Purge System Designs

Heavy Fouling Applications

Early cooperation between MOGAS and our customers has proven beneficial — resulting in optimal purge system designs, improved valve service life and effective purging of the adjacent piping.

Coking formation—sometimes referred to as asphaltene—can occur in high-fouling applications, depending on temperatures and pressures. This coke material has a tendency to harden and adhere to internal surfaces of the valve body, seats, and ball. Once this occurs, the required valve service break torque increases significantly from start-of-run (SOR) to end-of-run (EOR), and may eventually cause valve seizure or lock-up.

Purging has been demonstrated to be effective—in numerous field applications—at minimizing the ill effects of coke formation. MOGAS highly recommends purge systems designed specifically for valves in high-fouling applications to maximize their operating service life.

MOGAS® SEVERE SERVICE BALL VALVES

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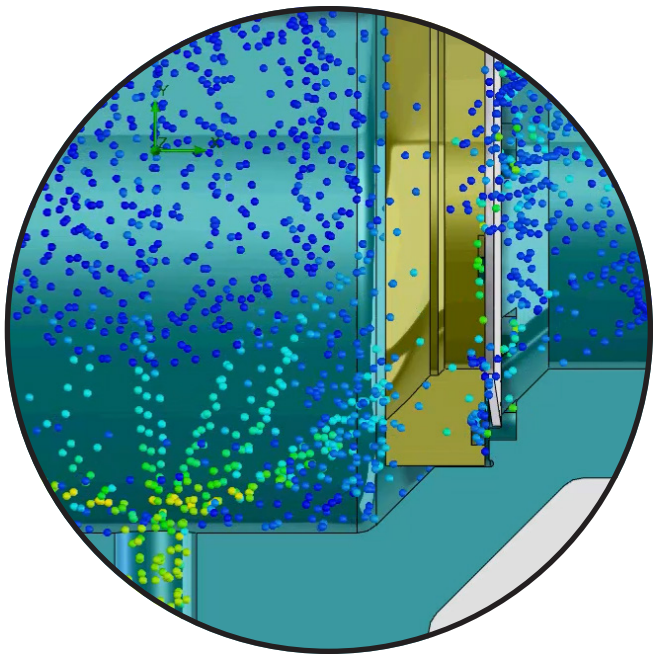
Purge System Objectives

- Prevent solids buildup
- Prevent internal damage to materials and coatings, extending life of ball and seats
- Minimize repairs between shutdowns
- Maintain cycling torque
- Maintain tight shut-off conditions
- Maintain operability of pressure instruments
- Provide valve warm-up
- Allow draining of trapped hot liquids



CFD Analysis Verifies Purge System Designs

- Computational Fluid Dynamics (CFD) analysis is used to verify all purge designs.
- Purge locations shown are for illustration purposes only
- Actual purge designs and locations will be determined based on application-specific data.

