



WALWORTH[®]
Since 1842



**CAST STEEL VALVE
CATALOG**

CAST STEEL GATE, GLOBE AND CHECK VALVES

CARBON STEEL; ALLOY STEEL; STAINLESS STEEL & EXOTIC ALLOY VALVES

This is the primary WALWORTH product line, manufactured in accordance with ANSI classes 150, 300, 600, 900, 1500 & 2500 # and sizes from 2" up to 72" nominal diameter, provides the end user a wide variety of valves to satisfy their needs. WALWORTH always keeps these valves in stock in the most common trims used in the industries. This product line is manufactured as per API-600 design requirements for gate valves; API-623 for globe valves and API-6D & API-594 for swing check valves.

One of the most important features of WALWORTH Cast Steel Valves is its guarantee to meet and exceed 50 ppm maximum low fugitive emissions leakage rate as furnished "off the shell" without a Customer's special order requirement.

WALWORTH valves were tested in accordance with API-591 RP and approved.

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

1. Carbon Steel like WCA, WCB, WCC, etc.
2. Low Carbon Steel like LCB, LCC, etc.
3. Low Alloy Steel like WC1, WC5, WC6, WC9, etc.
4. Low Carbon Low Alloy Steel like LC2, LC3, etc.
5. Medium Alloy Steel like C5, C12, C12A, etc.
6. Stainless Steel like CF8, CF8M, CF8C, CF10, CG8M, etc.
7. Low Carbon Stainless Steel like CF3, CF3M, CG3M, etc.
8. Super Stainless Steel like CN7M(Alloy 20), CN3M (Alloy 20 modified), CT15C, etc.
9. Duplex Stainless Steel like CE8MN, CD6MN, CD3MN, etc.
10. High Nickel Alloys like 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 (Incoloy 625), etc.
11. Super Duplex Stainless Steel like CE3MN, CD3MNCuN, etc.
12. Aluminum Bronze like 95500, 95600, 95800, etc.

Type	Size	Pressure class as per ASME B16.34	Ends
Gate	2" to 72"	150, 300, 600, 900, 1500 & 2500 #	RF, RTJ or BW
Globe	2" to 24"	150, 300, 600, 900, 1500 & 2500 #	RF, RTJ or BW
Swing Check	2" to 48"	150, 300, 600, 900, 1500 & 2500 #	RF, RTJ or BW



CAST STEEL BOLTED BONNET VALVES BODY MATERIALS

WALWORTH offers the standard product line of API 600 Cast Steel valves in a wide variety of carbon steel, low and medium allow materials, that can be used in combination with listed API-600 trims.

However, due to the actual requirements that the global market demands, WALWORTH offers now additional materials like stainless steel, nickel and exotic alloys using the heavy wall thickness patterns to meet those end user requirements which does not accept the light pattern design as per API-603.

Also, WALWORTH offers a new product line for valves with heavy wall thickness in Aluminum Bronze, either ASTM B148 grade 95500, 95600 or 95800.

* For those valves where light pattern design API-603 is accepted, please ask for our API-603 WALWORTH catalog.

