



# valveIT<sup>®</sup>

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## MATERIAL INFO SHEET

PRO AT FLUID CONTROL



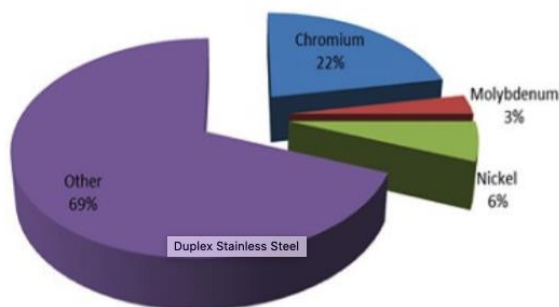
EN Material Designation		Old Material Designation (DIN)		ASTM	Material
Number (old)	Symbol (old)	Number	Symbol	equivalent <sup>1)</sup>	
1.0038	235JRG2	1.0038	RSt 37-2	A284-B	Constructional steel
1.0315	P235G2TH	1.0315	ST 37.8	–	Constructional steel
1.0345	P235GH	1.0345	ST 35.8 (HI)	A285-CA	High-quality steel (structural steel)
1.0460	P250GH	1.0460	C22.8	A105	Forged steel, unalloyed (carbon steel)
1.0619	GP240GH	1.0619	GS-C 25	A216-WCB	Cast steel (carbon steel)
1.4006	X12Cr13	1.4006	X10 Cr 13	A182-F6A	Chromium steel
1.4008	GX7CrNiMo12-1	1.4008	G-X 8 CrNi 13	–	Cast stainless steel
1.4021	X20Cr13	1.4021	X20 Cr 13	AISI 420	Chromium steel
1.4027	GX20Cr14	1.4027	G-X 20 Cr 14	–	(Cast) chromium steel
1.4107	GX8CrNi12	1.4107	G-X 8 CrNi 12	A217-CA15	Chromium steel
1.4301	X5CrNi18-10	1.4301	X5 CrNi 18 10	A182-F304	Forged stainless steel, austenitic
1.4308	GX5CrNi19-10	1.4308	G-X 6CrNi 18 9	A351-CF8	Cast stainless steel, austenitic
1.4317	GX4CrNi13-4	–	–	A743 CA6NM	Cast stainless steel
1.4404	X2CrNiMo17-12-2	1.4404	X2CrNiMo17132	A182 F316L	Forged stainless steel, austenitic
1.4408	GX5CrNiMo19-11-2	1.4408	G-X 6CrNiMo 18 10	A351-CF8M	Cast stainless steel, austenitic
1.4435	X2CrNiMo18-14-3	1.4435	X2 CrNiMo 18 14 3	AISI 316L	Stainless steel, forged, austenitic
1.4541	X6CrNiTi18-10	1.4541	X6 CrNiTi 18 10	–	Forged stainless steel, austenitic
1.4550	X6CrNiNb18-10	1.4550	X6 CrNiNb 18 10	A182-F347	Forged stainless steel, austenitic
1.4552	GX5CrNiNb19-11	1.4552	G-X 5 CrNiNb 18 9	A351-CF8C	Cast stainless steel, austenitic
1.4571	X6CrNiMoTi17-12-2	1.4571	X6 CrNiMoTi 17 12 2	AISI 316Ti	Forged stainless steel, austenitic
1.4581	GX5CrNiMoNb19-11-2	1.4581	G-X 5 CrNiMoNb 18 10	–	Cast stainless steel, austenitic
1.4901	X10CrWoMoVNB9-2	–	–	A182-F92	Forged steel, highly heat resistant
1.4903	X10CrMoVNB9-1	1.4903	X10 CrMoVNB 91	A182-F91	Forged steel, highly heat resistant
1.4922	X20 CrMo V11-1	1.4922	X20 CrMo V12 1	–	Forged steel, heat resistant
1.4923	X22CrMoV12-1	1.4923	X22 CrMo V12 1	–	Forged steel, heat resistant
1.4980	X6NiCrTiMoVB25-15-2	1.4980	X5NiCrTi 26 15	–	Forged steel, heat resistant
1.4496	X7 CrNiMo BNB 16-16	1.4986	X8 CrNiMo BNB 16 16	–	Forged steel, heat resistant
1.5415	16Mo3	1.5415	15 Mo 3	A182-F1	Forged steel, heat resistant
1.5419	G20Mo5	1.5419	GS-22 Mo 4	A217-WC1	Cast steel, heat resistant
1.7225	42CrMo4	1.7225	42CrMo4	A193-B7	Forged steel, heat resistant
1.7335	13CrMo4-5	1.7335	13 CrMo 4 4	A182-F12-2	Forged steel, heat resistant
1.7357	G17CrMo5-5	1.7357	GS-17 CrMo 5 5	A217-WC6	Cast steel, heat resistant
1.7380	10CrMo9-10	1.7380	10 CrMo 9 10	A182 F22-3	Forged steel, heat resistant
1.7383	11CrMo9-10	–	–	A182 F22-3	Forged steel, heat resistant
1.7709	21CrMoV 5-7	1.7709	21CrMoV 5 7	–	Forged steel, heat resistant
2.4600	Hastelloy B-3	2.4600	NiMo 29Cr	B335/564	Hastelloy B
2.4610	NiMo 16Cr 16Ti	2.4610	NiMo 16Cr 16Ti	B574	Hastelloy C
2.4632	Nimonic 90	2.4632	NiCr20 Co18Ti	–	Nimonic 90
2.4669	Inconel X750	2.4669	NiCr15 Fe7 TiAl	B637, NACE MR-01-75	Inconel X750
3.7035	Ti 2	3.7035	–	B348/381	Titan
5.1301 (EN-JL 1040)	EN-GJL-250	0.6025	GG-25	A126-B	Grey cast iron
5.3103 (EN-JS 1025)	EN-GJS-400-18-LT	0.7043	GGG-40.3	–	S. G. (ductile) iron
5.3106 (EN-JS 1030)	EN-GJS-400-15	0.7040	GGG-40	A536 60-40-18	S. G. (ductile) iron to AD 2000 A4/W3/2
5.4202 (EN-JM 1030)	EN-GJMW-400-5	0.8040	GTW-40	–	S. G. (ductile) iron
(EN-JS 1049) <sup>2)</sup>	(EN-GJS-400-18-U-LT)	0.7043	GGG-40.3	A395	Whiteheart malleable cast iron
CW608N	CuZn 38 Pb 2	2.0371	CuZn 38 Pb 1.5 (MS60)	–	Hot-pressed brass
CW614N	CuZn 39 Pb 3	2.0401	CuZn 39 Pb 3	–	Brass
CW617N	Cu Zn 40 Pb 2	2.0402	CuZn 40 Pb 2	–	Brass
CW710R	CuZn 35 Ni3Mn2Al Pb	2.0540	CuZn 35 Ni 2	–	Special brass
CW718R	CuZn 39 Mn1Al Pb Si	2.0561	CuZn 40 Al 1	–	Special brass
CC332G	CuAl10Ni3Fe2-C	2.0970.01	G-CuAl 9 Ni	–	Bronze
CC480K-GS	CuSn10-Cu	2.1050.01	G-CuSn 10	–	Bronze
CC483K-GS	CuSn12-C	2.1052.04	GC-CuSn 12	–	Bronze