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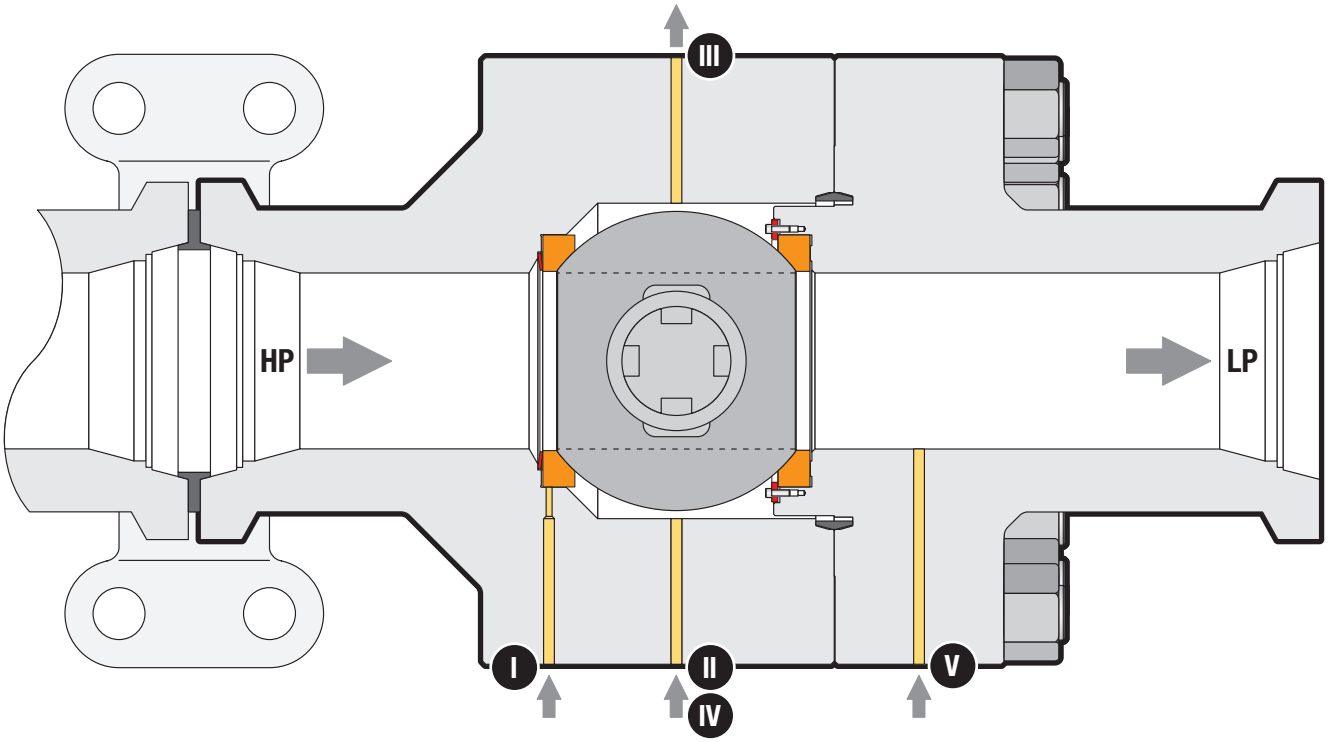
Purge Locations

Illustration viewed from top (12 o'clock) position. CA-1AS seat configuration shown.



TYPE	DESCRIPTION	FLOW		OPERATION
Type I	**Seat Pocket**	In	Continuous	All valve positions = practically no purge flow.
Type II	**Body Cavity**	In	Continuous	Valve cycling = high volume purge flow. Valve full open/closed = practically no purge flow.
Type III	**Drain**	Out	Continuous or intermittent	When activated, converts Type II purge into continuous flow for all valve positions.
Type IV	**Body Cavity + Spring + Upstream Piping**	In	Continuous	All valve positions = optimized purge flow.
Type V	**Flush**	In	Continuous or intermittent	All valve positions = optimized purge flow.

Notes

1 Purge locations shown are for illustration purposes only; actual purge locations will be determined based on application-specific data.
2 Purge types may be used independently or in combinations, depending on application requirements, process conditions or customer preferences.
3 Mating connections are customer choice; piping and fittings beyond mating connections are customer responsibility.
4 Compact flange connections are recommended for body; socket weld connections may be available, based on customer specifications; consult MOGAS engineering for specific details.

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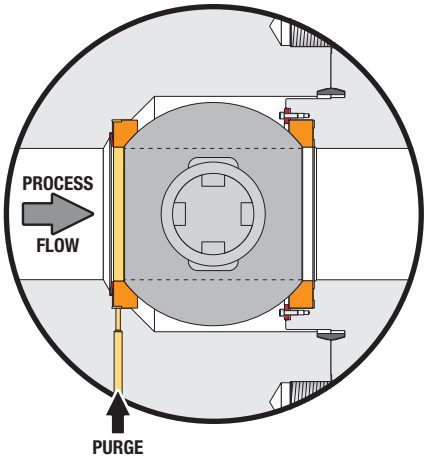


