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WILLIAMS
Valve Corp.
since 1918
williamsvalve.com 1800-221-1115

Pressure Temperature Rating

Class	Temp °F	A216 WCB	A217 C5	A217 WC6	A217 WC9	A352 LCB	A352 LC3
150	-20 to 100	285	290	290	290	265	290
	200	260	260	260	260	250	260
	300	230	230	230	230	230	230
	400	200	200	200	200	200	200
	500	170	170	170	170	170	170
	600	140	140	140	140	140	140
	650	125	125	125	125	125	125
	700	110	110	110	110	-	-
	750	95	95	95	95	-	-
	800	80	80	80	80	-	-
	850	65	65	65	65	-	-
	900	50	50	50	50	-	-
	950	35	35	35	35	-	-
	1000	20	20	20	20	-	-
300	-20 to 100	740	750	750	750	695	750
	200	675	750	710	715	655	750
	300	655	730	675	675	640	730
	400	635	705	660	660	620	705
	500	600	665	640	640	585	665
	600	550	605	605	605	535	605
	650	535	590	590	590	525	590
	700	535	570	570	570	-	-
	750	505	530	530	530	-	-
	800	410	500	510	510	-	-
	850	270	440	485	485	-	-
	900	170	355	450	450	-	-
	950	105	260	380	380	-	-
	1000	50	190	225	270	-	-
600	-20 to 100	1480	1500	1500	1500	1390	1500
	200	1350	1500	1425	1430	1315	1500
	300	1315	1455	1345	1355	1275	1455
	400	270	1410	1315	1295	1235	1410
	500	1200	1330	1285	1280	1165	1330
	600	1095	1210	1210	1210	1065	1210
	650	1075	1175	1175	1175	1045	1175
	700	1065	1135	1135	1135	-	-
	750	1010	1065	1065	1065	-	-
	800	825	995	1015	1015	-	-
	850	535	880	975	975	-	-
	900	345	705	900	900	-	-
	950	205	520	755	755	-	-
	1000	105	385	445	445	-	-

Class	Temp °F	A216 WCB	A217 C5	A217 WC6	A217 WC9	A352 LCB	A352 LC3
900	-20 to 100	2200	2250	2250	2250	2085	2250
	200	2025	2250	2135	2150	1970	2250
	300	1970	2185	2020	2030	1915	2185
	400	1900	2115	1975	1945	1850	2115
	500	1840	1995	1925	1920	1745	1995
	600	1640	1815	1815	1815	1600	1815
	650	1610	1765	1765	1765	1570	1765
	700	1600	1705	1705	1705	-	-
	750	1510	1595	1595	1595	-	-
	800	1235	1490	1525	1525	-	-
	850	805	1315	1460	1460	-	-
	900	510	1060	1350	1350	-	-
	950	310	780	1130	1130	-	-
	1000	155	575	670	805	-	-
1500	-20 to 100	3705	3750	3750	3750	3470	3750
	200	3375	3750	3560	3580	3280	3750
	300	3280	3640	3365	3385	3190	3640
	400	3170	3530	3290	3240	3085	3530
	500	2995	3325	3210	3200	2910	3325
	600	2735	3025	3025	3025	2665	3025
	650	2685	2940	2940	2940	2615	2940
	700	2665	2840	2840	2840	-	-
	750	2520	2660	2660	2660	-	-
	800	2060	2485	2540	2540	-	-
	850	1340	2195	2435	2435	-	-
	900	860	1765	2245	2245	-	-
	950	515	1305	1885	1885	-	-
	1000	260	960	1115	1340	-	-
2500	-20 to 100	6170	6250	6250	6250	5785	6250
	200	5625	6205	6250	6250	5470	6250
	300	5470	5965	6015	6070	5315	6070
	400	5280	5880	5775	5880	5145	2880
	500	4990	5540	5540	5540	4850	5540
	600	4560	5040	5040	5040	4440	5040
	650	4475	4905	4905	4905	4355	4905
	700	4440	4730	4730	4730	-	-
	750	4200	4400	4430	4430	-	-
	800	3430	4230	4230	4230	-	-
	850	2230	4030	4060	4060	-	-
	900	1430	3085	3745	3745	-	-
	950	860	2285	2655	3145	-	-
	1000	430	1655	1800	2170	-	-