<sup>1)</sup> Physical and chemical properties comply with DIN grade. ASTM nearest equivalent grade is stated for guidance only.

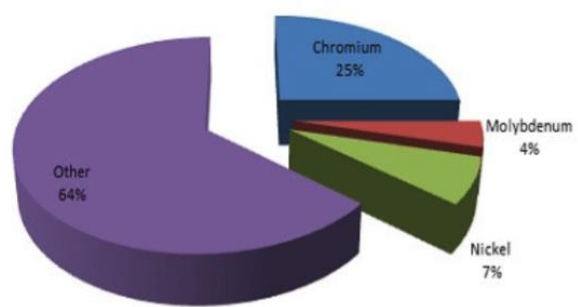
<sup>2)</sup> Replaced by 5.3103

## DUPLEX AND SUPERDUPLEX STEEL TECHNICAL PROPERTIES

### 22Cr Duplex - X2CrNiMoN22 5 3



### 25Cr Duplex - X2CrNiMoN25 7 4



#### Duplex Stainless Steel – UNS S31803 / UNS S32205

**Duplex Steel** also known as Duplex 2205 Stainless Steel is a two-phase, ferritic and austenitic steel with 22% chromium (22cr Duplex) 3% molybdenum, 5 to 6% nickel alloyed stainless steel also known as x2crnimon22-5-3 used extensively in applications that require good corrosion resistance & strength. Heat treatment of Duplex SS 2205 is solution treatment (annealing), between 1020 – 1100°C, followed by rapid cooling. **22 Cr Duplex Stainless Steel** cannot be hardened by heat treatment. They can however be work hardened.