Material suffix	Common designation	Forging specification	Wrought bar specification	Service recommendations (1)	Common trim for this base material	
					150 To 600 #	900 To 2500 #
ASTM A216 Grade WCB	Carbon Steel	A105	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
ASTM A216 Grade WCC	Carbon Steel	A105N	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
ASTM A352 Grade LCB	Low Temp Carbon steel	A350 LF1	A350 LF1	Low temperature applications to -50 °F (-46°C). Not for use above + 650°F(+340°C).	UT, 3HF, A	HF, 3HF+HF
ASTM A352 Grade LCC	Low Temp Carbon steel	A350 LF2	A350 LF2	Low temperature applications to -50 °F (-46°C). Not for use above + 650°F(+340°C).	UT, 3HF, A	HF, 3HF+HF
ASTM A352 Grade LC3	3 1/2 % Nickel Steel	A350 LF3	A350 LF3	Low temperature applications to -150°F (-101°C). Not for use above + 650°F(+340°C).	UT, 3HF, A	HF, 3HF+HF
ASTM A217 Grade WC1	C-1/2 Mo Low Alloy Steel	A182 F1	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
ASTM A217 Grade WC5	0.75% Ni; Mo; 0.75% Cr Low Alloy Steel	A182 F2	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
ASTM A217 Grade WC6	1 1/4% Chrome; 1/2% Moly Low Alloy Steel	A182 F11	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
ASTM A217 Grade WC9	2 1/4 % Chrome Low Alloy Steel	A182 F22	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
ASTM A217 Grade C5	5% Chrome; 1/2 % Moly, Medium Alloy Steel	A182 F5	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
ASTM A217 Grade C12	9% Chrome; 1% Moly, Medium Alloy Steel	A182 F9	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
ASTM A217 Grade C12-A	9% Chrome; 1% Moly; V-N, Medium Alloy Steel	A182 F91	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

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Material suffix	Common designation	Forging specification	Wrought bar Specification	Service recommendations (1)	Common trim for this base material	
					150 To 600 #	900 To 2500 #
ASTM A351 Grade CF8	18% Chrome; 8% Nickel; 0.08 % C Stainless Steel	ASTM A182 F304	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.	2, 4HF	4HF+HF
ASTM A351 Grade CF8M	18% Chrome; 12% Nickel; 2 % Mo; 0.08 % C Stainless Steel	ASTM A182 F316	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 A351 Grade CF3	18% Chrome; 8% Nickel; 0.03 % C Low Carbon Stainless Steel	ASTM A182 304L	ASTM A479 304L	Brackish water, phosphate solutions, pressurized water @ 570 °F (299 °C), sea water, steam.	304L, 3HF	304L, 3HF+HF
ASTM A351 Grade CF3M	18% Chrome; 12% Nickel; 2 % Mo; 0.03 % C Low Carbon Stainless Steel	ASTM A182 F316L	ASTM A479 316L	Acetic acid, calcium carbonate, calcium lactate, potable water, sea water, steam, sulfites.	316L, 3HF	316L, 3HF+HF
ASTM A351 Grade CG3M	18% Chrome; 12% Nickel; 3 % Mo; 0.03 % C Low Carbon Stainless Steel	ASTM A182 F317L	ASTM A182 F317L	Corrosive or non corrosive services to +800°F (+425°C)	317L, 317LH	317L, 317LH
ASTM A351 Grade CF8C	18% Chrome; 10% Nickel; Cb; 0.08 % C Stainless Steel	ASTM A182 F347	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 A351 Grade CF10	18% Chrome; 8% Nickel; 0.08 % C Stainless Steel	ASTM A182 F304H	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 A351 Grade CF10M	18% Chrome; 8% Nickel; 2% Mo; 0.08 % C Stainless Steel	ASTM A182 F316H	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 A351 Grade CG8M	18% Chrome; 10% Nickel; 3 % Mo; 0.08 % C Stainless Steel	ASTM A182 F317	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 A351 Grade CK20	25% Chrome; 20% Nickel; 0.04 To 0.2 % C Super Stainless Steel	ASTM A182 F310H	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 A351 Grade CN7M	19% Chrome; 28% Nickel; Cu-Mo; 0.07 % C Super Stainless Steel	ASTM B462 N08020	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 A351 Grade CN3MN	19% Chrome; 28% Nickel; Cu-Mo; 0.03 % C Super Stainless Steel	ASTM B462 N08020	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 A351 Grade CK3MCuN	20% Chrome; 18% Nickel; 6% Mo; 0.25 % C Super Stainless Steel	ASTM A182 F44	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 A351 Grade CT15C	19% Chrome; 32% Nickel; 0.05 to 0.15 % C Incoloy 800.	ASTM B564 N08810	ASTM B408 N08810		810T	810T

