



WALWORTH®
Since 1842



API 602
GATE, GLOBE AND CHECK VALVES

CATALOG

WALWORTH API 602 VALVES

FORGED STEEL, ALLOY AND STAINLESS STEEL

WALWORTH offers this product line manufactured in accordance with API-602. and ANSI Classes 800, 1500 and 2500 for socket weld, threaded and combined ends. Also available are Integral Flanges in 150, 300, 600 and 1500 either Raised Face or ring type joint ends.

WALWORTH keeps a large quantity of these valves in stock in the most common trims used by the industry. For Certain Customer applications where forged material is not available (specifically for high nickel alloys), WALWORTH has developed this product line using sand casting. In order to keep the same quality level as forged, these castings are produced with 10% of each lot to be subject to X-ray examination.

WALWORTH offers the majority of materials known and used for this product line, including but not limited to:

1. Carbon Steels A105.
2. Low Carbon Steels LF2, LF3.
3. Low Alloy Steels F1, F11, and F22.
4. Medium Alloy Steels F5, F9, and F91.
5. Stainless Steel Valves F304, F316.
6. Low Carbon Stainless Steel F304L, F316L.
7. Duplex Stainless Steel F51, F53.
8. Nickel Alloys Inconel, and Monel.

When cast steel valves are manufactured in accordance with API-602. as an acceptable option, WALWORTH offers this product line in the following materials either socket weld, threaded or flanged ends:

1. Stainless Steels CF8, CF8M, CF8C, CF10, CG8M.
2. Low Carbon Stainless Steels CF3, CF3M, CG3M.
3. Super Stainless Steels CN7M (Alloy 20), CN3M (Alloy 20 modified), CT15C.
4. High Nickel Alloys Monel M30C, Monel M35-1, Monel CZ100, Inconel CY40, (Inconel 600), CW2M (Hastelloy C4), N12MV (Hastelloy B), CW12MW (Former Hastelloy C-276), CW6M (New Hastelloy C-276), CU5MCuC (Incoloy 825), N7M (Hastelloy B2), CW6MC (Inconel 625).
5. Duplex Stainless Steel CE8MN, CD6MN, CD3MN.
6. Super Duplex Stainless Steel CE3MN, CD3MNCuN.
7. Aluminum Bronze 95500, 95600, 95800.

TYPE	SIZE	PRESSURE CLASS AS PER API 602 AND ASME/ANSI B16.34 FOR SW OR NPT ENDS	
		800, 1500 & 2500	150, 300, 600, & 1500
Gate	1/4" to 2"	800, 1500 & 2500	150, 300, 600, & 1500
Globe	1/4" to 2"	800, 1500 & 2500	150, 300, 600, & 1500
Piston Check	1/4" to 2"	800, 1500 & 2500	150, 300, 600, & 1500
Ball Check	1/4" to 2"	800, 1500 & 2500	150, 300, 600, & 1500
Swing Check	1/4" to 2"	800, 1500 & 2500	150, 300, 600, & 1500



API 602 VALVES BODY MATERIALS

WALWORTH offers the standard product line of API-602 Forged Steel valves in a wide variety of carbon steel, low and medium alloy materials, that can be used in combination with listed API-602 trims.

However, due to the actual requirements that the global market demands, WALWORTH now offers additional materials like stainless steel, nickel and exotic alloys. Also, WALWORTH offers a new product line for valves with heavy wall thickness in Aluminum Bronze, either ASTM B148 grade 95500, 95600 or 95800.