**1.4462 Stainless Steel Equivalent** – 1.4462 | 22Cr Duplex | [UNS S31803](#) (F51) | [UNS S32205](#) (F60) | Alloy 2205 | Sandvik – SAF 2205 | Duplex 2205 | x2crnimon22-5-3 | FALC223 | [URANUS 45N](#) (UR 45N) | [RA2205](#) | [Cronifer® 2205 LCN](#).

#### **SAF 2205 is Duplex (Austenitic-Ferritic) Stainless Steel characterized by –**

- High resistance to stress corrosion cracking (SCC) in chloride-bearing environments.
- High resistance to stress corrosion cracking (SCC) in environments containing hydrogen sulfide.
- High resistance to general corrosion, pitting, and crevice corrosion.
- High resistance to erosion corrosion and corrosion fatigue.
- High mechanical strength – roughly twice the proof strength of austenitic stainless steel.
- Physical properties that offer design advantages.
- Good weldability.

#### Super Duplex Stainless Steel – UNS S32750 / UNS S32760

**Super Duplex Steel** also is known as SAF 2507 or **Super Duplex 2507** with UNS S32750 and UNS S32760 (1.4410 / 1.4501 / F53 / F55 / 2507) is a high alloy duplex stainless steel with a PRE value of min.40\*. **Super Duplex S32750** and **Super Duplex S32760** has 25% chromium (25Cr Duplex), 4% molybdenum, and 7% nickel also known as X2CrNiMoN25 7 4. This high molybdenum, chromium and nitrogen content causes high resistance to chloride pitting and crevice corrosion attack and the duplex structure provides **2507** with exceptional resistance to chloride stress corrosion cracking.

**Super Duplex Equivalent names** – 25Cr Duplex | [2507](#) | UNS S32750 (F53) | UNS S32760 (F55) | [1.4410](#) | Alloy 2507 | SAF 2507 | Super Duplex S32750 | Super Duplex S32760 | [X2CrNiMoN25.7.4](#) | Stainless Steel Super Duplex | [2750](#) | Duplex 2507 | 1.4501 | Zeron 100 | Super Duplex 2507 | Duplex 2507.

#### **SAF 2507 is a Super Duplex (Austenitic-Ferritic) Stainless Steel is characterized by –**

- Excellent resistance to stress corrosion cracking (SCC) in chloride-bearing environments.
- Excellent resistance to pitting and crevice corrosion.
- High resistance to general corrosion.
- Very high mechanical strength.
- Physical properties that offer design advantages.
- High resistance to erosion corrosion and corrosion fatigue.
- Good weldability.