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Material suffix	Common designation	Forging specification	Wrought bar specification	Service recommendations (1)	Common trim for This base material	
					150 to 600 #	900 to 2500 #
ASTM A351 Grade CK3MCuN	20% Chrome; 18% Nickel; 6.5% Mo; 0.18% Nitrogen; 0.025% C Super Stainless Steel	ASTM A182 F44	ASTM A479 S31254	High resistance to pitting and crevice corrosion. Very High resistance to chloride stress corrosion cracking. 50% stronger than 300 series austenitic stainless steels. Excellent impact toughness.	31254H	31254H
ASTM A351 Grade CN2MCuN	21% Chrome; 25.5% Nickel; 4.5% Mo; 1.5%Cu; 0.02% C Super Stainless Steel	ASTM B469 8904	ASTM B625 8904	Chloride-containing environments where conventioned 300 series stainless steel do not provide adequate pitting and crevice corrosion resistance.	8904H	8904H
ASTM A487 Grade CA15	12% Chrome Steel	ASTM A182 F6	ASTM A276 410	Corrosive application at temperatures between -20°F (-30°C) and + 900°F (+482°C).	UT, HF	UT, HF
ASTM A487 Grade CA6NM	12% Chrome Steel	ASTM A182 F6	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 A494 Grade M-35-1	67% Ni; 30% Cu, Monel	ASTM B564 N04400	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 A494 Grade CZ100	95% Nickel	ASTM B160 N02200	ASTM B160 N02200	Chemical processing, mineral processing, food processing. Nicel 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 A494 Grade CY-40	75% Nickel; 15% Cr; 8% Fe, Inconel 600	ASTM B564 N06600	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 A494 Grade CW6MC	60% Nickel; 22% Cr; 9% Mo; 3.5% Cb, Inconel 625	ASTM B564 N06625	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 A494 Grade CU5MCuC	42% Nickel; 21.5% Cr; 3% Mo; 2.3% Cu, Incoloy 825	ASTM B564 N08825	ASTM B425 N08825	Sour gas service. Excellent resistance to both reducing and oxidizing acids, stress corrosion cracking, localized attack such as pitting and crevice corrosion, and sulfuric and phosphoric acids.	825, 23HF	825, 23HF
ASTM A494 Grade N12MV	62% Nickel; 28% Mo; 5% Fe, Hastelloy B	ASTM B335 N10001	ASTM B335 N10001	Excellent corrosion resistance. Suitable for the most chemical process applications. Excellent resistance to pitting and stress corrosion cracking.	10001, HB	10001, HB
ASTM A494 Grade N7M	62% Nickel; 28% Mo; 2% Fe, Hastelloy B2	ASTM B335 N10665	ASTM B335 N10665	Excellent corrosion resistance and improved resistance to knife-line and heat affected zone attack. Resist formation of grain-boundary carbide precipitates in the weld heat-affected zone.	HB	HB
ASTM A494 Grade CW2M	61% Nickel; 16% Mo; 16% Cr, Hastelloy C4	ASTM B574 N06455	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 A494 Grade CW12MW	56% Nickel; 18% Mo; 17% Cr; 6% Fe, Hastelloy C-276 (FORMER ALLOY)	ASTM B574 N10276	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 A494 Grade CW6M	56% Nickel; 19% Mo; 18% Cr; 16% Fe, Hastelloy C-276 (NEW ALLOY)	ASTM B574 N10276	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

