



brands you trust.



Pacific®CSV
High Alloy Valves Overview

CRANE

Crane ChemPharma & Energy

www.cranecpe.com



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High Alloy. High Integrity.

Ready for Battle

Pacific® High Alloy Valves are ready to combat the most challenging and corrosive conditions in the industry. With a proven track record of dependable performance, engineers can trust Pacific® to deliver exceptional results in the most adverse process applications.

Customer Service

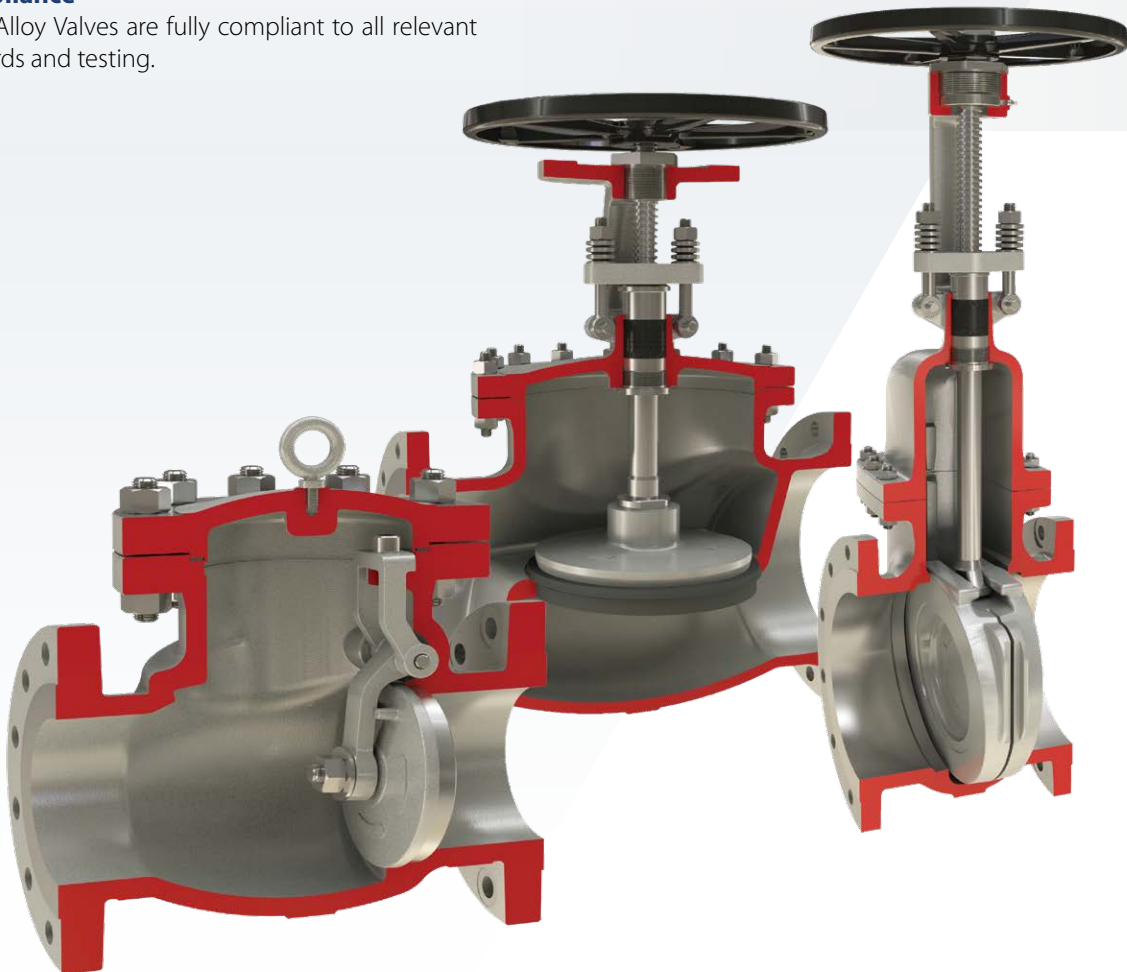
Customers know they can depend on Pacific® for after sales service and technical support from one of our many locally based sales engineers and distribution partners.