Schematic diagram of the austenitic stainless steels

corrosion resistance

A5  
higher alloyed steels

A4  
Cr-Ni-Mo steels  
V4A-range

A2  
Cr-Ni steels  
V2A-range

**1.4584**  
GX2NiCrMoCu25-20-5    AISI 904L  
200 185 33,8 1.4519  
400 70 000

C	Cr	Ni	Mo	Cu
0,025	19,0	24,0	4,0	1,0
	21,0	26,0	5,0	3,0

+ Mo  
+ N

**1.4588**  
GX2NiCrMoCuN25-20-6    2.4831  
200 210 40,4 000  
400 70 000

C	Cr	Ni	Mo	Cu
0,025	19,0	24,0	6,0	0,5
	21,0	26,0	7,0	1,5

+ Cu

**1.4448**  
GX2CrNiMoN18-14-3    AISI 316LN  
- 240 26,67 1.4455  
700 70 000

C	Cr	Ni	Mo	N
0,03	16,5	13,0	2,5	0,15
	18,5	15,0	3,0	0,25

+ Ni  
+ N

**1.4412**  
GX5CrNiMo19-11-3    AISI 317  
200 205 1.4430  
600 100 000

C	Cr	Ni	Mo
0,07	18,0	10,0	3,0
	20,0	13,0	3,5

+ Ni  
+ Mo

**1.4408**  
GX5CrNiMo19-11-2    AISI 316  
200 185 1.4430  
600 100 000

C	Cr	Ni	Mo
0,07	18,0	9,0	2,0
	20,0	12,0	2,5

+ C

**1.4409**  
GX2CrNiMoN19-11-2    AISI 316L  
200 195 1.4430  
600 100 000

C	Cr	Ni	Mo
0,03	18,0	9,0	2,0
	20,0	12,0	2,5

+ Ti

**1.4581**  
GX5CrNiMoNb19-11-2    AISI 316CB  
200 185 1.4430  
600 90 000

C	Cr	Ni	Mo	Nb
0,07	18,0	9,0	2,0	1,0
	20,0	12,0	2,5	

**1.4308**  
GX5CrNi19-10    AISI 304  
200 175 1.4551  
700 100 000

C	Si	Cr	Ni
0,07	1,5	18,0	8,0
		20,0	11,0

+ S

**1.4309**  
GX2CrNi19-11    AISI 304L  
200 185 1.4551  
600 100 000

C	Si	Cr	Ni
0,03	1,5	18,0	9,0
		20,0	12,0

+ C

**1.4552**  
GX5CrNiNb19-11    AISI 321  
200 175 1.4551  
850 80 000

C	Cr	Ni	Nb	Si
0,07	18,0	9,0	1,0	1,5
	20,0	12,0		

**K4305**  
GX8CrNiS18-9    AISI 303  
200 175 1.4316  
200 100

C	Si	Cr	Ni	S
0,1	1	17,0	10	0,15
		19,0		0,35

**1.4312**  
GX10CrNi18-8    AISI 301  
200 175 1.4316  
300 100

C	Si	Cr	Ni
0,12	2	17,0	8,0
		19,5	10,0

**Material no.**

material short name		AISI-Name	
a	c	e	f
b	d		g
Xy	Xy	Xy	Xy
min	min	min	min
max	max	max	max

Alloying elements  
Percentage share

- a. Max. annealed core hardness (HB)
- b. Max. recommended application temperature (°C)
- c. Min. yield strength Rp 0,2 (MPa)
- d. Machining (m/min)
- e. PREN value (seawater resistance > 32)
- f. Recommended filler material
- g. 000 = approved for pressure vessels (DIN EN 10213)

costs

# API 600 TRIM NUMBER CHART & SERVICE COVERAGE



## STANDARD TRIM CONFIGURATIONS

The following table details standard trim materials available for API600 bolted bonnet Gate valves†. Including API600 Nominal Seating Surface, Stem and Backseat Bushing or Weld-deposit Materials and Hardness.