Reference: ASME B16.34

WCB not recommended for prolonged use above 800 F

Forging Materials

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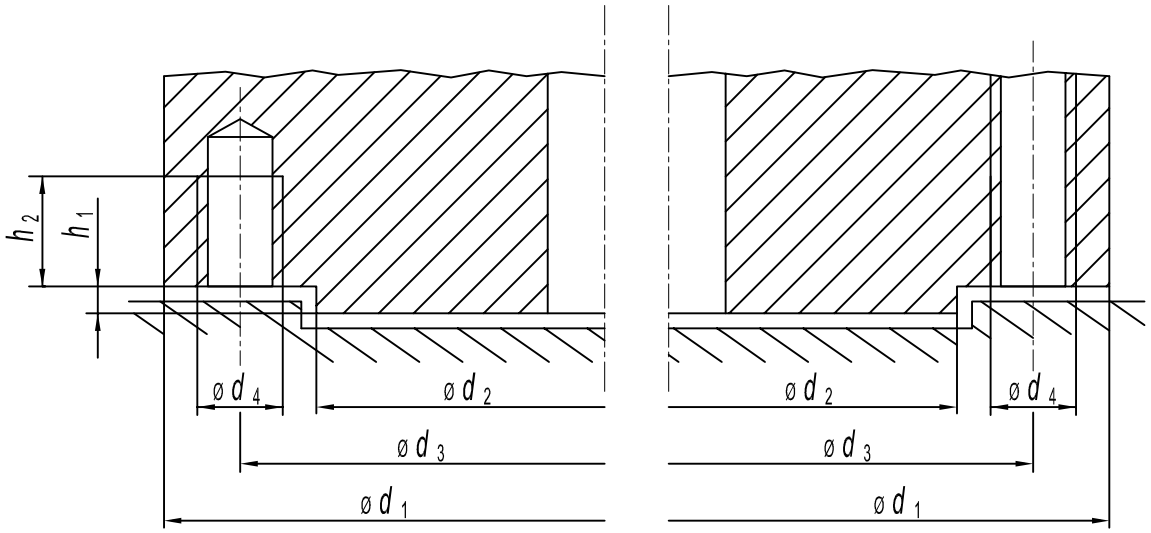
Specifications

