

Pig Valve Temperature/Pressure Rating and Test Information

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1.0 PURPOSE

To outline the temperature/pressure rating and test information of Pig Valve.

2.0 MAXIMUM ALLOWABLE WORKING PRESSURE (MAWP)

Table 1: Maximum Allowable Working Pressure (MAWP) by Temperature and ASME Class ^{[1], [2]}

Material	Temperature (°F)	MAWP by ASME Class (psi)				
		150	300	600	900	1500
A182-F316	250	225	590	1180	1770	2945
	100	275	720	1440	2160	3600
	-20					
	-50					
A182-F51	250	245	705	1410	2115	3525
	100	290	750	1500	2250	3750
	-20					
	-50					
A350-LF2	250	245	665	1335	2000	3330
	100	285	740	1480	2220	3705
	-20					
	-50					

Notes:

If updating Table 1 it is also found in ID-PV-005. Maximum allowable working pressures at 250 °F are determined from linear interpolation of values between 200 °F and 300 °F then rounded down to the next 5 psi increment.

Specifications are Subject to Change Without Prior Notice – All Dimensions: inch [mm]

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3.0 HYDROSTATIC TEST PRESSURE AND DURATION

All Pig Valves sized NPS 4" and larger will undergo a low-pressure hydrostatic shell test at 50 psi for a duration of 2 min. This test is an Argus requirement to specifically test the seal between tailpieces and body and is not governed by API or ASME.

Table 2: Hydrostatic Shell Test Pressures by ASME Class (150% MAWP at 100 °F) ^{[3], [4]}

Material	Pressure by ASME Class (psi)				
	150	300	600	900	1500
A182-F316	425	1100	2175	3250	5400
A182-F51	450	1125	2250	3375	5625
A350-LF2			2225	3350	5575

Table 3: Seat Test Pressures by ASME Class (110% MAWP at 100 °F) ^{[5], [6]}

Material	Pressure by ASME Class (psi)				
	150	300	600	900	1500
A182-F316	325	800	1600	2400	3975
A182-F51		825	1650	2475	4125
A350-LF2				2450	4100

Notes:

As per references [3] and [5], all test pressures in Tables 2 and 3 are rounded up to the next 25 psi increment. Hydrostatic testing shall be performed on the fully assembled valve prior to painting^[7]. The terms Seat Test and Hydrostatic Seat Test from API Specification 6D are equivalent to the term Valve Closure Test from ASME B16.34.

Table 4: Minimum Duration of Hydrostatic Shell Tests ^[4]

NPS Valve Size (in)	Test Duration (min)
2-4	2
6-10	5
12-18	15
20	30

Table 5: Minimum Duration of Hydrostatic Seat Tests ^[6]

NPS Valve Size (in)	Test Duration (min)
2-4	2
6-18	5
20	10

Notes:

The API test durations given in references [4] and [6] are all longer than the ASME equivalents given in reference [5] and, as such, the longer durations will be used for qualification.

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4.0 PNEUMATIC TEST PRESSURE AND DURATION

API Standard 598 specifies a “low-pressure closure” test pressure for “valves except butterfly and check” of 80 ± 20 psi ^[7]. And as per API Specification 6D, if required by the customer, a Type II valve classification can be achieved with pneumatic seat testing completed at the durations specified in Table 5 at 80-100 psi ^[8]. As such, to accommodate both requirements, 80 +20/-0 psi will be used for all valve sizes and ASME pressure classes for qualification.

Table 6: Minimum Duration of Pneumatic Shell Tests

NPS Valve Size (in)	Test Duration (min)
2	2
3-6	
8-12	
14-20	5

Notes:

A low-pressure pneumatic shell test is an Argus requirement to test stem and entry seals and is not governed by API or ASME. The test durations were selected to provide sufficient time to perform a complete inspection during testing.

Table 7: Minimum Duration of Pneumatic Seat Tests ^[9]

NPS Valve Size (in)	Test Duration (min)
2	2
3-6	
8-20	

Note:

The actual test durations as per *API Standard 598* are 15 sec for 2 in valves, 1 min for 3-6 in valves and 2 min for 8-20 in valves. However, these test durations were increased to 2 min to provide sufficient time to perform a complete inspection during testing.

5.0 REFERENCES

1. ASME. 2021. *Valves - Flanged, Threaded, and Welding End*, ASME B16.34-2020. The American Society of Mechanical Engineers, New York, Table 2-1.1C, Table 2-2.2C, Table 2-2.8C, pg. 32, 89-90, 110.
2. API. 2021. *Specification for Pipeline Valves*, API Specification 6D-2021. API Publishing Services, Washington, D.C., Section 4.3, pg. 14-15.
3. ASME. 2021. *Valves - Flanged, Threaded, and Welding End*, ASME B16.34-2020. The American Society of Mechanical Engineers, New York, Section 7.1, pg. 11.
4. API. 2021. *Specification for Pipeline Valves*, API Specification 6D-2021. API Publishing Services, Washington, D.C., Section 10.3, pg. 44-45.
5. ASME. 2021. *Valves - Flanged, Threaded, and Welding End*, ASME B16.34-2020. The American Society of Mechanical Engineers, New York, Section 7.2, pg. 11.
6. API. 2021. *Specification for Pipeline Valves*, API Specification 6D-2021. API Publishing Services, Washington, D.C., Section 10.4.1, pg. 45-46.
7. API. 2016. *Valve Inspection and Testing*, API Standard 598-2016. API Publishing Services, Washington, D.C., Table 3, pg. 7.
8. API. 2021. *Specification for Pipeline Valves*, API Specification 6D-2021. API Publishing Services, Washington, D.C., Annex I.9.1, pg. 141.
9. API. 2016. *Valve Inspection and Testing*, API Standard 598-2016. API Publishing Services, Washington, D.C., Table 4, pg. 8.