



Design and test parameters for knife gate and slide gate valves

MSS-SP81 for Knife Gate Valves*

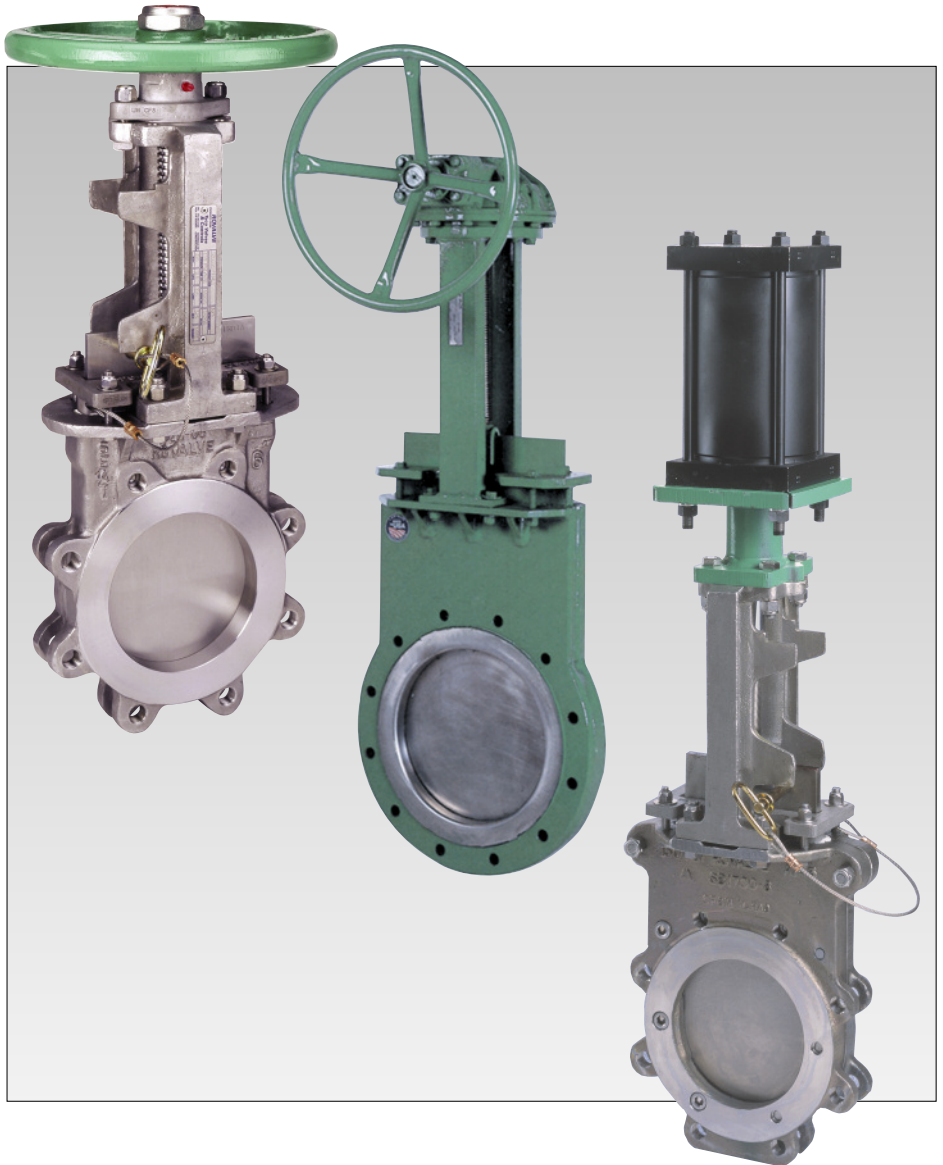
Tyco Valves & Controls applies the parameters as dictated by MSS-SP81 in the design and manufacture of many of its standard knife gate and slide gate valve products. The most important applicable parameters are the design and test pressures for the body, gate and seat along with the face-to-face dimension. However, many of our knife gate and slide gate products fall outside MSS-SP81 in scope, so in these cases, we apply MSS-SP81 where it makes sense for the product and potential application. The chart on page 2 displays the matrix of products and how they apply to MSS-SP81.

Other Applicable Standards

As the performance of many of our knife gate, slide gate and slurry valve products exceeds those established by MSS-SP81, other standards may apply including ANSI/FCI 70-2 Control Valve Leakage.

Special Applications

For specific applications and special valve products, other parameters will be considered. (Temperature and pressure relationship is specifically taken into account in design of product.)