Williams Material Suffix	Common Designation	ASTM Forging Specification	Service Recommendations
A105N	1/4% Max Carbon Steel	ASTM A105N	Non-corrosive applications including water, oil and gases at temperatures between -20°F (-30°C) and +800°F (+427°C).
LF2	Low Temp Carbon Steel	ASTM A350 Grade LF2	Non-corrosive applications at temperatures from -50°F (-46°C) to +800°F (+427°C).
F5	5%Chrome 1/2%Moly	ASTM A182 Grade F5	Non-corrosive applications at temperatures between -20°F (-30°C) and +1200°F (+650°C).
F9	9%Chrome 1%Moly	ASTM A182 Grade F9	Non-corrosive applications at temperatures between -20°F (-30°C) and +1200°F (+650°C).
F11	1-1/4%Chrome 1/2%Moly	ASTM A182 Grade F11	Non-corrosive applications including water, oil and gases at temperatures between -20°F (-30°C) and +1100°F (+593°C).
F22	2-1/4%Chrome 1%Moly	ASTM A182 Grade F22	Non-corrosive applications including water, oil and gases at temperatures between -20°F (-30°C) and +1100°F (+593°C).
F91	9%Chrome 1%Moly	ASTM A182 Grade F91	Non-corrosive applications at temperatures between -20°F (-30°C) and +1200°F (+650°C).
304	19%Chrome 9%Nickel	ASTM A182 Grade F304	Applications at temperatures up to +1000°F (+538°C).
304L	19%Chrome, 10%Nickel Low Carbon	ASTM A182 Grade F304L	Applications at temperatures up to +800°F (+427°C).
304H	18%Chrome 9%Nickel	ASTM A182 Grade F304H	Applications at temperatures up to +800°F (+427°C).
316	19%Chrome, 10%Nickel 2%Moly	ASTM A182 Grade F316	Applications at temperatures up to +1000°F (+538°C).
316L	19%Chrome, 10%Nickel 2%Moly, Low Carbon	ASTM A182 Grade F316L	Applications at temperatures up to +800°F (+427°C).
316H	18%Chrome, 8%Nickel with Molybdenum	ASTM A182 Grade F316H	Applications at temperatures up to +800°F (+427°C).
317L	25%Chrome, 21%Nickel 3/4%Moly	ASTM A182 Grade F317L	317L has superior corrosion resistance in difficult environments and can be used at temperatures between +1700°F (+927°C) to +2200°F (+1204°C).
321	18%Chrome, 10%Nickel with Titanium	ASTM A182 Grade F321	Applications at temperatures up to +800°F (+427°C).
347	18%Chrome, 10%Nickel with Columbium	ASTM A182 Grade F347	347 has good intergranular-corrosion resistance and is resistant to atmospheric conditions between temperatures of +800°F(+427°C) and +1650°F(+899°C).
410	13%Chrome 1/2%Moly	ASTM A182 Grade F6a	410 is the baic martensitic stainless. It has good impact strength, corrosion and scaling resistance up to +1200°F (+649°C).
420	13%Chrome, 1%Nickel 1/4%Moly	ASTM A276 Grade 420	Full corrosion resistance only in the hardened or hardened and stress relieved conditions. Temperature should be below +800°F (+427°C).
17-4PH	15-1/2%Chrome 4-1/2%Nickel	ASTM A564 Grade 630	Good corrosive resistance properties at temperatures up to +600°F (+316°C).
440C	17%Chrome 3/4%Moly	ASTM A276 Grade 440C	This grade is used in the harded plus tempered condition. For best corrosion resistance, the tempering temperature should be below +800°F (+427°C).
ALLOY 20	20%Chrome, 35%Nickel 2-1/2%Moly	ASTM A182 Grade F20	Good resistance to hot sulfuric acid to +800°F (+425°C).
F51 (Duplex 2205)	22%Chrome, 5%Nickel 3%Moly	ASTM A182 Grade F51	F51 is a super duplex stainless steel. Good Moderate to good corrosion resistance in a variety of environments. Service to +600°F (+316°C).
F53 (Duplex 2507)	25%Chrome, 7%Nickel 4-1/2%Moly	ASTM A182 Grade F53	F53 is a super duplex stainless steel. This material has excellent corrosion resistance in a variety of environments. Service to +600°F (+316°C).
F55	25%Chrome, 7%Nickel 3-1/2%Moly	ASTM A182 Grade F55	This material combines high mechanical strength and good ductility with excellent corrosion resistance in environments with temperatures up to +600°F (+316°C).
400	Monel	ASTM B564 Grade 400	This nickel alloy has good corrosion resistance, good weldability and high strength. Great mechanical properties at subzero temperatures up to +1000°F (+538°C).
K500	Monel	QQ-N-286 Grade K500	This nickel alloy has good corrosion resistance. Monel K500 has great mechanical properties at subzero temperatures up to about +480°C.
600	Inconel	ASTM B564 Grade 600	This nickel-chromium alloy has good oxidation resistance at higher temperatures to +2000°F (+1093°C). .
625	Inconel	ASTM B564 Grade 625	This nickel-chromium alloy has good carburization and oxidation in high-resistance at higher temperatures to +2000°F (+1093°C).
800H/HT	Incoloy	ASTM B564 Grade 800	This nickel-chromium alloy has good carburization and oxidation in high-resistance and normally used in temperatures above +1100°F (+593°C).
825	Incoloy	ASTM B564 Grade 825	Alloy 825 has a high level of corrosion resistance in both reducing and oxidizing environments and good mechanical properties at temperatures up to +1000°F (+538°C).
X-750	Inconel	ASTM B637 Grade X-750	This nickel-chromium alloy has good resistance to corrosion and oxidation along with high tensile and creep-rupture properties at temperatures to +1300°F (+700°C).
C276	Hastelloy	ASTM B564 Grade C276	This nickel-molybdenum-chromium alloy has excellent corrosion resistance in a wide range of corrosive media and corrosion resistant at ambient temperatures.