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Material suffix	Common designation	Forging specification	Wrought bar specification	Service recommendations (1)	Common trim for This base material	
					150 to 600 #	900 to 2500 #
ASTM A995 Grade CD4MCuN	25.5% Chrome; 5.5% Nickel; 2% Mo; 0.040% C Duplex Stainless Steel Grade 1A.	N/A	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 A995 Grade CE8MN	24% Chrome; 9.5% Nickel; 4% Mo; 0.080% C Duplex Stainless Steel Grade 2A.	ASTM A182 F51	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 A995 Grade CD3MN	22% Chrome; 5% Nickel; 3% Mo; N; 0.030% C Duplex Stainless Steel Grade 4A.	ASTM A182 F51	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 A995 Grade CE3MN	25% Chrome; 7% Nickel; 4.5% Mo; N; 0.030% C Duplex Stainless Steel Grade 5A.	ASTM A182 F53	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 A995 Grade CD3MWCuN	25% Chrome; 7.5% Nickel; 3.5% Mo; N; 0.030% C Duplex Stainless Steel Grade 6A.	ASTM A182 F53	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 B148 Grade 95800	79% min Copper; 4.5% Nickel; 9% Aluminum; 3-4.5% Fe; 0.03 % max Pb.	N/A	ASTM B150 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 where they can be used as a guide; however, the responsibility to choice the proper alloy is from 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

CAST STEEL 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 offered these days by the Company.

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

WALWORTH Trim Nr.	API-600 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

Notes: 1. Free machining grades of 13 Cr are prohibited.
 2. A minimum of 50 HB against seat ring (s) is required.

CAST STEEL VALVES TRIM ARRANGEMENTS

WALWORTH Trim Nr.	API-600 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 (Inconel 625)	UNS N06625 (Inconel 625)	UNS N06625 (Inconel 625)
625HF	Not specified	60Ni-22Cr-9Mo-3.5Cb/Co-Cr-A	UNS N06625 (Inconel 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 B148 95800	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)
1F	Not specified	16% Cr-4%Ni-Nb/13%Cr-0.75Ni-1Mn/Co-Cr-A	ASTM A564-H1150	SS-410 (250HBN min)	Stellite 6 (350 HBN min)
1G	Not specified	16% Cr-4%Ni-Nb/13%Cr-0.75Ni-1Mn/Co-Cr-A	ASTM A564-H1150	Stellite 6 (350 HBN min)	Stellite 6 (350 HBN min)

Notes: 1. Free machining grades of 13 Cr are prohibited.
 2. A minimum of 50 HB against seat ring (s) is required.

COMMON CONSTRUCTION MATERIALS COMBINATION

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.

