API 598 is a standard for pressure testing and inspecting new ball, butterfly, gate, globe and check valves. It defines acceptable industry-wide leakage rates for liquid and gas media. Included in this tech bulletin are charts listing the type of test performed, pressures used, and maximum expected and allowable leak rates and bubble-tightness.

Maximum Allowable Leakage for Closure/Seat(s) Test

	API 598					API 6D			
	Metal-Metal			Resilient					
Valve Size	Liquid	Air/Gas		Liquid	Air/Gas	Liquid	Air/Gas		
to DN50	0	0		0	0	No visible leakage at applicable test pressure for specified test duration.			
DN65-DN100	12	12		0	0				
DN125	12	12		0	0				
DN150	12	12		0	0				
DN200	20	40		0	0				
DN250	20	40		0	0				
DN300	20	40		0	0				
DN350-DN450	28	56		0	0				
DN500 up	28	56		0	0				

(Allowable leakage rates are drops/minute for liquid and bubbles/minute for air/gas.)

Maximum Allowable Leakage Rates for Closure Tests

Valve Size		All Resilient-seated Valves[b]	Metal Seated Valves Except Check				Metal Seated Check Valves		
DN (mm)	NPS (in.)		Liquid Test [a] (drops/min)	Liquid Test (ml/min)	Gas Test [a] (bubbles/min)	Gas Test (ml/min)	Liquid Test (ml/min)	Gas Test (m^3/h)	Gas Test (ft^3/h)
≤ 50	≤ 2	0	0 [b]	0 [b]	0 [b]	0 [b]	6	0.08	3
65	$2^1/_2$	0	5	0.31	10	0.10	7.5	0.11	3.75
80	3	0	6	0.38	12	0.12	9	0.13	4.5
100	4	0	8	0.50	16	0.16	12	0.17	6
125	5	0	10	0.63	20	0.20	15	0.21	7.5
150	6	0	12	0.75	24	0.24	18	0.25	9
200	8	0	16	1.00	32	0.32	24	0.34	12
250	10	0	20	1.25	40	0.40	30	0.42	15
300	12	0	24	1.50	48	0.48	36	0.50	18
350	14	0	28	1.75	56	0.56	42	0.59	21
400	16	0	32	2.00	64	0.64	48	0.67	24
450	18	0	36	2.25	72	0.72	54	0.76	27
500	20	0	40	2.50	80	0.80	60	0.84	30
600	24	0	48	3.00	96	0.96	72	1.01	36
650	26	0	52	3.25	104	1.04	78	1.09	39
700	28	0	56	3.50	112	1.12	84	1.18	42
750	30	0	60	3.75	120	1.20	90	1.26	45
800	32	0	64	4.00	128	1.28	96	1.34	48
900	36	0	72	4.50	144	1.44	108	1.51	54
1000	40	0	80	5.00	160	1.60	120	1.68	60
1050	42	0	84	5.25	168	1.68	126	1.76	63
1200	48	0	96	6.00	192	1.92	144	2.02	72

[a] For the liquid test, 1 mL is considered equivalent to 16 drops. For the gas test, 1 mL is considered equivalent to 100 bubbles.

[b] There shall be no leakage for the minimum specified test duration. For a liquid test, 0 drops means no visible leakage per minimum specified test duration. For a standard gas test, 0 bubbles means less than 1 bubble per minimum specified test duration. For a high-pressure pneumatic closure test, refer to 5.4.

[c] Leakage rates for sizes above DN 1200 (NPS 48) shall be calculated by the following formulas:

Liquid test for metal seated valves except check: 2 x NPS (drops/min)

Gas test for metal seated valves except check: 4 x NPS (bubbles/min)

Liquid test for metal seated check valves: 3 x NPS (cc/min)

Gas test for metal seated check valves: 0.042 x NPS (m^3/h)

Gas test for metal seated check valves: 1.5 x NPS (ft^3/h)

Test Requirements by Valve Type & Specification											
	API 598									API 6D	ANSI B16.34 or MSS SP-61
	Up to DN100 up to 1500LB Over DN100 up to 600LB			Up to DN100 above 1500LB Over DN100 above 600LB			Resilient-seated		Lubricat'd.		
							Floating	Trunnion	Plug		
TEST TYPE	Gate	Globe	Check	Gate	Globe	Check	Ball	or B/fly	Valves		
Shell Hydro	Required	Required	Required	Required	Required	Required	Required	Required	Required	Required	Required
Backseat Hydro*	Required	Required	N/A	Required	Required	N/A	N/A	N/A	N/A	Required	N/A
Seat(s) Hydro	Optional	Required	Required	Required	Required	Required	Optional	Required^	Required	Required	Note 1
Seat(s) LP (pneum.)	Required	Optional	Optional	Optional	Optional	Optional	Required	Optional^	Optional	Optional	Note 1

(*Backseat test required for all valves that have backseat feature except bellows-sealed valves.)