Williams Material Suffix	Common Designation	ASTM Casting Specification	Service Recommendations
WCB	Carbon Steel	ASTM A216 Grade WCB	Non-corrosive applications including water, oil and gases at temperatures between -20°F (-30°C) and +800°F (+425°C)
LCB	Low Temp Carbon Steel	ASTM A352 Grade LCB	Low temperature applications to -50°F (-46°C). Not for use above +650°F (+340°C).
LCC	Low Temp Carbon Steel	ASTM A352 Grade LCB	Low temperature applications to -50°F (-46°C). Not for use above +650°F (+340°C).
LC1	Low Temp Carbon Steel	ASTM A352 Grade LC1	Low temperature applications to -75°F (-59°C). Not for use above +650°F (+340°C).
LC2	Low Temp Carbon Steel	ASTM A352 Grade LC2	Low temperature applications to -100°F (-73°C). Not for use above +650°F (+340°C).
LC3	3½% Nickel Steel	ASTM A352 Grade LC3	Low temperature applications to -150°F (-101°C). Not for use above +650°F (+340°C).
WC6	1¼%Chrome ½% Moly Steel	ASTM A217 Grade WC6	Non-corrosive applications including water, oil and gases at temperatures between -20°F (-30°C) and +1100°F (+593°C).
WC9	2¼%Chrome	ASTM A217 Grade C9	Non-corrosive applications including water, oil and gases at temperatures between -20°F (-30°C) and +1100°F (+593°C).
C5	5%Chrome ½% Moly	ASTM A217 Grade C5	Mild corrosive or erosive applications as well as non-corrosive applications at temperatures between -20°F (-30°C) and +1200°F (+649°).
C12	9%Chrome 1% Moly	ASTM A217 Grade C12	Mild corrosive or erosive applications as well as non-corrosive applications at temperatures between -20°F (-30°C) and +1200°F (+649°C).
CA6NM	12% Chrome Steel	ASTM A487 Grade CA6NM	Corrosive application at temperatures between -20°F (-30°C) and +900°F (+482°C).
CA15	12% Chrome	ASTM A217 Grade CA15	Corrosive application at temperatures up to +1300°F (+704°C)
CF8M	316SS	ASTM A351 Grade CF8M	Corrosive or either extremely low or high temperature non-corrosive services between -450°F (-268°C) and +1200°F (+649°C). Above +800°F (+425°C) specify carbon content of 0.04% or greater.
CF8C	347SS	ASTM 351 Grade CF8C	Primarily for high temperature, corrosive applications between -450°F (-268°C) and +1200°F (+649°C). Above +1000°F (+540°C) specify carbon content of 0.04% or greater.
CF8	304SS	ASTM A351 Grade CF8	Corrosive or extremely high temperatures non-corrosive services between -450° (-268°C) and +1200°F (+649°C). Above +800°F (+425°C) specify carbon content of 0.04% or greater.
CF3	304L SS	ASTM A351 Grade CF3	Corrosive or non-corrosive services to +800F (+425°C).
CF3M	316L SS	ASTM A351 Grade CF3M	Corrosive or non-corrosive services to +800F (+425°C).
CN7M	Alloy-20	ASTM A351 Grade CN7M	Good resistance to hot sulfuric acid to +800F (+425°C).
M-35	Monel	ASTM 743 Grade M3-35-1	Weldable grade. Good resistance to corrosion by all common organic acids and salt water. Also highly resistant to most alkaline solutions to +750°F (+400°C).
N-12M	Hastelloy B	ASTM A743 Grade N-12M	Is well suited for handling hydrofluoric acid at all concentrations and temperatures. Good resistance to sulphuric and phosphoric acids to +1200°F (+649°C).
CW12M	Hastelloy C	ASTM A743 Grade CW-12M	Good resistance to strong oxidation conditions. Good properties at high temperatures. Good resistance to sulphuric and phosphoric acids to +1200°F (+649°C).
CY-40	Inconel	ASTM A743 Grade CY-40	Very good for high temperature service. Good resistance to strongly corrosive media and atmosphere to +800°F (+425°C).
B62	Bronze	ASTM B62	Water, oil or gas: up to 400°F. Excellent for brine and seawater service.



ISO Mounting Pad Dimensions

Dimensions: **inches** (millimeters)

Flanged type	d_1	d_2	d_3	d_4	$h_{1\ max.}$	$h_{2\ min.}$	Number of screws, studs or bolts
F03	**1.81** (46)	**.984** (25)	**1.42** (36)	M5	**.118** (3)	**.315** (8)	4
F04	**2.12** (54)	**1.18** (30)	**1.65** (42)	M5	**.118** (3)	**.315** (8)	4
F05	**2.56** (65)	**1.37** (35)	**2** (50)	M6	**.118** (3)	**.354** (9)	4
F07	**3.54** (90)	**2.16** (55)	**2.75** (70)	M8	**.118** (3)	**.472** (12)	4
F10	**4.92** (125)	**2.75** (70)	**4.00** (102)	M10	**.118** (3)	**.590** (15)	4
F12	**5.90** (150)	**3.34** (85)	**4.92** (125)	M12	**.118** (3)	**.708** (18)	4
F14	**6.88** (175)	**3.94** (100)	**5.50** (140)	M16	**.157** (4)	**.945** (24)	4
F16	**8.26** (210)	**5.12** (130)	**6.50** (165)	M20	**.197** (5)	**1.18** (30)	4
F25	**11.81** (300)	**7.87** (200)	**10** (254)	M16	**.197** (5)	**.945** (24)	8
F30	**13.78** (350)	**9** (230)	**11.75** (298)	M20	**.197** (5)	**1.18** (30)	8
F35	**16.34** (415)	**10.25** (260)	**14** (356)	M30	**.197** (5)	**1.77** (45)	8
F40	**18.70** (475)	**11.81** (300)	**16** (406)	M36	**.315** (8)	**2.12** (54)	8
F48	**22** (560)	**14.57** (370)	**19** (483)	M36	**.315** (8)	**2.12** (54)	12
F60	**27** (686)	**18.50** (470)	**23.75** (603)	M36	**.315** (8)	**2.12** (54)	20