FORGING SPECIFICATION	COMMON DESIGNATION	MATERIAL SUFFIX	WROUGHT BAR SPECIFICATION	SERVICE RECOMMENDATIONS (1)	COMMON TRIM FOR THIS BASE MATERIAL	
					150 TO 600 #	900 TO 2500 #
A105	Carbon Steel	ASTM A216 WCB	Grade A105	Non-corrosive applications including water, oil and gases at temperatures between -20°F (-30°F) and +800°F (+425°C)	UT, 3HF, A	HF, 3HF+HF
A105N	Carbon Steel	ASTM A216 WCC	Grade A105N	Non-corrosive applications including water, oil and gases at temperatures between -20°F (-30°F) and +800°F (+425°C)	UT, 3HF, A	HF, 3HF+HF
A350 LF1	Low Temp Carbon steel	ASTM A352 LCB	Grade A350 LF1	Low temperature applications to -50 °F (-46°C).Not for use above + 650°F(+340°C).	UT, 3HF, A	HF, 3HF+HF
A350 LF2	Low Temp Carbon steel	ASTM A352 LCC	Grade A350 LF2	Low temperature applications to -50 °F (-46°C).Not for use above + 650°F(+340°C).	UT, 3HF, A	HF, 3HF+HF
A350 LF3	3 1/2 % Nickel Steel	ASTM A352 LC3	Grade A350 LF3	Low temperature applications to - 150°F (-101°C). Not for use above + 650°F(+340°C).	UT, 3HF, A	HF, 3HF+HF
A182 F1	C-1/2 Mo Low Alloy Steel	ASTM A217 WC1	Grade A182 F1	Non-corrosive applications including water, oil and gases at temperatures between -20°F (-30°C) and + 1100°F(+593°C).	UT, 3HF, A	HF, 3HF+HF
A182 F2	0.75% Ni; Mo; 0.75% Cr Low Alloy Steel	ASTM A217 WC5	Grade A182 F2	Non-corrosive applications including water, oil and gases at temperatures between -20°F (-30°C) and + 1100°F(+593°C).	UT, 3HF, A	HF, 3HF+HF
A182 F11	1 1/4% Chrome; 1/2% Moly Low Alloy Steel	ASTM A217 WC6	Grade A182 F11 Class 2	Non-corrosive applications including water, oil and gases at temperatures between -20°F (-30°C) and + 1100°F(+593°C).	UT, 3HF, A	HF, 3HF+HF
A182 F22	2 1/4 % Chrome Low Alloy Steel	ASTM A217 WC9	Grade A182 F11 Class 3	Non-corrosive applications including water, oil and gases at temperatures between -20°F (-30°C) and + 1100°F(+593°C).	UT, 3HF, A	HF, 3HF+HF
A182 F5	5% Chrome; 1/2 % Moly, Medium Alloy Steel	ASTM A217 Grade C5	A182 F5	Mild corrosive or erosive applications as well as non-corrosive applications at temperatures between- 20°F (-30°C) and + 1200°F (+649°C).	UT, 3HF, A	HF, 3HF+HF
A182 F9	9% Chrome; 1% Moly, Medium Alloy Steel	ASTM A217 C12	Grade A182 F9	Mild corrosive or erosive applications as well as non-corrosive applications at temperatures between- 20°F (-30°C) and + 1200°F (+649°C).	UT, 3HF, A	HF, 3HF+HF

API 602 VALVES BODY MATERIALS

FORGING SPECIFICATION	COMMON DESIGNATION	MATERIAL SUFFIX	WROUGHT BAR SPECIFICATION	SERVICE RECOMMENDATIONS (1)	COMMON TRIM FOR THIS BASE MATERIAL	
					150 TO 600 #	900 TO 2500 #
A182 F91	9% Chrome; 1% Moly; V-N, Medium Alloy Steel	ASTM A217 Grade C12-A	A182 F91	Mild corrosive or erosive applications as well as non-corrosive applications at temperatures between -20°F (-30°C) and +1200°F (+649°C).	UT, 3HF, A	HF, 3HF+HF
ASTM A182 F304	18% Chrome; 8% Nickel; 0.08 % C Stainless Steel	ASTM A351 Grade CF8	ASTM A479 304	Corrosive or extremely 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.	4HF	4HF+HF
ASTM A182 F316	18% Chrome; 12% Nickel; 2% Mo; 0.08% C Stainless Steel	ASTM A351 Grade CF8M	ASTM A479 316	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.	18-8smo, 3HF	3HF+HF
