



Reliable Equipments
Importer & Stockists

VALVE MATERIAL SELECTION GUIDE

VALVE BODY MATERIALS

Material Group	Common Name	Material Type	Forging Spec	UNS	Casting Spec. Equivalent	DIN	DIN W. No	Application					
Carbon Steel	CS	C-Mn-Fe	A105N	K03504	A216-WCB	C22.8 DIN 17243	1.0460	General non-corrosive service from -20°F (-29°C) to 800°F (427°C)					
Low Temperature Carbon Steel	LTCS	C-Mn-Fe	A350-LF2	K03011	A352-LC1	TSTE 355 DIN 18103	1.0566	General non-corrosive service from -50°F (-46°C) to 650°F (340°C), LF2 to 800°F(427°C)					
					A352-LCB								
					A352-LCC								
Low Temperature Alloy Steel	Nickel Steel	3.1/2Ni	A350-LF3	K32025	A352-LC3	10Ni14	1.5637	-150°F (-101°C) to 650°F (340°C)					
Low Alloy Steel	Moly Steel	C-1/2Mo	A182-F1	K12822	A217-WC1	15Mo3	1.5415	Up to 875°F (468°C)					
					A217-WC6	13CrMo44	1.7335	Up to 1100°F (593°C)					
					A217-WC9	10CrMo910	1.7380	Up to 1100°F (593°C), HP steam					
					A217-C5	12CrMo195	1.7362	High temp. refinery service					
					A217-C12	X 12 CrMo 9 1	1.7386	High temp. erosive refinery					
					A217-C12A	X 10 CrMoVNb 9 1	1.4903	High pressure steam					
Stainless Steel	Austenitic S Steel 300 series S Steel	304 : 18Cr-8Ni	A182-F304	S30400	A351-CF8	DIN X5CrNi 18 9	1.4301	0.04% min. carbon for temp. >1000°F (538°C)					
					A351-CF3	X 2 CrNi 19 11	1.4306	Up to 800°F (427°C)					
					A351-CF10	n/a	n/a						
					A351-CF8M	DIN X5CrNiMo 18 10	1.4401	0.04% min. carbon for temp. >1000°F (538°C)					
					A351-CF3M	X 5 CrNiMo 17 12 2	1.4404	Up to 800°F (427°C)					
					A351-CF10M	n/a	n/a						
					A351-CF10M	X 6 CrNiMoTi 17 12 2	1.4571	Special grade					
					A351-CF10M	X 6 CrNiTi 18 10	1.4541	0.04%min. carbon (grade F321H) and heat treat at 2000°F (1100°C) for service temps. >1000°F (538°C)					
					A351-CF10M	n/a	n/a						
					A351-CF8C	DIN 8556	1.4550	0.04%min. carbon (grade F347H) and heat treat at 200°F (1100°C) for service temps. >1000°F (538°C)					
					A351-CF8C	n/a	n/a						
					A351-CF8C	DIN 8556	1.4550	0.04%min. carbon (grade F347H) and heat treat at 200°F (1100°C) for service temps. >1000°F (538°C)					
					A351-CF8C	n/a	n/a						
					A351-CF8C	DIN 8556	1.4550	0.04%min. carbon (grade F347H) and heat treat at 200°F (1100°C) for service temps. >1000°F (538°C)					
					Alloy 20	28Ni-19Cr-Cu-Mo	A182-F20*	N08020	A351-CN7M	DIN 1.4500	2.4660	Service to 600°F (316°C)*	
A351-CN7M	DIN 1.4500	2.4660	Service to 600°F (316°C)*										
A351-CN7M	DIN 1.4500	2.4660	Service to 600°F (316°C)*										
A351-CN7M	DIN 1.4500	2.4660	Service to 600°F (316°C)*										
A351-CN7M	DIN 1.4500	2.4660	Service to 600°F (316°C)*										
A351-CN7M	DIN 1.4500	2.4660	Service to 600°F (316°C)*										
Duplex 2205	22Cr-5Ni-3Mo-N	A182-F53	S32750	A351-CD3MN	X2CrNiMoN22-5-3	1.4462	Service to 600°F (316°C) - The original S31803 UNS designation has been supplemented by S32205 which has higher minimum N, CR, and Mo						