API Trim Number	Nominal Trim	Trim code	Stem & other trim parts	Disc/Wedge Surface	Seat surface †	Seating Surface Hardness (HB) Minimum A	Seat Surface Material Type B	Seat Surface Typical Specification Guide						Stem/Bushing			Trim Material Grade
								Cast		Forged		Welded M	Material Type B	Typical Specifications Type	Stem Hardness (HB)	Backseat Bushing Hardness (HB)	
1	410	F6	410 (13Cr) (200-275 HBN)	F6 (13Cr) (200 HBN)	410 (13Cr)	250	13Cr	ASTM A217 (CA 15)	ASTM A182 (F6a)			13Cr	ASTM A276-T410 or T420	200 min 275 max	250 min	13Cr-0.75Ni-1Mn	
2	304 1	304	304	304 (18Cr-8Ni)	304 (18Cr-8Ni)	Note D	18Cr-8Ni	N/A	ASTM A182 (F304)			18Cr-8Ni	ASTM A276-T304	Note D	Note D	19Cr-9.5Ni-2Mn-0.08C	
25	304 - Hard faced	304HFS	304	304 (18Cr-8Ni)	304 (18Cr-8Ni)		Co-Cr A G	N/A	ASTM A182 (F304)	AWS A5.9 ER310		18Cr-8Ni	ASTM A276-T304	Note D	Note D	19Cr-9.5Ni-2Mn-0.08C	
3	310	310	310 (25Cr-20Ni)	310 (25Cr-20Ni)	310 (25Cr-20Ni) Note D	Note D	25Cr-20Ni	N/A	ASTM A182 (F310)	AWS A5.9 ER310		25Cr-20Ni	ASTM A276-T310	Note D	Note D	25Cr-20.5Ni-2Mn	
4	410 - Hard (Hard F6)	F6H	410 (13Cr) (200-275 HBN)	F6 (13Cr) (200-275 HBN)	F6 (13Cr)	750 E	Hard 13Cr	N/A	Note F	N/A		13Cr	ASTM A276-T410 or T420	200 min 275 max	250 min	13Cr-0.75Ni-1Mn	
5	410 - Full Hard faced	F6HF	410 (13Cr) (200-275 HBN)	St Gr6 (CoCr Alloy)	St Gr6 (CoCr Alloy)	350 F	Co-Cr A G	N/A	N/A	AWS A5.13 ECoCr-A or AWS A5.21 ERCoCr-A		13Cr	ASTM A276 T410 or T420	200 min 275 max	250 min	13Cr-0.5Ni-1Mn/Co-Cr-A	
5a	410 - Full Hard faced	F6HF	410 (13Cr) (200-275 HBN)	Hardf. NiCr Alloy	Hardf. NiCr Alloy	350 E	Ni-Cr	N/A	N/A	Note H		13Cr	ASTM A276 T410 or T420	200 min 275 max	250 min	13Cr-0.5Ni-1Mn/Co-Cr-A	
6	410 (F6) and Cu-Ni	F6HFS	410 (13Cr) (200-275 HBN)	Monel 400* (NiCu Alloy)	CA15 or CuNi	250 J 175 J	13Cr Cu-Ni	ASTM A217 (CA 15)	ASTM A182 (F6a)	AWS A5.9 ER410		13Cr	ASTM A276 T410 or T420	200 min 275 max	250 min	13Cr-0.5Ni-1Mn/Ni-Cu	
7	410 (F6) Hard F6	F6HF+	410 (13Cr) (200-275 HBN)	F6 (13Cr)	F6 (Hard 13Cr) or 13Cr	250 J 750 J	13Cr Hard 13Cr	ASTM A217 (CA 15)	AWS A5.9 ER410	AWS A5.9 ER410		13Cr	ASTM A276 T410 or T420	200 min 275 max	250 min	13Cr-0.5Ni-1Mo/13Cr-0.5Ni-Mo	
8	F6 (410) - Hard faced	F6HFS	410 (13Cr) (200-275 HBN)	410 (13Cr)	St Gr6 (CoCr Alloy)	250 J 350 J	13Cr Co-Cr A G	ASTM A217 (CA 15)	ASTM A182 (F6a)	AWS A5.9 ER410		13Cr	ASTM A276 T410 or T420	200 min 275 max	250 min	13Cr-0.75Ni-1Mn/1/2Co-Cr-A	
8a	F6 (410) - Hard faced	F6HFS	410 (13Cr) (200-275 HBN)	F6 (13Cr)	Hardf. NiCr Alloy	250 J 350 J	13Cr Ni-Cr	ASTM A217 (CA 15)	ASTM A182 (F6a)	AWS A5.9 ER410		13Cr	ASTM A276 T410 or T420	200 min 275 max	250 min	13Cr-0.75Ni-1Mn/1/2Co-Cr-A	
9	Monel	Monel	Monel* (NiCu Alloy)	Monel 400* (NiCu Alloy)	Monel 400* (NiCu Alloy)	Note D	Ni-Cu Alloy	N/A	MFG Standard	N/A		Ni-Cu Alloy	MFG Standard	Note D	Note D	70Ni-30Cu	
10	316	316	316 (18Cr-Ni-Mo)	316 (18Cr-Ni-Mo)	316 (18Cr-Ni-Mo)	Note D	18Cr-8Ni	ASTM A351 (CF8M)	ASTM A182 (F316)	AWS A5.9 ER316		18Cr-8Ni-Mo	ASTM A276-T316	Note D	Note D	18Cr-12Ni-2.5Mo-2Mn	
11	Monel - Hard faced	MonelHFS	Monel* (NiCu Alloy)	Monel 400* (NiCu Alloy)	Monel 400*+St Gr6	Note D 350 J	Ni-Cu Alloy Co-Cr A G	N/A	MFG Standard	N/A		Ni-Cu Alloy	MFG Standard	Note D	Note D	70Ni-30Cu/1/2Co-Cr-A	