ASTM A182 304L	18% Chrome; 8% Nickel; 0.03 % C Low Carbon Stainless Steel	ASTM A351 Grade CF3	ASTM A479 304L	Brackish water, phosphate solutions, pressurized water @ 570 °F (299 °C), sea water, steam.	304L, 3HF	304L, 3HF+HF
ASTM A182 F316L	18% Chrome; 12% Nickel; 2% Mo; 0.03 % C Low Carbon Stainless Steel	ASTM A351 Grade CF3M	ASTM A479 316L	Acetic acid, calcium carbonate, calcium lactate, potable water, sea water, steam, sulfites.	316L, 3HF	316L, 3HF+HF
ASTM A182 F317L	18% Chrome; 12% Nickel; 3% Mo; 0.03 % C Low Carbon Stainless Steel	ASTM A351 Grade CG3M	ASTM A182 F317L	Corrosive or non corrosive services to +800°F (+425°C)**	317L, 317LH	317L, 317LH
ASTM A182 F347	18% Chrome; 10% Nickel; Cb; 0.08 % C Stainless Steel	ASTM A351 Grade CF8C	ASTM A479 347	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. Hydrogen service."	347H, 347HF	347H, 347HF
ASTM A182 F304H	18% Chrome; 8% Nickel; 0.08 % C Stainless Steel	ASTM A351 Grade CF10	ASTM A479 304H	Corrosive or extremely 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.	310, 310HF	310HF
ASTM A182 F316H	18% Chrome; 8% Nickel; 2% Mo; 0.08 % C Stainless Steel	ASTM A351 Grade CF10M	ASTM A479 316H	Corrosive or extremely 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.	310, 310HF	310HF
ASTM A182 F317	18% Chrome; 10% Nickel; 3% Mo; 0.08 % C Stainless Steel	ASTM A351 Grade CG8M	ASTM A182 F317	Heavy water manufacturing, Nuclear, Petroleum, Pipe Line, Power, Pulp and paper, Printing Textile, Corrosive dye solutions, ink, sulfite liquor.	317H, 21HF	317H, 21HF
ASTM A182 F310H	25% Chrome; 20% Nickel; 0.04 To 0.2 % C Super Stainless Steel	ASTM A351 Grade CK20	ASTM A182 F310H	Aircraft, Chemical processing, Oil Refining, Pulp and Paper. Corrosives Hot products around 1200 °F (649 °C), sulfite liquor, sulfuric acid (dilute).	310, 310HF	310HF
ASTM B462 N08020	19% Chrome; 28% Nickel; Cu-Mo; 0.07 % C Super Stainless Steel	ASTM A351 Grade CN7M	ASTM B473 N08020	Acetic acid (hot), brines, caustic solutions, (strong, hot), hydrochloric acid (dilute), hydrofluoric acid and hydrofluosilicic acid (dilute), nitric acid, (strong, hot), nitric-hydrofluoric pickling acids, sulfates and sulfites, sulfuric acid, (all concentrations to 150 °F (65.6 °C), sulfuric acid, phosphoric acid.	A20, A20H	A20, A20H
ASTM B462 N08020	19% Chrome; 28% Nickel; Cu-Mo; 0.03 % C Super Stainless Steel	ASTM A351 Grade CN3MN	ASTM B473 N08020	Acetic acid (hot), brines, caustic solutions, (strong, hot), hydrochloric acid (dilute), hydrofluoric acid and hydrofluosilicic acid (dilute), nitric acid, (strong, hot), nitric-hydrofluoric pickling acids, sulfates and sulfites, sulfuric acid, (all concentrations to 150 °F (65.6 °C), sulfuric acid, phosphoric acid. Better weldability properties than CN7M	A20, A20H	A20, A20H
ASTM A182 F44	20% Chrome; 18% Nickel; 6% Mo; 0.25 % C Super Stainless Steel	ASTM A351 Grade CK3MCuN	ASTM A479 S31254	Acetic Acid, antibiotics and drugs, bleaching compounds, formic acid, fruit and juices, hot air, hot water, hydrocarbons, hydrochloric acid, organic liquids and acids, nitric acid, organic salts, oxalic acid, phosphoric acid, sea water, sewage, sodium bisulfite, steam, sulfamic acid, 10 % sulfuric acid,	254HF	254HF
ASTM B564 N08810	19% Chrome; 32% Nickel; 0.05 to 0.15 % C Incoloy 800.	ASTM A351 Grade CT15C	ASTM B408 N08810		810T	810T