Global Compliance

Pacific® High Alloy Valves are fully compliant to all relevant global standards and testing.

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Pacific® High Alloy Valves

Crane ChemPharma & Energy (CPE)

Crane CPE designs and manufactures a variety of high-performance products including: highly-engineered check valves, sleeved plug valves, lined valves, process ball valves, high performance butterfly valves, bellows sealed globe valves, aseptic and industrial diaphragm valves, multi/quarter-turn valves, actuation, sight glasses, lined pipe, fittings and hoses, and air-operated diaphragm and peristaltic pumps. Its trusted brands are in use worldwide in many industries, including Oil & Gas, Oil Refining, Petrochemical, Power Generation, Chemical Processing, Biotechnology, and Pharmaceutical.

Pacific®: A History of Excellence

Pacific® Valves has a long history, spanning over eighty years of designing and developing valves for critical service applications. Pacific® Valve's line of Pressure Seal, Wedgeplug, and HF acid valves have a proven track record of meeting and exceeding the needs of the Refining, Chemical and Power markets. Whether its needing a valve for a high temperature and high pressure steam application or a valve to handle severe delayed coker service, you can trust Pacific® Valves to provide a product that is up for the job. In the spirit of continuing to provide highly engineered products for the most challenging conditions, Pacific® Valves is excited to offer a line of high alloy Gate, Globe and Swing Check valves to combat corrosive and relentless applications.



Manufacturing Locations



CHIHUAHUA, MEXICO

CINCINNATI, OHIO

VIRALMALAI, INDIA



HIGH ALLOY GGC



PRESSURE SEAL



HF ACID



WEDGEPLUG



Standards

You Can Depend on Us

From Stainless to Super Duplex & Nickel Base Alloys, Pacific® takes pride in manufacturing high quality and high performing cast steel valves that meets and exceeds end user expectations. Designed and built on a foundation of rigorous engineering, detailed craftsmanship, dedication, hard work and over 160 years of providing solutions to the most challenging conditions. Pacific® CSV can outperform the toughest applications seen across the industry. And to handle challenging conditions, Pacific® offers a wide range of high alloys that are poured from a state-of-the-art foundry located in India.

Industry Compliance

Pacific® High Alloy Valves comply with the applicable requirements of the following standards.

- API 594
- API 600
- API 623
- API 622
- API 624
- API 598
- ASME B 16.34
- ASME B 16.10
- ASME B 16.5
- ASME B 16.25
- NACE MR0103
- NACE MR0175
- PED/CE
- ISO 15848-1
- Canadian Registration Number (CRN)
- Indian Boiler Regulation (IBR)

Fugitive Emissions

Pacific® believes in ensuring a safer environment, and is taking a proactive approach towards reducing fugitive emissions. Fugitive emissions occur from spills, leaks, and evaporation. Pacific® High Alloy Valves will ensure some of the lowest fugitive emission ratings within the industry. Pacific® is proud to offer fully compliant and tested valves per API 624. Certificates of API 624 testing are available upon request.

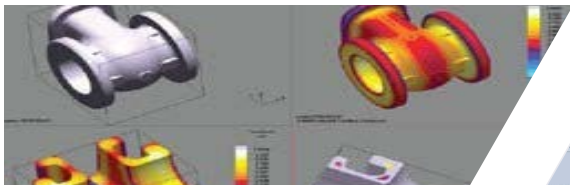


Quality

Ease of Mind

Pacific® understands that end users demand a product that is reliable and can provide repeatable performance. Every step of the way from order entry to shipping, Pacific® makes sure that quality is always a number-one priority. Pacific's manufacturing facilities undergo multiple internal and 3rd party audits in efforts to continue to solidify itself as an industry leader. Pacific® also puts their valves through RP-591 testing to ensure they are compliant and meeting the latest industry standards.

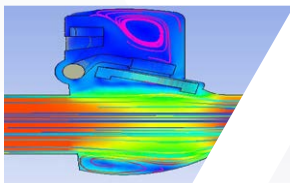
Pacific® valves are designed in accordance to ASME B16.34, API 600, API 623, API 594, API 624 and are manufactured in ISO 9001 certified facilities. Every valve is tested per API 598 before it leaves our manufacturing plants. Pacific® prides itself in its world class quality control and continues to make improvements everyday.