12	316 - Hard faced	316HFS	316 (Cr-Ni-Mo)	316 (18Cr-8Ni-Mo)	316+St Gr6	Note D 350 J	18Cr-8Ni Co-Cr A G	ASTM A351 (CF8M)	ASTM A182 (F316)	AWS A5.9 ER316		18Cr-8Ni-Mo	ASTM A276-T316	Note D	Note D	18Cr-12Ni-2.5Mo-2Mn/1/2Co-Cr-A	
13	Alloy 20	Alloy 20	Alloy 20 (19Cr-29Ni)	Alloy 20 (19Cr-29Ni)	Alloy 20 (19Cr-29Ni)	Note D	19Cr-29Ni	ASTM A351 (CN7M)	ASTM B473	AWS A5.9 ER320		19Cr-29Ni	ASTM B473	Note D	Note D	29Ni-19Cr-2.5Mo-0.07C	
14	Alloy 20 - Hard faced	Alloy 20HFS	Alloy 20 (19Cr-29Ni)	Alloy 20 (19Cr-29Ni)	Alloy 20 St Gr6	Note D 350 J	19Cr-29Ni Co-Cr A G	ASTM A351 (CN7M)	ASTM B473	AWS A5.9 ER320		19Cr-29Ni	ASTM B473	Note D	Note D	29Ni-19Cr-2.5Mo-0.07C/1/2Co-Cr-A	
15	304 - Full Hard faced	304HF	304 HF (18Cr-8Ni-Mo)	304+St Gr6	304+St Gr6	350 E	Co-Cr A G	N/A	N/A	AWS A5.13 ECoCr-A or AWS A5.21 ERCoCr-A		18Cr-8Ni	ASTM A276-T304	Note D	Note N	19Cr-9.5Ni-2Mn-0.08C/1/2Co-Cr-A	
16	316 - Full Hard faced	316HF	316 HF (18Cr-8Ni-Mo)	316+St Gr6	316+St Gr6	350 E	Co-Cr A G	N/A	N/A	AWS A5.13 ECoCr-A or AWS A5.21 ERCoCr-A		18Cr-8Ni-Mo	ASTM A276-T316	Note D	Note N	18Cr-12Ni-2.5Mo-2Mn/Co-Cr-Mo	
17	347 - Full Hard faced	347HF	347 HF (18Cr-10Ni-Cb)	347+St Gr6	347+St Gr6	350 E	Co-Cr A G	N/A	N/A	AWS A5.13 ECoCr-A or AWS A5.21 ERCoCr-A		18Cr-10Ni-Cb	ASTM A276-T347	Note D	Note N	18Cr-10Ni-Cb/Co-Cr-A	
18	Alloy 20 - Full Hard faced	Alloy 20 HF	Alloy 20 (19Cr-29Ni)	Alloy 20+St Gr6	Alloy 20+St Gr6	350 E	Co-Cr A G	N/A	N/A	AWS A5.13 ECoCr-A or AWS A5.21 ERCoCr-A		19Cr-29Ni	ASTM B473	Note D	Note N	19 Cr-29Ni/Co-Cr-A	
19	Nickel 1					Note D	Ni Alloy	MFG Standard 1	MFG Standard 1	MFG Standard		Ni Alloy 1	MFG Standard 1	Note D	Note N		
19a	Alloy 625					Note D	Alloy 625	ASTM A494 (CW6MC)	ASTM B564 UNS N06625	AWS A5.14 ERNiCrMo-3		Alloy 625	ASTM B564 UNS N06625	Note D	Note N		
19b	Alloy C276					Note D	Alloy C276	ASTM A494 (CW2M)	ASTM B564 UNS N10276	AWS A5.14 ERNiCrMo-4		Alloy C276	ASTM B564 UNS N10276	Note D	Note N		
19c	Alloy 825					Note D	Alloy 825	ASTM A494 (CU5MCuC)	ASTM B564 UNS N08825	AWS A5.14 ERNiCrMo-3		Alloy 825	ASTM B564 UNS N08825	Note D	Note N		
20	Nickel 1 and Hard faced					Note D 350 J	Ni Alloy Co-Cr A G	MFG Standard 1	MFG Standard 1	AWS 5.13 ECoCr-A or AWS 5.21 ECoCr-A		Ni Alloy 1	MFG Standard 1	Note D	Note N		
20a	Alloy 625 and Hard faced					Note D 350 J	Alloy 625 Co-Cr A G	ASTM A494 (CW6MC)	ASTM B564 UNS N06625	AWS A5.14 ERNiCrMo-3		Alloy 625	ASTM B564 UNS N06625	Note D	Note N		
20b	Alloy C276 and Hard faced					Note D 350 J	Alloy C276 Co-Cr A G	ASTM A494 (CW2M)	ASTM B564 UNS N10276	AWS A5.14 ERNiCrMo-4		Alloy C276	ASTM B564 UNS N10276	Note D	Note N		
20c	Alloy 825 and Hard faced					Note D 350 J	Alloy 825 Co-Cr A G	ASTM A494 (CU5MCuC)	ASTM B564 UNS N08825	AWS A5.14 ERNiCrMo-3		Alloy 825	ASTM B564 UNS N08825	Note D	Note N		
21	CoCr-A(orCRA)Hardfaced Z					350 E	Co-Cr A G	N/A	N/A	AWS 5.13 ECoCr-A or AWS 5.21 ECoCr-A		Ni Alloy 1	MFG Standard 1	Note D	Note N		
Special	Bronze	Bronze	410 (CR13)	Bronze	Bronze												
Special	Alloy 625	Alloy 625	Alloy 625	Alloy 625	Alloy 625												
NACE	Specially treated 316 or 410 trim combined with 87M bolts and 2HM nuts to meet NACE MR-01-75 requirements.																
Full Stellite	Full Hard faced trim, suitable for abrasive & severe services up to 1200°F (650°C).																