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FORGING SPECIFICATION	COMMON DESIGNATION	MATERIAL SUFFIX	WROUGHT BAR SPECIFICATION	SERVICE RECOMMENDATIONS (1)	COMMON TRIM FOR THIS BASE MATERIAL	
					150 TO 600 #	900 TO 2500 #
N/A	25.5% Chrome; 5.5% Nickel; 2% Mo; 0.040% C Super Stainless Steel	ASTM A351 Grade CD4MCu	ASTM A479 S32550	Concentrate brine, fatty acids, potable water, pulp water, pulp liquors at 220 °F (104 °C), sea water, stem, sulfuric acid (15-30% @ 140-160 °F (60-71 °C), sulfuric acid (35-40 % @185 °F (85 °C), plus 5 % organics).	32250H	32250H
ASTM B469 8904	21% Chrome; 25.5% Nickel; 4.5% Mo; 1.5%Cu; 0.02% C Super Stainless Steel	ASTM A351 Grade CN2MCuN	ASTM B625 8904		8904H	8904H
ASTM A182 F6	12% Chrome Steel	ASTM A487 Grade CA15	ASTM A276 410	Corrosive application at temperatures between -20°F (-30°C) and + 900°F (+482°C).	UT, HF	UT, HF
ASTM A182 F6	12% Chrome Steel	ASTM A487 Grade CA6NM	ASTM A276 410	Corrosive application at temperatures up to +1300°F (704°C). Boiler feed water 250 °F (115°C), sea water, steam sulfur.	UT, HF	UT, HF
ASTM B564 N04400	67% Ni; 30% Cu, Monel	ASTM M-35-1 A494 Grade	ASTM B164 N04400	Weldable grade. Good resistance to corrosion by all common organic acids and salt water. Also highly resistant to most alkaline solutions to +7W°F (+400°C)	A, AHF	A, AHF
ASTM B160 N02200	95% Nickel	ASTM CZ100 A494 Grade	ASTM B160 N02200	Chemical processing, mineral processing, food processing. Nickel is useful in handling hot concentrate alkaline or caustic solutions, reducing acids, certain food products, organic acids under certain conditions, dry chlorine and anhydrous ammonia. Cast nickel is not applicable in oxidizing acids and alkaline perchlorite.	2200	2200
ASTM B564 N06600	75% Nickel; 15% Cr; 8% Fe, Inconel 600	ASTM CY-40 A494 Grade	ASTM B166 N06600	Very good for high temperature service. Good resistance to strongly corrosive media and atmosphere to + 800°F (+425°C). Hot boiler feed water, hot caustics, hot concentrate alk water, elevated temperature oxidizing conditions.	600, 600HF	600, 600HF
ASTM B564 N06625	60% Nickel; 22% Cr; 9% Mo; 3.5% Cb, Inconel 625	ASTM CW6MC A494 Grade	ASTM B446 N06625	Very good for high temperature service. Good resistance to strongly corrosive media and atmosphere to + 800°F (+425°C).	625, 625HF	625, 625HF
ASTM B425 N08825	42% Nickel; 21.5% Cr; 3% Mo; 2.3% Cu, Incoloy 825	ASTM CU5MCuC A494 Grade	ASTM B425 N08825		825, 23HF	825, 23HF
ASTM B335 N10001	62% Nickel; 28% Mo; 5% Fe, Hastelloy B	ASTM N12MV A494 Grade	ASTM B335 N10001		10001, HB	10001, HB
ASTM B335 N10665	62% Nickel; 28% Mo; 2% Fe, Hastelloy B2	ASTM A494 Grade N7M	ASTM B335 N10665		HB	HB
ASTM B574 N06455	61% Nickel; 16% Mo; 16% Cr, Hastelloy C4	ASTM CW2M A494 Grade	ASTM B574 N06455	Good resistance to strong oxidation conditions. Good properties at high temperatures, high resistance to formic, phosphoric, sulphurous and sulfuric acids to + 1200°F (+649°C)	6455H	6455H
ASTM B574 N10276	56% Nickel; 18% Mo; 17% Cr; 6% Fe, Hastelloy C-276 (FORMER ALLOY)	ASTM CW12MW A494 Grade	ASTM B574 N10276	Good resistance to strong oxidation conditions. Good properties at high temperatures, high resistance to formic, phosphoric, sulphurous and sulfuric acids to + 1200°F (+649°C)	HC, HCH	HC, HCH
ASTM B574 N10276	56% Nickel; 19% Mo; 18% Cr; 16% Fe, Hastelloy C-276 (NEW ALLOY)	ASTM CW6MC A494 Grade	ASTM B574 N10276	Good resistance to strong oxidation conditions. Good properties at high temperatures, high resistance to formic, phosphoric, sulphurous and sulfuric acids to + 1200°F (+649°C)	HC, HCH	HC, HCH

