, IEC 60079-1
Design life	10 years
Viscosity	Viscosity-independent up to 100 cP
Installation orientation	No restriction
Weight, lbm [kg]	207.2 [94]
Process connections	NPT, autoclave, or customer specific
Materials	
Body material	316 or 316L stainless steel (SS)
Metallic components	825 SS, 316 or 316L SS, INCONEL 718, Elgiloy, 22% Cr duplex SS
Nonmetallic components	PTFE, polyamide, Kalrez®, and HNBR elastomeric seals
Valve trim	Precision needle and seat
Actuator	Low-power electric
ATEX enclosure	Certified Ex d, flameproof design
Actuator and Controls	
Power	24 V DC (≤28 W)
Control type	Closed-loop control in automatic position and flow modes Open-loop control in manual standby mode
Communication protocol	MODBUS TCP over Ethernet and MODBUS RTU over RS485
Local display	Flow rate, valve position, pressures, voltage, and current
ATEX certification	Zone 1, ATEX, IECEx Ex d (flameproof)
Ingress protection	IP66
Failure mode	Fail as is

All specifications are subject to change without notice.

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