NOTE: Cr = Chromium Ni = Nickel Co = Cobalt Cu = Copper N/A = Not Applicable.

1 API lists as obsolete but still used in the valve industry. (Trim# 1 is still used for API603 gates as well as globe & check valves).  
Also, even though API no longer references trim# 2, for API603 gate, globe & check, (and in some commodity API600 gate valves in lower classes and under 300NB) it is still manufactured as it is specified by clients.

A HB (formerly BHN) is the symbol for Brinell Hardness per ASTM E10.

B Free Machine grades of 13Cr are prohibited.

C Body and disc seat surfaces should be 250HB minimum with a 50HB minimum differential between the body and disc seat surfaces.

D Manufacturer's standard hardness.

E Differential hardness between the body and disc seat surfaces is not required.

F Case hardness by nitriding to a thickness of 0.13 mm (0.005 in) minimum.

G AWS A5.13 ECoCr-A or AWS A5.21 ERCoCr-A: This classification includes such trademark materials as Stellite 6™, Stoddy 6™ and Wallex 6™. For Plasma Transfer Arc Welding (PTAW) process powder with the metallurgy equivalents to UNS R30006 can also be used. CoCr-E (Stellite 21™\* or equal) may be used only with purchaser approval and typical CoCr-E alloys include AWS A5.13 ECoCr-E or AWS A5.21 ERCoCr-E.

H Manufacturer's standard hardfacing with a maximum iron content of 25%.

J Hardness differential between the body and disc seat surfaces shall be the manufacturer's standard.

K Manufacturer's standard with 30 Ni minimum.

M Typical backseat weld deposit material.

N Per manufacturer's standard if not Hard faced, 250 HB minimum if Hard faced.

Z Trim materials, including stem and base material for HF trim items, shall have a corrosion resistance and temperature limit at least equal to the valve body's corrosion resistance and pressure temperature rating.

\*Important Note: Data provided in this chart is for informational purposes only. Always consult current API publications to verify information (as of Feb 2017 API Table 8). Note API600 is only designed for steel bolted bonnet gate valves and specific hardness requirements. Do not literally apply to globe & check valves. ValveIT recommend that customer's engineers analyse service requirements and specify the materials they consider optimum for their service conditions. Temperatures shown will vary depending on service applications, pressure and media type.

† The API600 trim chart specifications are primarily designed for API600 Gate valves. For API603 gate valves as well as globe valves and check valves, the same trim numbers are more loosely applied (API603 does not reference a trim chart as of 2017). In regard to globe and check valve, the hardness differentials shown above on the disc and seat aren't mandatory by many end users (and manufacturers are not required to follow the latest version of API600 unless client requires it) as wear, galling, sticking etc., is not such an issue with globe & check valves. In large parts of the world globe valves and check valves are ordered as BS spec not API (BS spec is now converted to ISO specification). Many check valves are also ordered to API603 specifications. In regard to API602, the same identical trim chart is specified in the latest version of API602. Once again, for globe and check valves traditionally the BS specification (now ISO specification) has been adopted by many manufacturers.