API 602 VALVES BODY MATERIALS

FORGING SPECIFICATION	COMMON DESIGNATION	MATERIAL SUFFIX	WROUGHT BAR SPECIFICATION	SERVICE RECOMMENDATIONS (1)	COMMON TRIM FOR THIS BASE MATERIAL	
					150 TO 600 #	900 TO 2500 #
N/A	25.5% Chrome; 5.5% Nickel; 2% Mo; 0.040% C Duplex Stainless Steel Grade 1A.	ASTM A995 Grade CD4MCu	ASTM A479 S32550	Concentrate brine, fatty acids, potable water, pulp water, pulp liquors at 220 °F (104 °C), sea water, stem, sulfuric acid (15-30% @ 140-160 °F (60-71 °C), sulfuric acid (35-40% @ 185 °F (85 °C), plus 5 % organics).	32250H	32250H
ASTM A182 F51	24% Chrome; 9.5% Nickel; 4% Mo; 0.080% C Duplex Stainless Steel Grade 2A.	ASTM A995 Grade CE8MN	ASTM A479 32750	Concentrate brine, fatty acids, potable water, pulp water, pulp liquors at 220 °F (104 °C), sea water, stem, sulfuric acid (15-30% @ 140-160 °F (60-71 °C), sulfuric acid (35-40% @ 185 °F (85 °C), plus 5 % organics).	32750H, 31803H, 51H	32750H, 31803H, 51H
ASTM A182 F51	22% Chrome; 5% Nickel; 3% Mo; N; 0.030% C Duplex Stainless Steel Grade 4A.	ASTM A995 Grade CD3MN	ASTM A479 31803	Concentrate brine, fatty acids, potable water, pulp water, pulp liquors at 220 °F (104 °C), sea water, stem, sulfuric acid (15-30% @ 140-160 °F (60-71 °C), sulfuric acid (35-40% @ 185 °F (85 °C), plus 5 % organics).	32750H, 31803H, 51H	32750H, 31803H, 51H
ASTM A182 F53	25% Chrome; 7% Nickel; 4.5% Mo; N; 0.030% C Duplex Stainless Steel Grade 5A.	ASTM A995 Grade CeE3MN	ASTM A182 F53	Concentrate brine, fatty acids, potable water, pulp water, pulp liquors at 220 °F (104 °C), sea water, stem, sulfuric acid (15-30% @ 140-160 °F (60-71 °C), sulfuric acid (35-40% @ 185 °F (85 °C), plus 5 % organics). Useful where the Pitting Resistance Number (PREN) is required.	53H, 53HF	53H, 53HF
ASTM A182 F53	25% Chrome; 7.5% Nickel; 3.5% Mo; N; 0.030% C Duplex Stainless Steel Grade 6A.	ASTM A995 Grade CD3MWCuN	ASTM A182 F53	Concentrate brine, fatty acids, potable water, pulp water, pulp liquors at 220 °F (104 °C), sea water, stem, sulfuric acid (15-30% @ 140-160 °F (60-71 °C), sulfuric acid (35-40% @ 185 °F (85 °C), plus 5 % organics). Useful where the Pitting Resistance Number (PREN) is required.	53H, 53HF	53H, 53HF
N/A	79% min Copper; 4.5% Nickel; 9% Aluminum; 3-4.5% Fe; 0.03 % max Pb.	ASTM B148 Grade 95800	ASTM C63000	Sea water service.	BCE630	BCE630