* Manufacturer's Standardization Society Standard Practice # 81



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Knife Gate and Slide Gate Valve Testing Criteria

MSS-SP81 Defined

MSS-SP81 applies only to bonnetless metal-seated knife gates, 2" to 24" in size, 150 psi CWP. Sizes above 24" are not covered under this standard. Additionally, resilient seated knife gates, slurry knife gates and slide gate valves are not taken into account within MSS-SP81. These products are subject to the individual manufacturer's internal testing and design specifications.

Design and Testing

Body: MSS-SP81 requires the valve body (pressure vessel and related structure) to be designed for and hydrostatically pressure tested to 1.5 times the rated working pressure.

- Valve rated pressure: 150 psi
- Body test pressure: 225 psi

Gate: MSS-SP81 requires the gate to be designed for and hydrostatically pressure tested to 1.1 times the rated working pressure.

- Valve rated pressure: 150 psi
- Gate test pressure: 165 psi

Shutoff: MSS-SP81 has an allowable leakage rate (for metal-to-metal seated valves) of 40 cc per inch of diameter, per minute, at 40 psi. On a 12" valve this would be equal 40 times 12, or 480 cc per minute at 40 psi.

Face-to-Face: MSS-SP81 has specified face-to-face dimensions and tolerances of each valve size to assure ease of installation for the consumer, regardless of the valve manufacturer. See chart below for dimensions.

Notes:

A. Special, custom design valves are designed to suit a particular application. Where practical, the design and testing parameters for the body and gate as specified in MSS-SP81 are applied.

Example: For a 50 psi CWP knife gate valve, the following test pressures may apply:

- Body test pressure: 75 psi
- Gate test pressure: 55 psi

As each custom design valve is unique, you should consult your sales representative to confirm design and test pressure in each case.

B. Tyco Flow Control does apply, as a standard, the design and testing parameters for the body and gate as specified in MSS-SP81, to large diameter valves (above 24" to 48"). Contact your sales representative for larger sizes.

MSS-SP81 Matrix

Brand	Figure Number	MSS-SP81 Parameters			
		Body Test	Shutoff Test	Gate Test	Face-to-Face
Rovalve	1	Yes	Yes	Yes	No
	F17	Yes	Superior (A)	Yes	Yes
	F20	Yes	Yes	Yes	Yes
	S17	Yes	Superior (A)	Yes	Yes
	SB1700	Yes	Superior (A)	Yes	Yes
	S20	Yes	Yes	Yes	Yes
	F215	Yes	N/A (B)	Yes	Yes
	F220	Yes	Yes	Yes	Yes
	TIV	Yes	Yes	Yes	No
	L&M Valve	M145	Yes	Superior (C)	Yes
M202		Yes	Yes	Yes	Yes
Clarkson	KGA	No	No (D)	No	No
	KGD	No	No (D)	No	Yes (E)

Notes:

- A. MSS-SP81 does not apply to resilient seated knife gate valves. The Tyco Flow Control standard for the F17, S17 and SB1700 is ZERO leakage of water from 1 to 150 psi in both directions.
- B. MSS-SP81 does not apply to slide gate valves. However, Tyco Flow Control applies this standard for valve sizes 2" to 12" with standard seating.
- C. The M145 features a polymer liner and offers shutoff exceeding the requirements of MSS-SP81. The allowable leak rate for the M145 is 20 cc per inch of diameter at 40 psi in BOTH directions.
- D. Both the KGA and KGD are elastomer sleeved slurry valves and MSS does not apply. Both products provide bi-directional, ZERO leakage across the sleeves.
- E. For ease of replacement and installation, the KGD is provided in MSS face-to-face dimension.

Face-to-Face per MSS-SP81

Valve Size	2	3	4	6	8	10	12	14	16	18	20	24
MSS Face-to-face	1 ^{7/8}	2	2	2 ^{1/4}	2 ^{3/4}	2 ^{3/4}	3	3	3 ^{1/2}	3 ^{1/2}	4 ^{1/2}	4 ^{1/2}

Notes:

Valve flanges are drilled and tapped to ANSI B16.5/150.