								A351-CD3MN	X2CrNiMoN22-5-3	1.4462	Service to 600°F (316°C) - The original S31803 UNS designation has been supplemented by S32205 which has higher minimum N, CR, and Mo		
								A351-CD3MN	X2CrNiMoN22-5-3	1.4462	Service to 600°F (316°C) - The original S31803 UNS designation has been supplemented by S32205 which has higher minimum N, CR, and Mo		
								A351-CD3MN	X2CrNiMoN22-5-3	1.4462	Service to 600°F (316°C) - The original S31803 UNS designation has been supplemented by S32205 which has higher minimum N, CR, and Mo		
								A351-CD3MN	X2CrNiMoN22-5-3	1.4462	Service to 600°F (316°C) - The original S31803 UNS designation has been supplemented by S32205 which has higher minimum N, CR, and Mo		
								A351-CD3MN	X2CrNiMoN22-5-3	1.4462	Service to 600°F (316°C) - The original S31803 UNS designation has been supplemented by S32205 which has higher minimum N, CR, and Mo		
Super Duplex 2507	25Cr-7Ni-4Mo-N	A182-F53	S32760	A995-CD3MWCuN	X2CrNiMoN27-7-4	1.4501	Service to 600°F (316°C)						
								A995-CD3MWCuN	X2CrNiMoN27-7-4	1.4501	Service to 600°F (316°C)		
								A995-CD3MWCuN	X2CrNiMoN27-7-4	1.4501	Service to 600°F (316°C)		
Super Duplex F55	25Cr-7Ni-3.5Mo-N-Cu-W	A182-F55	S32760	A995-CD3MWCuN	X2CrNiMoN27-7-4	1.4501	Service to 600°F (316°C)						
								A995-CD3MWCuN	X2CrNiMoN27-7-4	1.4501	Service to 600°F (316°C)		
								A995-CD3MWCuN	X2CrNiMoN27-7-4	1.4501	Service to 600°F (316°C)		
Super Austenitic 6Mo	20Cr-18Ni-6Mo	A182-F44	S31254	A351-CK3MCuN	X1CrNiMoCuN20-18-7	1.4547	Service to 600°F (316°C)						
								A351-CK3MCuN	X1CrNiMoCuN20-18-7	1.4547	Service to 600°F (316°C)		
								A351-CK3MCuN	X1CrNiMoCuN20-18-7	1.4547	Service to 600°F (316°C)		
Incoloy 800	33Ni-42Fe-21Cr	B564-N08900	N08900	A494-CU5MCu*	X10NiCrAlTi32-20	1.4876	Service to 1000°F (538°C)						
								A494-CU5MCu*	X10NiCrAlTi32-20	1.4876	Service to 1000°F (538°C)		
Incoloy 825	42Ni-21.5Cr-3Mo-2.3Cu	B564-N08825*	N08825	A494-CU5MCu*	DIN 17744	2.4858	Service to 600°F (316°C) for N02200, 1200°F (648°C) for N02201						
								A494-CU5MCu*	DIN 17744	2.4858	Service to 600°F (316°C) for N02200, 1200°F (648°C) for N02201		
Nickel-Iron Alloy	Nickel	99/95Ni	B160-N02200 (bar)	N02200	A494-CZ-100*	NW2200	1.7740						
Nickel-Copper	Monel 400	67Ni-30Cu	B564-N04400	N04400	A494-M35-1	DIN 17730	2.4360						
									B564-N05500*	N05500		2.4375	
Nickel-Alloy	904L	904L	N08904	N08904	n/a	Z2 NCDU 25-20	1.4539						
									N08904		1.4539		
Nickel Superalloys	Inconel 600	72Ni-15Cr-8Fe	B564-N06600	N06600	A494-CY40*	DIN 17742	2.4816						
									B564-N06625	N06625	A494-CW-6MC*	2.4856	
									B564-N10276	N10276	A494-CW-2M*	2.4819	
Titanium	Hastelloy C-276	54Ni-15Cr-16Mo	B564-N10276	N10276	A494-CW-2M*	NiMo 16 Cr 15 W	2.4819						
									N10276		2.4819		
Titanium	Titanium	98Ti	B381-Gr2	R50400	B387-C2*	Ti2	3.7035	Special grade					