(1) The above list of consuming industries and corrosive materials are useful as examples of typical applications where these materials can be used as a guide; however, the responsibility of choosing the proper alloy is that of the Engineering firm or End User.

NOMENCLATURE

TYPE	CLASS
ST6	STELLITE 6
13%Cr	STAINLESS STEEL 410
316	STAINLESS STEEL 316
304	STAINLESS STEEL 304
HC	HASTELLOY "C"
CN7M	CHROME-NICKEL STEEL
321	STAINLESS STEEL 321
ST21	STELLITE 21
A20	STAINLESS STEEL ALLOY 20
347	STAINLESS STEEL 347
321	STAINLESS STEEL 321
8810	STAINLESS STEEL 8810
625	INCONEL 625
410 T	STAINLESS 410 (HARDNESS 200-275 BHN)

TYPE	CLASS
316L	STAINLESS STEEL 316L
HB	HASTELLOY "B"
317L	STAINLESS STEEL 317L
17 4PH	STAINLESS STEEL 17 4PH
317	STAINLESS STEEL 317
825	INCOLOY 825
304L	STAINLESS STEEL 304L
K500	MONEL K500
31803	STAINLESS STEEL 31803
718	INCONEL 718
8367	STAINLESS STEEL 8367
TC	TUNGSTEN CARBIDE
W1	WALWELD-100
NUC	NUCALLOY

WALWORTH API 602 VALVES TRIM ARRANGEMENTS

WALWORTH valves are available in the widest range of standard and special trims available in the Industry. The following table shows the most popular trims used for the valves currently offered by the Company.

Special trims as per Customer requirements are available upon request. Please contact your closest WALWORTH Distributor.

WALWORTH TRIM Nr.	API-602 TRIM Nr.	SEAL MATERIAL TYPE	STEM AND OTHER TRIM PARTS (1)	WEDGE/DISC SEAT SURFACES	BODY SEAT SURFACES (2)
AA	1	13Cr-0.75Ni-1Mn	SS-410 (200-275 HBN)	SS-410 (200 HBN)	SS-410 (250 HBN min)
18-8	2	19Cr-9.5Ni-2Mn-0.08C	SS-304	SS-304	SS-304
310	3	25Cr-20.5Ni-2Mn	SS-310	SS-310	SS-310
N/A	4	13Cr-0.75Ni-1Mn	SS-410 (200-275 HBN)	SS-410 (200-275 HBN)	SS-410 (275 HBN min)
HF	5 OR 5A	13Cr-0.5Ni-1Mn/Co-Cr-A	SS-410(200-275 HBN)	Stellite 6 (350 HBN min)	Stellite 6 (350 HBN min)
AAA	6	13Cr-0.5Ni-1Mn/Ni-Cu	SS-410(200-275 HBN)	SS-410(250 HBN min)	Monel 400 (175 HBN min)
N/A	7	13Cr-0.5Ni-1Mo/13Cr-0.5Ni-1Mo	SS-410(200-275 HBN)	SS-410(250 HBN min)	SS-410(750 HBN min)
UT	8 OR 8A	13Cr-0.75Ni-1Mn/1/2Co-Cr-A	SS-410 (200-275 HBN)	SS-410 (250 HBN min)	Stellite 6 (350 HBN min)
A	9	70Ni-30Cu	UN N04400 (Monel 400)	UN N04400 (Monel 400)	UN N04400 (Monel 400)
18-8smo	10	18Cr-12Ni-2.5Mo-2Mn	SS-316	SS-316	SS-316
AHF	11 OR 11A	70Ni-30Cu/1/2Co-Cr-A	UN N04400 (Monel 400)	UN N04400 (Monel 400)	Stellite 6 (350 HBN min)
3HF	12 OR 12A	18Cr-12Ni-2.5Mo-2Mn/1/2Co-Cr-A	SS-316	SS-316	Stellite 6 (350 HBN min)
A20	13	29Ni-19Cr-2.5Mo-0.07C	UNS N08020 (Alloy 20)	UNS N08020 (Alloy 20)	UNS N08020 (Alloy 20)
A20H	14 OR 14A	29Ni-19Cr-2.5Mo-0.07C/1/2Co-Cr-A	UNS N08020 (Alloy 20)	UNS N08020 (Alloy 20)	Stellite 6 (350 HBN min)
NUC	NOT SPECIFIED	13Cr-0.5Ni-1Mn/NUCALLOY	SS-410(200-275 HBN)	NUCALLOY	NUCALLOY
4HF	NOT SPECIFIED	19Cr-9.5Ni-2Mn-0.08C/1/2Co-Cr-A	SS-304	SS-304	Stellite 6 (350 HBN min)
4HF+HF	NOT SPECIFIED	19Cr-9.5Ni-2Mn-0.08C/Co-Cr-A	SS-304	Stellite 6 (350 HBN min)	Stellite 6 (350 HBN min)
304L	NOT SPECIFIED	19Cr-9.5Ni-2Mn-0.03C	SS-304L	SS-304L	SS-304L
1HF	NOT SPECIFIED	18Cr-12Ni-2.5Mo-2Mn/Co-Cr-Mo	SS-316	Stellite 21 (320 HBN min)	Stellite 21 (320 HBN min)
3HF+HF	16	18Cr-12Ni-2.5Mo-2Mn/Co-Cr-A	SS-316	Stellite 6 (350 HBN min)	Stellite 6 (350 HBN min)
3TC (3)	NOT SPECIFIED	18Cr-8Ni-Mo/TgC	SS-316/Tungsten carbide	Tungsten Carbide	Stellite 6 (350 HBN min)
316L	NOT SPECIFIED	17Cr-12Ni-2.5Mo-2Mn0.03C	SS-316L	SS-316L	SS-316L
3LHF	NOT SPECIFIED	17Cr-12Ni-2.5Mo-2Mn0.03C/1/2Co-Cr-A	SS-316L	SS-316L	Stellite 6 (350 HBN min)
3HFL	NOT SPECIFIED	17Cr-12Ni-2.5Mo-2Mn0.03C/Co-Cr-A	SS-316L	Stellite 6 (350 HBN min)	Stellite 6 (350 HBN min)
21HF	NOT SPECIFIED	19Cr-11.5Ni-3.5Mo/Co-Cr-A	SS-317	Stellite 6 (350 HBN min)	Stellite 6 (350 HBN min)
317	NOT SPECIFIED	19Cr-11.5Ni-3.5Mo	SS-317	SS-317	SS-317