WILLIAMS

Steel Pipe Schedule (I.D. of Pipe)

PIPE SIZE	O.D. IN INCHES	PIPE SCHEDULES													
		5	10	20	30	40	60	80	100	120	140	160	STD.	XS	XXS
1/8"	0.405	_	0.307	_	0.291	0.269	_	0.215	_	_	_	0.157	0.269	0.215	0.025
1/4"	0.540	_	0.410	_	0.394	0.364	_	0.302	_	_	_	0.250	0.364	0.302	0.064
3/8"	0.675	_	0.545	_	0.529	0.493	_	0.423	_	_	_	0.359	0.493	0.423	0.171
1/2"	0.840	0.710	0.674	_	0.650	0.622	_	0.546	_	_	_	0.464	0.622	0.546	0.252
3/4"	1.050	0.920	0.884	_	0.860	0.824	_	0.742	_	_	_	0.612	0.824	0.742	0.434
1"	1.315	1.185	1.097	_	1.087	1.049	_	0.957	_	_	_	0.815	1.049	0.957	0.599
1-1/4"	1.660	1.530	1.442	_	1.426	1.380	_	1.278	_	_	_	1.160	1.380	1.278	0.896
1-1/2"	1.900	1.770	1.682	_	1.650	1.610	_	1.500	_	_	_	1.338	1.610	1.500	1.100
2"	2.375	2.245	2.157	_	2.125	2.067	_	1.939	_	_	_	1.687	2.067	1.939	1.503
2-1/8"	2.875	2.709	2.635	_	2.499	2.469	_	2.323	_	_	_	2.125	2.469	2.323	1.771
3"	3.500	3.334	3.260	_	3.124	3.068	_	2.900	_	_	_	2.624	3.068	2.900	2.300
3-1/2"	4.000	3.834	3.760	_	3.624	3.548	_	3.364	_	_	_	_	3.548	3.364	2.728
4"	4.500	4.334	4.260	_	4.124	4.026	_	3.826	_	3.624	_	3.438	4.026	3.826	3.152
5"	5.563	5.345	5.295	_	_	5.047	_	4.813	_	4.563	_	4.313	5.047	4.813	4.063
6"	6.625	6.407	6.357	_	_	6.065	_	5.761	_	5.501	_	5.187	6.065	5.671	4.897
8"	8.625	8.409	8.329	8.125	8.071	7.981	7.813	7.625	7.437	7.187	7.001	6.813	7.981	7.625	6.875
10"	10.750	10.482	10.420	10.250	10.136	10.020	9.750	9.562	9.312	9.062	8.750	8.500	10.020	9.750	8.750
12"	12.750	12.438	12.390	12.250	12.090	11.938	11.626	11.374	11.062	10.750	10.500	10.126	12.000	11.750	10.750
14"	14.000	13.688	13.500	13.376	13.250	13.124	12.812	12.500	12.124	11.812	11.500	11.188	13.250	13.000	_
16"	16.000	15.670	15.500	15.376	15.250	15.000	14.688	14.312	13.938	13.562	13.124	12.812	15.250	15.000	_
18"	18.000	17.670	17.500	17.376	17.124	16.876	16.500	16.124	15.688	15.250	14.876	14.438	17.250	17.000	_
20"	20.000	19.624	19.500	19.250	19.000	18.812	18.376	17.938	17.438	17.000	16.500	16.062	19.250	19.000	_
24"	24.000	23.564	23.500	23.250	22.876	22.624	22.062	21.562	20.938	20.376	19.876	19.312	23.250	23.000	_
30"	30.000	29.500	29.376	29.000	28.750	_	_	_	_	_	_	_	29.250	29.000	_