† Cast CN7M only rated to 150°C, however 'New Alloy 20' grade CN3MCu is available which is to be rated to at least 316°C.

* Now discontinued in ANSI B16.34 - 2009.

Disclaimer: These charts are for reference only, AE can not be held liable for any damages incurred due to the use of these tables. Temperatures shown must be analysed in conjunction with ASTM P/T charts and manufacturers recommendations for each valve type.



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MAJOR VALVE MATERIAL GROUPS

FORGED	CAST
CARBON STEEL	
ASTM A105N	ASTM A216 WCB/WCC
ASTM A350 LF2	ASTM A352 LCB/LCC
ALLOY STEEL	
ASTM A350 LF3	ASTM A352 LC3
ASTM A182 F5a	ASTM A217 C5
ASTM A182 F9	ASTM A217 C12
ASTM A182 F11	ASTM A217 WC6
ASTM A182 F22	ASTM A217 WC9
ASTM A182 F91	ASTM A217 C12A
AUSTENITIC STAINLESS STEEL	
ASTM A182 F304/F304L	ASTM A351 CF8/CF3
ASTM A182 F316/F316L	ASTM A351 CF8M/CF3M
ASTM A182 F321	
ASTM A182 F347	ASTM A351 CF8C
ASTM A182 F44 (6MO)	ASTM CK3MCuN
ASTM A182 F20* (ALLOY 20)	A351 CN7M
FERRITIC-AUSTENITIC STAINLESS STEEL	
ASTM A182 F51 - UNS S31803† (DUPLEX S.S.)	A890 GR.4A*/ A351 CD3MN
ASTM A182 F53 - UNS S32750 (SUPER DUPLEX S.S.)	A890 GR.5A*/ A351 CE8MN
ASTM A182 F55 - UNS S32760 (SUPER DUPLEX S.S.)	A995 CD3MWCuN/6A
NICKEL ALLOY	
INCONEL 825 - UNS N08825 ASTM B564 - N08825	A484 CU5MCuC*
INCONEL 600 - UNS N06600 ASTM B564 - N06600	A494 CY40*
INCONEL 625 - UNS N06625 ASTM B564 - N06625	A494 CW6MC*
MONEL 400 - UNS N04400 ASTM B564 - N04400	A494 M35-1
TITANIUM	
ASTM B381 GR.F2	ASTM B367 GR.C2
ASTM B381 GR.F3	ASTM B367 GR.C3

† Grade UNS31803 now supplemented by UNS32205. UNS32205 which dual conforms and is now often specified.

* No longer referenced in ANSI B16.34 - 2009.

AE can also arrange exotic grades such as Nickel, Super-Duplex F55 and Monel (ASTM A494-M35-1), Cd4M-Cu, Hastelloy C (ASTM A-494 CW12MW), 317 (C8G8M) in short lead-time.

We supply valves in API600, API602, API6D, API603, BS1868, API6A and numerous other standards including Butterfly, Ball, Check, Globe, Gate, Plug and Needlevalves.



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STANDARD VALVE TRIM MATERIALS