## TRIM SERVICE APPLICATIONS & OLD BS DESIGNATION

API Trim Number	Service	Old BS Designation
1 <sup>1</sup>	For oil and oil vapors and general services with heat treated seats and wedges. General very low erosive or non-corrosive service between -100°C and 320°C. This stainless steel material lends itself readily to hardening by heat treatment and is excellent for contacting parts such as stems, gates, and discs. Steam, gas & general service to 370°C. Oil & Oil vapor 480°C.	Cr13
2 <sup>1</sup>	For moderate pressure in corrosive, low erosive service between -265°C and 450°C.	18-8Ti
3	For moderate pressure in corrosive or non corrosive service between -265°C and 450°C.	25-20
4	Seats 275 BHN min. As trim 1 but for medium pressure and more corrosive service.	HF
5	High pressure slightly erosive and corrosive service between -265°C and 650°C and higher pressure. Premium trim service to 650°C. Excellent for high pressure water and steam service.	HF
5a	As trim 5 where Co is not allowed.	HF
6	As trim 1 and more corrosive service.	Cr and Cu-Ni
7	Seats 750 BHN min. As trim 1 but for higher pressure and more corrosive/erosive service.	Cr and Cu-Ni
8	Universal trim for general service requiring long service life up to 593°C. As trim 5 for moderate pressure and more corrosive service. Steam, gas & general service to 540°C. Standard trim for gate valves.	Cr + HF
8a	As trim 5a for moderate pressure and more corrosive service.	Cr + HF
9	For corrosive service to 450°C such as acids, alkalis, salt solutions, etc. Very corrosive fluids. Erosive-corrosive service between -240°C and 480°C. Resistant to sea water, acids, alkalis. Has excellent corrosion resistance in chlorine and alkylation service.	Ni-Cu
10	For superior resistance to corrosion for liquids and gases which are corrosive to 410 stainless steel up to 455°C. As trim 2 but a higher level of corrosive service. Provides excellent resistance to corrosive media at high temperatures and toughness for service at low temperatures. Low temperature service standard for 316SS valves.	18/10/2002
11	As trim 9 but for medium pressure and more corrosive service.	HF-Ni
12	As trim 10 but for medium pressure and more corrosive or abrasive service.	-
13	Very corrosive service. For moderate pressure between -45°C and 320°C.	-
14	As trim 13 but for medium pressure and more corrosive service.	-
15	As trim 2 but more erosive service & higher pressure.	-
16	As trim 10 but more erosive service & higher pressure.	-
17	As trim 13 but more corrosive service & higher pressure. Combines good corrosion resistance with high temperature resistance up to 800°C.	18-8 Nb
18	As trim 13 but more corrosive service & higher pressure. Water, gas or low pressure steam to 230°C.	-
Bronze	Water, oil, gas, or low pressure steam to 232°C.	-

<sup>1</sup> API lists as obsolete but still used in the valve industry. (Trim# 1 is still used for API603 gates as well as globe & check valves). Also, even though API no longer references trim# 2, for API603 gate, globe & check, (and in some commodity API600 gate valves in lower classes and under 300NB) it is still manufactured as it is specified by clients.

Important Note: Data provided in this chart is for informational purposes only. Always consult current API publications to verify information and trim date. ValveIT recommend that customer's engineers analyse service requirements and specify the materials they consider optimum for their service conditions. Temperatures shown will vary depending on service applications, pressure and media type.

## TRIM MATERIAL EQUIVALENT GRADES

TRIM	UNS	TYPE	GRADE (forged)	ASTM (wrought)	DIN	DIN W No.
F6	UNS S41000	13Cr	ASTM A182 F6a	A4276-410	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 X6CrNiNb 18 10	1.455
MONEL®	UNS N04400	67Ni-30Cu	ASTM B564-N04400	B164-N04400	DIN 17743	2.436
ALLOY 20	UNS N08020	28Ni-19Cr-Cu-Mo	ASTM A182-F20*	ASTM B473	DIN 14500	2.466
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	0C417Ni4Cu4Nb	ASTM A4750 UNS S17400	ASTM A4705 UNS S17400	X5CrNiCuNb17-4-4	1.4548
St. Gr6	UNS R30006	Co Cr-A	AMS 5894		Stellite® Gr6	

\* No longer listed in ASME B16.34 - 2009.