Test Procedures for Rovalve and L&M Valve Products

Notes:

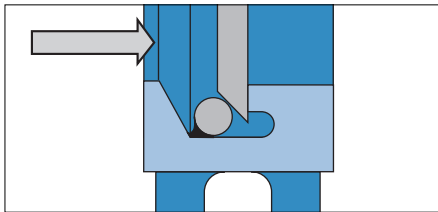
- A. Certified tests are available upon request at time of order.
- B. Because of testing facilities, valves above 72" will not be hydrostatically tested unless it is a part of the specification and purchase order.
- C. Valves larger than 24" with special flange drilling may require additional equipment to test. Consult your sales representative.
- D. L&M valves with metal liners, Rovalve Figure F215 with hardened gate or seat and Figure F215 larger than 12" will not be leak tested unless it is part of the specification and purchase order.
- E. Square or rectangular valves do not have seat leakage tests unless specified on the order.

Body: Valve body is blanked, gate is off the seat. Cold, clean water is introduced and pressure is applied until maximum test pressure is achieved. Body is visually examined for leak points. Any evidence of leakage indicates failure. A packing leak at the maximum test pressure (1.5 times the rated pressure) is not cause for rejection.

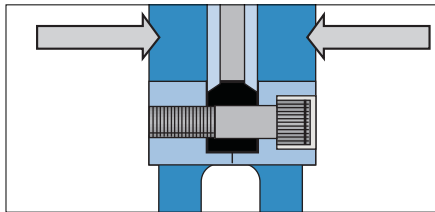
Gate: Valve body is blanked on one side, gate is fully closed. Cold, clean water is introduced and pressure applied until maximum test pressure is achieved. Gate is visually examined for leak points and deflection. Any evidence of leakage or excess deflection indicates failure.

Seat: Refer to the illustrations below. Valve body is blanked on one side (on uni-directional valves, this would be opposite the seat side of the valve) gate is fully closed. Cold, clean water is introduced and pressure applied until maximum test pressure is achieved. Seat is visually examined for leakage. Any evidence of excessive leakage indicates failure. The leakage on valves tested to ANSI Class V or Class VI is captured and measured to determine actual leak rate. Refer to Standard Shutoff chart below for allowable leakage.

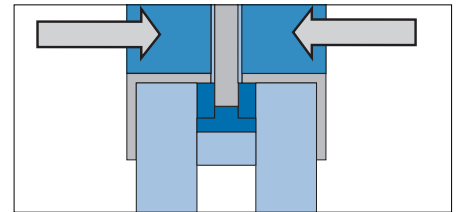
(Uni-directional knife gate and slide gate valves have a seat on one side of the gate and the normal test is with pressure pushing the gate against the seat. Bi-directional valves may be tested in one or both directions. Refer to Standard Shutoff chart below.)



Metal-to-Metal seated valves, like the S20 and 220, are uni-directional and are tested with pressure pushing the gate against the seat.



Perimeter resilient seated valves, like the S17 and SB1700, are bi-directional. With a perimeter seat, pressure against the gate is not required to create a seal, so testing is done in one direction only.



Polymer lined valves, like the M145, have bi-directional, pressure assisted seals. Because of this, they are tested in both directions with pressure pushing the gate against the seat.

Notes:

- A. Total acceptable leak rate equals valve size times number of cc's per minute. Metal seated, round ported knife gates meet MSS-SP81 which has an allowable leak rate of 40 cc/inch/min at 40 psi.
- B. Includes all Rovalve metal seated, round ported knife gate valves with standard seat. Valves with modified seats may not meet the standard leak rate, Consult your sales representative.
- C. Includes all Rovalve normally metal seated knife gate valves with optional resilient O-ring seat.
- D. Although perimeter seated valves are designed for two-way shutoff, seat leakage testing is required in one direction only.
- E. Applies to all round or rectangular ported multi-piece polymer lined L&M knife gate valves. Valves are fully rated for bi-directional flow and shutoff.
- F. The M145 is available on special order with an ANSI Class V leak rate. This equals valve size times .05 CC per minute at test pressure.

Standard Shutoff

Valve Style	Test psi	Leakage (A)	Test Direction
Uni-directional Metal-to-Metal seat, (Figures 1, F20, S20, 220 and TIV) (B)	40	40 cc	Normal
Uni-directional O-ring Seat (Figures 1, F20, S20, 220 and TIV with O-ring) (C)	40	ZERO	Normal
Resilient Perimeter Seat S17, SB1700 (D)	150	ZERO	Exception
Uni-directional Metal-to-Metal Slide Gate Rovalve Fig 215 2" to 12"	40	40 cc	Normal
Polymer Lined Knife Gate L&M Valve M145 (E) (F)	40	20 cc	Both
Polymer Lined Slide Gate L&M Valve M202	40	40 cc	Both

This chart describes normally accepted leak rates for various Rovalve and L&M Valve products. Depending on the actual application, superior performance may be available. Advise your sales representative of desired performance.

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