API Trim No	Nonimal Trim	Trim code	Stem	Disc/Wedge	Seat	Min. Hardness (Brinell)
1	F6	F6	410 (13Cr)	F6 (13Cr)	410 (13Cr)	250
2	304	304	304 (18Cr-8Ni)	304 (18Cr-8Ni)	304 (18Cr-8Ni)	not specified
3	310	310	(25Cr-20Ni)	310 (25Cr-20Ni)	310 (25Cr-20Ni)	not specified
4	Hard 410	F6-H	410 (13Cr)	F6 (13Cr)	F6 (13Cr)	275
5	410 Full Hard faced	F6-HF	410 (13Cr)	F6+St Gr6 (CoCr Alloy)	410+St Gr6 (CoCr Alloy)	350
5A	410 Full Hard faced	F6-HF	410 (13Cr)	F6+Hardf. NiCr Alloy	410+Hardf. NiCr Alloy	350
6	410 and Ni-Cu	F6-HFS	410 (13Cr)	F6 (13Cr)	Monel 400 ® (NiCu Alloy)	250/175
7	410 and Full Hard	410	410 (13Cr)	F6 (13Cr)	F6 (13Cr) (750 HB)	250/750
8	410 and Hard faced	F6-HFS	410 (13Cr)	F6 (13Cr)	410+St Gr6 (CoCr Alloy)	250/350
8A	410 and Hard faced	F6-HFS	410 (13Cr)	F6 (13Cr)	410+Hardf. NiCr Alloy	250/350
9	Monel	Monel	Monel® (NiCu Alloy)	Monel® (NiCu Alloy)	Monel 400 ® (NiCu Alloy)	not specified
10	316	316	316 (18Cr-Ni-Mo)	316 (18Cr-8Ni-Mo)	316 (18Cr-8Ni-Mo)	not specified
11	Monel and Hard faced	Monel-HFS	Monel® (NiCu Alloy)	Monel® (NiCu Alloy)	Monel 400 ® St Gr6	350
11A	Monel and Hard faced	Monel-HFS	Monel® (NiCu Alloy)	Monel® (NiCu Alloy)	Monel 400 ® Hardf. NiCrA	350
12	316 and Hard faced	316-HFS	316 (18Cr-Ni-Mo)	316 (18Cr-8Ni-Mo)	316+St Gr6	350
12A	316 and Hard faced	316-HFS	316 (18Cr-Ni-Mo)	316 (18Cr-8Ni-Mo)	316 Hardf. NiCr Alloy	350
13	Alloy 20	Alloy 20	Alloy 20 (19Cr-29Ni)	Alloy 20 (19Cr-29Ni)	Alloy 20 (19Cr-29Ni)	not specified
14	Alloy 20 & Hard faced	Alloy 20-HFS	Alloy 20 (19Cr-29Ni)	Alloy 20 (19Cr-29Ni)	Alloy 20 St Gr6	350
14A	Alloy 20 & Hard faced	Alloy 20-HFS	Alloy 20 (19Cr-29Ni)	Alloy 20 (19Cr-29Ni)	Alloy 20 hardf. NiCr Alloy	350
15	304 Full Hard faced	304-HF	304 (18Cr-8Ni-Mo)	304+St Gr6	304+St Gr6	350
16	316 Full Hard faced	316-HF	316 HF (18Cr-8Ni-Mo)	316+St Gr6	316+St Gr6	350
17	347 Full Hard faced	347-HF	347 HF (18Cr-10Ni-Cb)	347+St Gr6	347+St Gr6	350
18	Alloy 20 Full Hard faced	Alloy-HF	Alloy 20 (19Cr-29Ni)	Alloy 20+St Gr6	Alloy 20+St Gr6	350
n/a	Alloy 625	Alloy 625	Alloy 625	Alloy 625	Alloy 625	



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TRIM MATERIAL EQUIVALENT GRADES

† Hard facing weld overlay

* No longer referenced in ANSI B16.34 - 2009.

Contact manufacturers for **SPECIAL TRIM MATERIALS** .

TRIM	UNS	TYPE	Grade (forged)	ASTM wrought	DIN	DIN W NO.
F6	UNS S41000	13Cr	ASTM A182 F6a	A276-410	DIN X12Cr13	1.4006
304	UNS S30400	18-8 Cr-Ni	ASTM A182 F304	A276-304	DIN X5CrNi 18 10	1.4301
316	UNS S31600	18-8 Cr-Ni (18-10-2)	ASTM A182 F316	A276-316	DIN X5CrNiMo 18 10	1.4401
321	UNS S32100	18 Cr-10 Ni-Ti	ASTM A182 F321	A276-321	DIN X6CrNiTi 18 10	1.4541
347	UNS S34700	18 Cr-10 Ni-Cb	ASTM A182 F347	A276-347	DIN X6CrNiNb18 10	1.4550
MONEL®	UNS N04400	67Ni-30Cu	ASTM B564-N04400	B164-N04400	BDIN 17743	2.4360
ALLOY 20	UNS N08020	28Ni-19Cr-Cu-Mo	ASTM A182-F20*	ASTM B473	DIN 14500	2.4660
ALLOY 625	UNS N06625	60Ni-22Cr-9Mo-3.5Cb	ASTM B564-N06625	ASTM B564-N06625	DIN 17361	2.4865
C276	UNS N10276	54Ni-15Cr-16Mo	ASTM B564-N10276	ASTM B574-N10276	DIN NiMo 16 Cr 15 W	2.4819
17/4PH	UNS S17400	0Cr17Ni4Cu4Nb	ASTM A705 UNS S17400	ASTM A564 UNS S17400	X5CrNiCuNb17-4-4	1.4548
St. Gr6†	UNS R30006	Co Cr-A	AMS 5894	Stellite(R) Gr6		

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