(^For metal-seated ball & butterfly valves the LP closure test is required and the hydro closure test is optional.)

1) MSS SP-61 allows LP closure test on valves below 600LB for DN300 and smaller, and on all pressure classes for DN100 and smaller. ANSI B16.34 allows an LP closure test on valves below 600LB for DN200 and smaller, and all pressure classes for DN100 and smaller.

Test Pressures by Material & Pressure Class													
		API 598										API 6D	
Class	Test	A105, WCB, LF2		WC1, LC1, LCB		WC6, WC9, C5		CF3(M),CF8(M), F316		F304L, F316L, CN7M			
150LB	Shell Hydro	450	psig	400	psig	450	psig	425	psig	350	psig	425	psig
	Seat(s) Hydro	325	psig	300	psig	325	psig	325	psig	275	psig	300	psig
	Seat(s) LP	60-100	psig	60-100	psig	60-100	psig	60-100	psig	60-100	psig	80 +/-10	psig
300LB	Shell Hydro	1125	psig	1050	psig	1125	psig	1100	psig	900	psig	1100	psig
	Seat(s) Hydro	825	psig	775	psig	825	psig	800	psig	675	psig	800	psig
	Seat(s) LP	60-100	psig	60-100	psig	60-100	psig	60-100	psig	60-100	psig	80 +/-10	psig
600LB	Shell Hydro	2225	psig	2100	psig	2250	psig	2175	psig	1800	psig	2175	psig
	Seat(s) Hydro	1630	psig	1550	psig	1650	psig	1600	psig	1325	psig	1600	psig
	Seat(s) LP	60-100	psig	60-100	psig	60-100	psig	60-100	psig	60-100	psig	80 +/-10	psig
800LB	Shell Hydro	3000	psig		psig	3000	psig	2900	psig	2400	psig		psig
	Seat(s) Hydro	2175	psig		psig	2200	psig	2150	psig	1800	psig		psig
	Seat(s) LP	60-100	psig	60-100	psig	60-100	psig	60-100	psig	60-100	psig	80 +/-10	psig
900LB	Shell Hydro	3350	psig	3150	psig	3375	psig	3250	psig	2700	psig	3250	psig
	Seat(s) Hydro	2450	psig	2300	psig	2475	psig	2400	psig	2000	psig	2400	psig
	Seat(s) LP	60-100	psig	60-100	psig	60-100	psig	60-100	psig	60-100	psig	80 +/-10	psig
1500LB	Shell Hydro	5575	psig	5225	psig	5625	psig	5400	psig	4500	psig	5400	psig
	Seat(s) Hydro	4100	psig	3825	psig	4125	psig	3975	psig	3300	psig	4000	psig
	Seat(s) LP	60-100	psig	60-100	psig	60-100	psig	60-100	psig	60-100	psig	80 +/-10	psig
2500LB	Shell Hydro	9275	psig	8700	psig	9375	psig	9000	psig	7500	psig	9000	psig
	Seat(s) Hydro	6800	psig	6375	psig	6875	psig	6600	psig	5500	psig	6600	psig
	Seat(s) LP	60-100	psig	60-100	psig	60-100	psig	60-100	psig	60-100	psig	80 +/-10	psig

Minimum Test Duration									
	API 598					API 6D		MSS SP-61 & ANSI B16.34	
	Shell Test		Backseat	Seat(s) Test		Shell Test	Seat(s)	Shell Test	Seat(s)
Valve Size	Check	Other		Check	Other				
to DN50	1 min.	15 sec.	15 sec.	1 min.	15 sec.	2 min*	2 min*	15 sec.	15 sec.
DN65-DN100	1 min.	1 min.	1 min.	1 min.	1 min.	2 min.	2 min.	1 min.	30 sec.
DN125	1 min.	1 min.	1 min.	1 min.	1 min.	N/A	N/A	1 min.	30 sec.
DN150	1 min.	1 min.	1 min.	1 min.	1 min.	5 min.	5 min.	1 min.	30 sec.
DN200	1 min.	2 min.	1 min.	1 min.	2 min.	5 min.	5 min.	1 min.	30 sec.
DN250	1 min.	2 min.	1 min.	1 min.	2 min.	5 min.	5 min.	3 min.	1 min.
DN300	1 min.	2 min.	1 min.	1 min.	2 min.	15 min.	5 min.	3 min.	1 min.
DN350-DN450	2 min.	5 min.	1 min.	2 min.	2 min.	15 min.	5 min.	3 min.	1 min.
DN500 up	2 min.	5 min.	1 min.	2 min.	2 min.	30 min.	5 min.	3 min.	2 min.

(*Applies to DN50 only)