WALWORTH API 602 VALVES TRIM ARRANGEMENTS

WALWORTH TRIM Nr.	API-602 TRIM Nr.	SEAL MATERIAL TYPE	STEM AND OTHER TRIM PARTS (1)	WEDGE/DISC SEAT SURFACES	BODY SEAT SURFACES (2)
317H	NOT SPECIFIED	19Cr-11.5Ni-3.5Mo/1/2Co-Cr-A	SS-317	SS-317	Stellite 6 (350 HBN min)
317LH	NOT SPECIFIED	19Cr-13Ni-3.5Mo/Co-Cr-A	SS-317L	Stellite 6 (350 HBN min)	Stellite 6 (350 HBN min)
317L	NOT SPECIFIED	19Cr-13Ni-3.5Mo-0.03C	SS-317L	SS-317L	SS-317L
317LS	NOT SPECIFIED	19Cr-13Ni-3.5Mo/1/2Co-Cr-A	SS-317L	SS-317L	Stellite 6 (350 HBN min)
2HF	NOT SPECIFIED	18Cr-10Ni-0.1N/Co-Cr-A	SS-321	SS-321	Stellite 6 (350 HBN min)
321F	NOT SPECIFIED	18.5Cr-11Ni-2Mn/Co-Cr-A	SS-321	Stellite 6 (350 HBN min)	Stellite 6 (350 HBN min)
321	NOT SPECIFIED	19Cr-11.5Ni-3.5Mo	SS-321	SS-321	SS-321
347HF	NOT SPECIFIED	18.5Cr-11Ni-2Mn-Co/Co-Cr-A	SS-347	Stellite 6 (350 HBN min)	Stellite 6 (350 HBN min)
347	NOT SPECIFIED	18.5Cr-11Ni-2Mn-Co	SS-347	SS-347	SS-347
347H	NOT SPECIFIED	18.5Cr-11Ni-2Mn-Co/1/2Co-Cr-A	SS-347	SS-347	Stellite 6 (350 HBN min)
254HF	NOT SPECIFIED	20Cr-18Ni-6.2Mo-0.02C-Cu+N	UNS S31254	Stellite 6 (350 HBN min)	Stellite 6 (350 HBN min)
51H	NOT SPECIFIED	22Cr-5.5Ni-3Mo-N-0.03C/Co-Cr-A	UNS S31803	Stellite 6 (350 HBN min)	Stellite 6 (350 HBN min)
31803H	NOT SPECIFIED	22Cr-5.5Ni-3Mo-N-0.03C/Co-Cr-A	UNS S31803	UNS S31803	Stellite 6 (350 HBN min)
T9	NOT SPECIFIED	16Cr-4Ni-4Cu-Nb+Ta/Co-Cr	17-4pH	Triballoy 900	Triballoy 900
HC	NOT SPECIFIED	55Ni-15.5Cr-16Mo-3Tg-4Fe	Hastelloy C-276	Hastelloy C-276	Hastelloy C-276
HCH	NOT SPECIFIED	55Ni-15.5Cr-16Mo-3Tg-4Fe/1/2Co-Cr-A	Hastelloy C-276	Hastelloy C-276	Stellite 6 (350 HBN min)
UOP	NOT SPECIFIED	63Ni-30Cu-Al+Ti/70Ni-30Cu	UN N05500 (Monel K-500)	UN N04400 (Monel 400)	UN N04400 (Monel 400)
625	NOT SPECIFIED	60Ni-22Cr-9Mo-3.5Cb	UNS N06625 (Incoloy 625)	UNS N06625 (Incoloy 625)	UNS N06625 (Incoloy 625)
625HF	NOT SPECIFIED	60Ni-22Cr-9Mo-3.5Cb/Co-Cr-A	UNS N06625 (Incoloy 625)	Stellite 6 (350 HBN min)	Stellite 6 (350 HBN min)
8367HF+HF	NOT SPECIFIED	25Ni-20Cr-6.5Mo-2Mn-0.03C/Co-Cr-A	UNS N08367 (AL6XN)	Stellite 6 (350 HBN min)	Stellite 6 (350 HBN min)
810T	NOT SPECIFIED	33Ni-21Cr-39.5Fe-1.5Mn	UNS N08810 (Incoloy 800H)	UNS N08810 (Incoloy 800H)	UNS N08810 (Incoloy 800H)
825	NOT SPECIFIED	42Ni-21.5Cr-3Mo-Ti+Al-0.05C	UNS N08825 (Incoloy 825)	UNS N08825 (Incoloy 825)	UNS N08825 (Incoloy 825)
23HF	NOT SPECIFIED	42Ni-21.5Cr-3Mo/CO-Cr-Mo	UNS N08825 (Incoloy 825)	Stellite 21 (320 HBN min)	Stellite 21 (320 HBN min)
HB	NOT SPECIFIED	66Ni-28Mo-1Mn-0.02C	UNS N10665 (Hastelloy B2)	UNS N10665 (Hastelloy B2)	UNS N10665 (Hastelloy B2)
BCE630	NOT SPECIFIED	79Cu-4.5Ni-9Al-4Fe-0.03Pb	ASTMB B150 63000	ASTMB B150 63000	ASTM B150 63000
HB	NOT SPECIFIED	66Ni-28Mo-1Mn-0.02C	UNS N10665 (Hastelloy B2)	UNS N10665 (Hastelloy B2)	UNS N10665 (Hastelloy B2)

COMMON CONSTRUCTION MATERIALS COMBINATION

The following table shows the most common combination in between base material and trim. There are many other trims which can be combined with these base materials, please refer to other sections of this catalog for additional information.