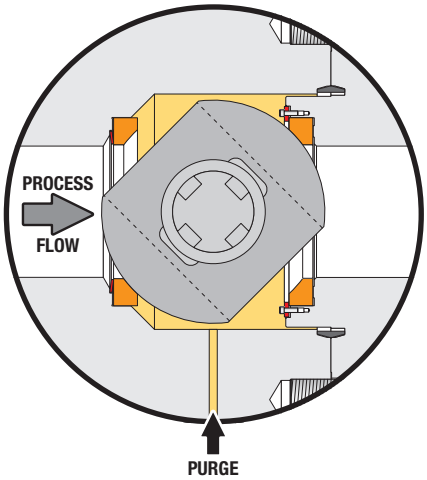
Type I – Seat Pocket

One (1) inlet purge located at the pressure-end seat pocket area directs clean purge media around perimeter of seat.

Note: Requires MOGAS seat design specific to Type I Purge for proper operation.

Continuous Purge Media

All valve positions = practically no purge flow.



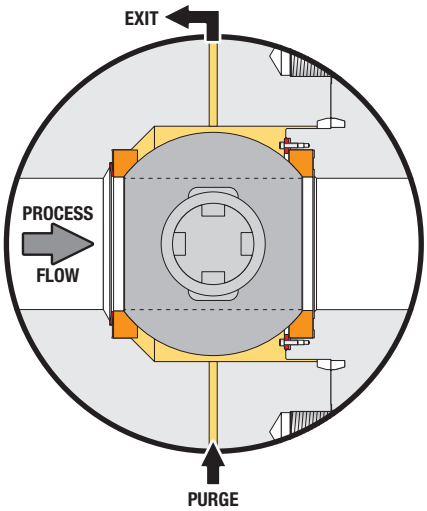
Type II – Body Cavity

One (1) inlet purge located at valve body cavity delivers clean purging media to this region.

Note: This area has a tendency to accumulate heavy coke build-up.

Continuous Purge Media

Valve cycling = optimized high volume purge flow.
Valve fully open / closed = practically no purge flow.



Type III – Drain

One (1) outlet line draws undesirable media away from valve body cavity and directs it to customer chosen location. (Commonly directed into process stream; must include appropriate check, block and control valves.)

Note: Customer is responsible for piping beyond purge connection.

Continuous or Intermittent Purge Media

When activated, converts Type II purge into optimized purge flow for all valve positions.

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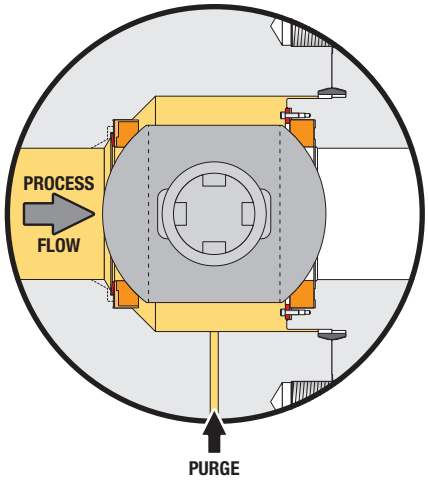


Type IV – Body Cavity + Spring + Upstream Piping

One (1) inlet purge located at valve body cavity delivers clean purging media to this region.

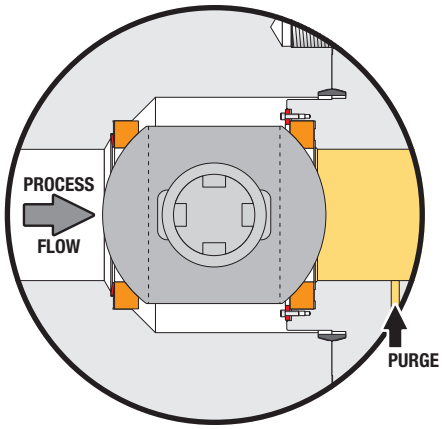
Unique upstream seat and spring pocket design allows purge media to flow

- between back of seat and spring
- between back of spring and spring pocket
- to upstream process piping

Note: Requires MOGAS seat and spring pocket design specific to Type IV Purge for proper operation. Not used where bi-directional sealing is required.

