

## Standard Specifications for Valve Materials

Material	ASTM	Grade / Class / Type	Temp		Composition (Percent)																								
			Min	Max	Al	Bi	C	Co	Cr	Cu	Fe	Mn	Mo	Nb	Ni	P	Pb	S	SI	Sn	Ti	V	Va	W	Zn	Other			
<b>Pressure Containing Castings</b>																													
Carbon Steel	A216	WCB	-29	593			0.30					1.00				0.05		0.06	0.60										
Carbon Steel	A352	LCB	-46	343			0.30					1.00				0.05		0.06	0.60										
Chrome Moly Steel	A217	C5	-29	593			0.20			4-6.5		0.4-0.7	0.45-0.65			0.05		0.06	0.75										
Carbon Moly Steel	A217	WC1	-29	454			0.25					0.5-0.8	0.45-0.65			0.05		0.06	0.60										
Chrome Moly Steel	A217	WC6	-29	538			0.20					0.5-0.8	0.45-0.65			0.05		0.06	0.60										
Chrome Moly Steel	A217	WC9	-29	566			0.18			2-2.75		0.4-0.7	0.9-1.2			0.05		0.60											
3-1/2% Nickel Steel	A352	LC3	-101	343			0.15					0.5-0.8			3-4	0.05		0.05	0.60										
Chrome Moly Steel	A217	C12	-29	593			0.20			8-10		0.35-0.65	0.9-1.2			0.05		0.06	1.00										
Type 304 Stainless Steel	A351	CF - 8	-254	816			0.08			18-21		1.50			8-11	0.04		0.04	2.00										
Type 316 Satinless Steel	A351	CF - 8M	-254	816			0.08			18-21		1.50	2-3		9-12	0.04		0.04	2.00										
Cast Iron	A126	B	-101	232												0.75		0.12											
Cast Iron	A126	C	-101	232												0.75													
Ductile Iron	A395	60-45-15	-29	343			3.00*									0.08							2.75						
Ductile NI-Resist Iron	A439	D-2B	-29	399			3.00			2.75-4		0.7-1.25			18-22	0.08			1.5-3										
Standard Valve Bronze	B62		-198	232							84-86	0.30				1.00	0.05	4-6					4-6					4-6	
Tin Bronze	B143	Alloy 1A	-198	204							86-89	0.15				1.00	0.05	0.30					9-11					1-3	
Manganese Bronze	B147	Alloy 8A	-198	177	0.5-1.5						55-60	0.4-2	1.50			0.50		0.40					1.00					R	
Aluminium Bronze	B148	Alloy 9C	-198	260	10-11.5						83.00*	3-5	0.50			2.50													
Monel		Alloy 411	-198	482			0.30				26-33	3.50	1.50		1-3	60.00*													
Nickel-Moly	A494	Alloy B	-198	371			0.12	2.50	1.00			4-6	1.00	26-30		R	0.04		0.03	1.00				0.2-0.6					
Nickel-Moly-Chrome	A494	Alloy C	-198	538			0.12	2.50	15.5-17.5			4.5-7.5	1.00	16-18		R	0.04		0.03	1.00				0.2-0.4			3.75-5.25		
Colbalt-Base Alloy No.6							0.9-1.4	R		26-32		3.00	1.00	1.00		3.00				0.4-2							3-6		
<b>Material for Trim parts of Valve</b>																													
Aluminium Bar	B211	Alloy 2011-T3				R	0.2-0.6				5-6	0.70						0.2-0.6		0.40							0.30	0.15	
Yello Brass Bar	B16	1/2 Hard									60-63	0.35						2.5-3.7										R	
Naval Brass Bar	B211	Alloy 464									59-62							0.2					0.5-1					R	
Leaded Steel Bar							0.15						0.8-1.2				0.04-0.09	0.15-0.35	0.25-0.35										
Carbon Steel Bar	A108	1018					0.15-0.2						0.6-0.9				0.04		0.05										
AISI 4140 Chrome-Moly Steel	A193	B7					0.38-0.43			0.8-1.1		R	0.75-1	0.15-0.25			0.04		0.04	0.2-0.35									
Type 302 Stainless Steel	A276	302					0.15			17-19		2.00				8-10	0.05		0.03	1.00									
Type 304 Stainless Steel	A276	304					0.08			18-20		2.00				8-12	0.05		0.03	1.00									
Type 316 Stainless Steel	A276	316					0.08			16-18		2.00	2-3			10-14	0.05		0.03	1.00									
Type 316L Stainless Steel	A276	316L					0.03			16-18		2.00	2-3			10-14	0.05		0.03	1.00									
Type 410 Stainless Steel	A276	410		0.1-0.3			0.15			11.5-13.5		1.00					0.04		0.03	1.00									
Type 17-4PH Stainless Steel	A461	630					0.07			15.5-17.5	3-5	R	1.00		0.05-0.45	3-5	0.04		0.03	1.00									
Nickel Copper Alloy Bar		Alloy K500				2-4		0.25				R	2.00	1.50					0.01	1.00				0.25-1					
Nickel-Moly Alloy "B" Bar	B335	Alloy "B" Bar					0.05	2.5	1.00			4-6	1.00	26-30		R	0.03		0.03	1.00					0.2-0.4				
Nickel-Moly-Chrome	B336	Alloy "C" Bar					0.08	2.5	14.5-16.5			4-7	1.00	15-17		R	0.04		0.03	1.00							0.35	3-4.5	

\* = Minimum Value  
R = Remainder

-20	1100
-50	650
-20	1100
-20	850
-20	1000
-20	1050
-150	650
-20	1100
-425	1500
-425	1500
-150	450
-150	450
-20	650
-20	750
-325	450
-325	400
-325	350
-325	500
-325	900
-325	700
-325	1000