DESCRIPTION	ASTM A 105 TRIM UT (API-602 Nr. 8)	ASTM A182 Grade F11 TRIM UT (API-602 Nr. 8)	ASTM A182 Grade F22 TRIM UT (API-602 Nr. 8)	ASTM A182 Grade F5TRIM UT (API-602 Nr. 8)	ASTM A182 Grade F9 TRIM UT (API-602 Nr. 8)	ASTM A350 Grade LF1 TRIM UT (API-602 Nr. 8)
BODY	ASTM A 105	ASTM A182 Grade F11	ASTM A182 Grade F22	ASTM A182 Grade F5	ASTM A182 Grade F9	ASTM A350 Grade LF1
BONNET GASKET	304+FLEXIBLE GRAPHITE	304+FLEXIBLE GRAPHITE	304+FLEXIBLE GRAPHITE	304+FLEXIBLE GRAPHITE	304+FLEXIBLE GRAPHITE	304+FLEXIBLE GRAPHITE
SEAT	ASTM A 276 TYPE 410 + ST6	ASTM A 276 TYPE 410 + ST6	ASTM A 276 TYPE 410 + ST6	ASTM A 276 TYPE 410 + ST6	ASTM A 276 TYPE 410 + ST6	ASTM A 276 TYPE 410 + ST6
WEDGE	ASTM A 276 TYPE 420	ASTM A 276 TYPE 420	ASTM A 276 TYPE 420	ASTM A 276 TYPE 420	ASTM A 276 TYPE 420	ASTM A 276 TYPE 420
STEM PACKING	FLEXIBLE GRAPHITE	FLEXIBLE GRAPHITE	FLEXIBLE GRAPHITE	FLEXIBLE GRAPHITE	FLEXIBLE GRAPHITE	FLEXIBLE GRAPHITE
BONNET	ASTM A105	ASTM A182 Grade F11	ASTM A182 Grade F22	ASTM A182 Grade F5	ASTM A182 Grade F9	ASTM A350 Grade LF1
STEM	ASTM A 276 TYPE 410	ASTM A 276 TYPE 410	ASTM A 276 TYPE 410	ASTM A 276 TYPE 410	ASTM A 276 TYPE 410	ASTM A 276 TYPE 410
EYE BOLT PIN	ASTM A 276 TYPE 304	ASTM A 276 TYPE 304	ASTM A 276 TYPE 304	ASTM A 276 TYPE 304	ASTM A 276 TYPE 304	ASTM A 276 TYPE 304
EYE BOLT	ASTM A193 GR. B7	ASTM A193 GR. B16	ASTM A193 GR. B16	ASTM A193 GR. B16	ASTM A193 GR. B16	ASTM A193 GR. B16
BONNET BOLTS	ASTM A193 GR. B7	ASTM A193 GR. B16	ASTM A193 GR. B16	ASTM A193 GR. B16	ASTM A193 GR. B16	ASTM A193 GR. B16
GLAND NUT	ASTM A 276 TYPE 420	ASTM A 276 TYPE 420	ASTM A 276 TYPE 420	ASTM A 276 TYPE 420	ASTM A 276 TYPE 420	ASTM A 276 TYPE 420
GLAND PLATE	ASTM A105	ASTM A182 Grade F11	ASTM A182 Grade F22	ASTM A182 Grade F5	ASTM A182 Grade F9	ASTM A350 Grade LF1
GLAND BUSHING	ASTM A 276 TYPE 420	ASTM A 276 TYPE 420	ASTM A 276 TYPE 420	ASTM A 276 TYPE 420	ASTM A 276 TYPE 420	ASTM A 276 TYPE 420
STEM NUT	ASTM A 276 TYPE 410	ASTM A 276 TYPE 410	ASTM A 276 TYPE 410	ASTM A 276 TYPE 410	ASTM A 276 TYPE 410	ASTM A 276 TYPE 410
HANDWHEEL	ASTM A 197	ASTM A 197	ASTM A 197	ASTM A 197	ASTM A 197	ASTM A 197
HANDWHEEL NUT	ASTM A194 GR. 2H	ASTM A194 GR. 2H	ASTM A194 GR. 2H	ASTM A194 GR. 2H	ASTM A194 GR. 2H	ASTM A194 GR. 2H
IDENTIFICATION PLATE	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM

CHEMICAL COMPOSITION AND MECHANICAL PROPERTIES

The following table shows the nominal chemical composition and mechanical properties for the most common materials supplied. Additional information can be requested from your closest WALWORTH Distributor for other steel, stainless steels or Nickel alloys.

CHEMICAL COMPOSITION AND MECHANICAL PROPERTIES										
Elements and Properties	CARBON STEEL	LOW CARBON STEEL		LOW ALLOY STEEL		MEDIUM ALLOY STEEL		STAINLESS STEEL		
	ASTM-A105	ASTM-A350		ASTM-A182				ASTM-A182		
		LF1	LF2	F11	F22	F5	F9	F304	F316	F347
Carbon	0.35	0.30	0.30	0.10-0.20	0.05-0.15	0.15	0.15	0.030	0.030	0.080
Manganese	0.60-1.05	0.60-1.05	0.60-1.05	0.30-0.80	0.30-0.80	0.30-0.60	0.30-0.60	2.00	2.00	2.00
Phosphorus	0.035	0.035	0.035	0.040	0.040	0.03	0.030	0.045	0.045	0.045
Sulphur	0.040	0.040	0.040	0.040	0.040	0.03	0.030	0.030	0.030	0.030
Silicon	0.10-0.35	0.10-0.35	0.10-0.35	0.50-1.00	0.50	0.50	0.50-1.00	1.00	1.00	1.00
Nickel	0.40	0.40	0.40	-	-	0.50	-	8.0-11.0	10.0-14.0	9.0-13.0
Chromium	0.30	0.30	0.30	1.00-1.50	2.00-2.50	4.00-6.00	8.0-10.0	18.0-20.0	16.0-18.0	17.0-20.0
Molybdenum	0.12	0.12	0.12	0.44-0.65	0.87-1.13	0.44-0.65	0.90-1.10	-	2.0-3.0	-
Copper	0.40	0.40	0.40	-	-	-	-	-	-	-
Columbium	0.02	0.02	0.02	-	-	-	-	-	-	* 2
Vanadium	0.05	0.05	0.05	-	-	-	-	-	-	-
Yield Strength PSI minimum	70,000	71,000	71,000	70,000	75,000	70,000	85,000	75,000	75,000	75,000
Elongation In 2" minimum	36,000	36,000	36,000	40,000	45,000	40,000	55,000	30,000	30,000	30,000
ReductionArea % minimum	22	22	22	20	20	20	20	30	30	30
Hardness (HB) Maximum	30	30	30	30	30	35	40	50	50	50

Notes:

- The percentage (%) shown on the elements is the maximum except where ranges are indicated.
- Steel F347 should have a Columbium content of not less than 8 times the carbon content, but not exceeding 1%.