Continuous Purge Media

All valve positions = optimized purge flow.



Type V – Flush

One (1) inlet purge located between the sealing seat and valve body end (clamp, flange, etc.) introduces clean purge media into bore and piping.

Note: This design is typically used in applications with vacuum process conditions, but may be used in other applications as well.

Continuous or Intermittent Purge Media

All valve positions = optimized purge flow.

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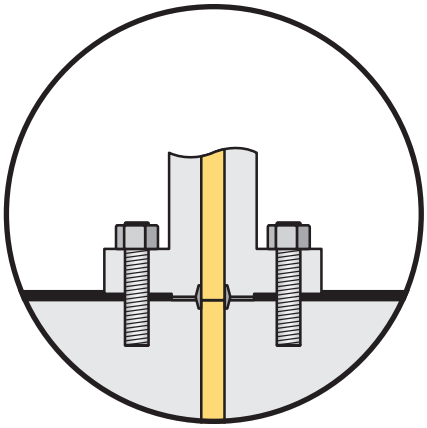
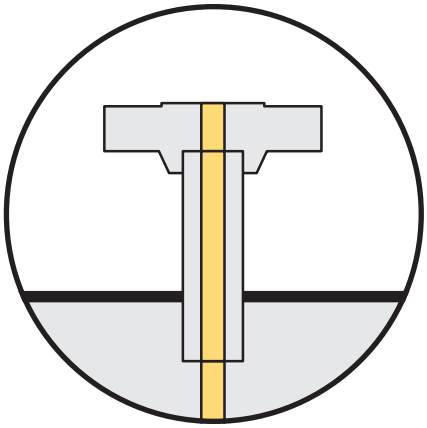


Body Connection Types

Compact Flange

- Preferred connection type used in all sizes and pressure classes where space is available



Socket Weld

- Optional connection type for lower pressure classes with space constraints

Customer Connection Types

MOGAS will supply valves with purge connections specified by the customer, including:

- Raised Face Flange (RFF)
- Ring Type Joint (RTJ)
- Clamp Connector (CL)
- Welded Ends – Socket Weld (SW); Butt Weld (BW)

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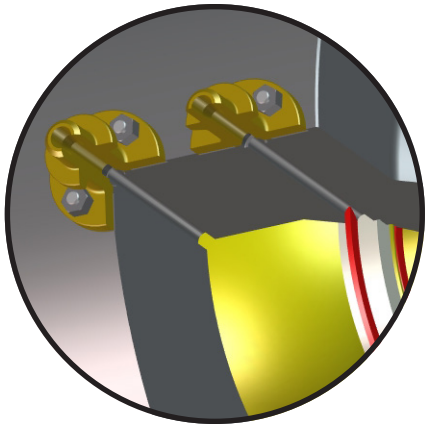

Optimized Purge Systems

Purge systems designed by MOGAS for application-specific conditions consider these factors:

- Purge design type
- Media type
- Volume and flow rate requirements
- Media pressure
- Media temperature
- Piping size
- Connection type
- Connection location

Commonly Used Purge Media in Heavy Fouling Applications

Liquids

Gas Oils (Vacuum, Atmospheric, Coker)
Cycle Oils (Light & Heavy)
Diesels (Light & Heavy)
Naphthas (Light & Heavy)

Gases

Hydrogen
Nitrogen

Customer Responsibilities

- Materials of construction
- Auxilliary connections to purge piping
- Specification of purge piping to be supplied
- Non-destructive exam requirements
- Provide purge media as specified
- Ensure all piping is safely connected and operational

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