GATE VALVES 150#						
Description	ASTM A216 WCB or WCC trim UT (API-600 nr. 8)	ASTM A217 WC6 Trim UT (API-600 nr. 8)	ASTM A21 WC9 Trim UT (API-600 nr. 8)	ASTM A217 C5 Trim UT (API-600 nr. 8)	ASTM A217 C12 Trim UT (API-600 nr. 8)	ASTM A352 LCB or LCC trim UT (API-600 nr. 8)
Body	ASTM A 216 GR WCB/WCC	ASTM A 217 GR WC6	ASTM A 217 GR WC9	ASTM A 217 GR C5	ASTM A 217 GR C12	ASTM A352 GR LCB/LCC
Bonnet	ASTM A 216 GR WCB/WCC	ASTM A 217 GR WC6	ASTM A 217 GR WC9	ASTM A 217 GR C5	ASTM A 217 GR C12	ASTM A352 GR LCB/LCC
Wedge/seating	ASTM A 216 GR WCB/WCC+13% Cr.	ASTM A 217 GR WC6 + 13% Cr.	ASTM A 217 GR WC9 + 13% Cr.	ASTM A 217 GR C5 + 13% Cr.	ASTM A 217 GR C12 + 13% Cr.	ASTM A 352 GR LCB/LCC + 13% Cr.
Seat rings	ASTM A 515 GR 70 + ST 6	ASTM A 240 TYPE 410 + ST 6	ASTM A 240 TYPE 410 + ST 6	ASTM A 240 TYPE 410 + ST 6	ASTM A 240 TYPE 410 + ST 6	ASTM A 516 GR 65 + ST 6
Stem nut	ASTM A 439 TYPE D2 OR ASTM B 148 UNS C95600	ASTM A 439 TYPE D2 OR ASTM B 148 UNS C95600	ASTM A 439 TYPE D2 OR ASTM B 148 UNS C95600	ASTM A 439 TYPE D2 OR ASTM B 148 UNS C95600	ASTM A 439 TYPE D2 OR ASTM B 148 UNS C95600	ASTM A 439 TYPE D2 OR ASTM B 148 UNS C95600
Bonnet bushing	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
Bonnet stud	ASTM A 193 GR B7	ASTM A 193 GR B16	ASTM A 193 GR B16	ASTM A 193 GR B16	ASTM A 193 GR B16	ASTM A 193 GR L7
Bonnet stud nut	ASTM A 194 GR 2H	ASTM A 194 GR 7	ASTM A 194 GR 7	ASTM A 194 GR 7	ASTM A 194 GR 7	ASTM A 194 GR 7
Stem packing	Graphite	Graphite	Graphite	Graphite	Graphite	Graphite
Bonnet gasket	Graphite/Stainless 316	Graphite/Stainless 316	Graphite/Stainless 316	Graphite/Stainless 316	Graphite/Stainless 316	Graphite/Stainless 316
Handwheel	ASTM A 197	ASTM A 197	ASTM A 197	ASTM A 197	ASTM A 197	ASTM A 197
Gear operator	As per WALWORTH design	As per WALWORTH design	As per WALWORTH design	As per WALWORTH design	As per WALWORTH design	As per WALWORTH design

CHEMICAL COMPOSITION AND MECHANICAL PROPERTIES

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 A 216		ASTM A 352		ASTM A217				ASTM A351		
	WCB	WCC	LCB	LCC	WC6	WC9	C5	C12	CF8	CF8M	CF8C
Carbon	0.30	0.25	0.30	0.25	0.05-0.20	0.05-0.18	0.20	0.20	0.08	0.08	0.08
Manganese	1	1.2	1	1.2	0.50-0.80	0.40-0.70	0.40-0.70	0.35-0.65	1.5	1.5	1.5
Phosphorus	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Sulphur	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.04	0.04	0.04
Silicon	0.6	0.6	0.6	0.6	0.6	0.6	0.75	1	2	1.5	2
Nickel	0.5	0.5	0.5	0.5	-	-	-	-	8.00-11.0	9.00-12.0	9.00-12.0
Chromium	0.5	0.5	0.5	0.5	1.00-1.50	2.00-2.75	4.00-6.50	8.00-10.0	18.00-21.0	18.00-21.0	18.00-21.0
Molybdenum	0.2	0.2	0.2	0.2	0.45-0.65	0.90-1.20	0.45-0.65	0.90-1.20	0.5	2.00-3.00	0.5
Copper	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.5	-	-	-
Columbium	-	-	-	-	-	-	-	-	-	-	(2)
Vanadium	0.03	0.03	0.03	0.03	-	-	-	-	-	-	-
Tensile Strength PSI minimum	70,000-95,000	70,000	65,000	70000-95,000	70,000	70,000	90,000-115,000	90,000-115,000	70,000	70,000	70,000
Yield Strength PSI minimum	36,000	40,000	35,000	40,000	40,000	40,000	60,000	60,000	30,000	30,000	30,000
Elongation In 2"% minimum	22	22	24	22	20	20	18	18	35	30	30
ReductionArea "% minimum	35	35	35	35	35	35	35	35	-	-	-
Hardness (HB) Maximum	185	185	190	200	200	200	237	237	-	-	-

- Notes:
1. The percentage (%) shown on the elements is the maximum except where ranges are indicated.
 2. Steel CF8C should have a Columbium content of not less than 8 times the carbon content, but not exceeding 1%.