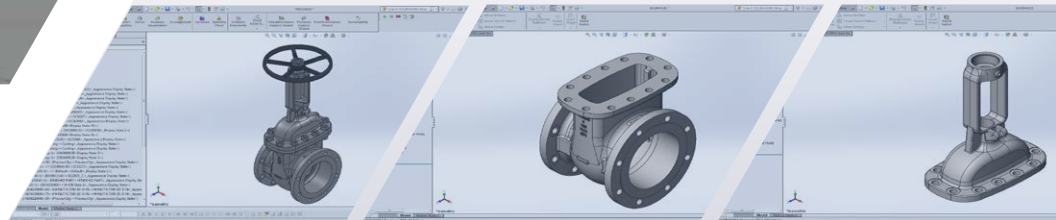
MAGMA SIMULATIONS



PRODUCT TESTING



FLOW SIMULATIONS



Detailed Design

Pacific® High Alloys valves are engineered from a robust and rigorous design process. This design methodology is utilized across the entire range and ensures the product is meeting the latest industry standards. This enables us to provide engineering data such as general arrangement drawings with high quality and accuracy.



Product Portfolio

Special Testing Available

- Positive Material Identification (PMI)
- Liquid Dye Penetration (LPT)
- Mag Particle Testing (MPT)
- Ultrasonic Testing (UT)
- Helium Testing
- Intergranular Corrosion Testing (IGC)
- Hardness Testing
- Dimensional Inspections
- BW End Radiography
- Critical Area Radiography
- 100% Area Radiography

Other Services Offered

- Valve Sizing
- Pressure Drop Calculations
- General Arrangement Drawings

Actuation & Modification

- Pneumatic & Electric Automation
- Stem Extensions
- Live Loading
- Bypasses & Drains
- PTFE Packing & Gaskets
- Locking Devices
- Special Trims
- Special Coatings

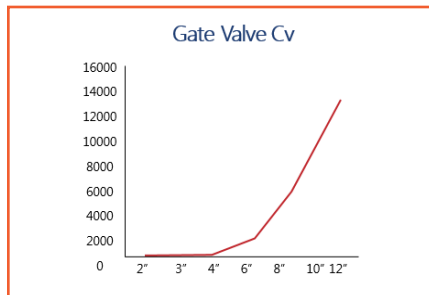
Valve Type & Class	IN	2	2.5	3	4	6	8	10	12	14	16	18	20	24
	DN	50	65	80	100	150	200	250	300	350	400	450	500	600
Gate	150	•	•	•	•	•	•	•	•	•	•	•	•	•
	300	•	•	•	•	•	•	•	•	•	•	•	•	•
	600	•	•	•	•	•	•	•	•	•	•	•	•	•
Globe	150	•	•	•	•	•	•	•	•	•	•	•		
	300	•	•	•	•	•	•	•	•	•	•	•		
	600	•	•	•	•	•	•	•	•	•	•	•		
Check	150	•	•	•	•	•	•	•	•	•	•	•	•	•
	300	•	•	•	•	•	•	•	•	•	•	•	•	•
	600	•	•	•	•	•	•	•	•	•	•	•	•	•

*Larger sizes and higher pressure classes available upon request.

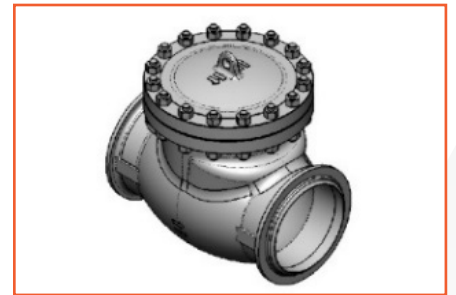
*Spiral Wound gaskets available upon request for 150# & 600#



PRODUCT TESTING



CV DATA



SUBMITTAL DRAWINGS

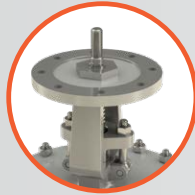
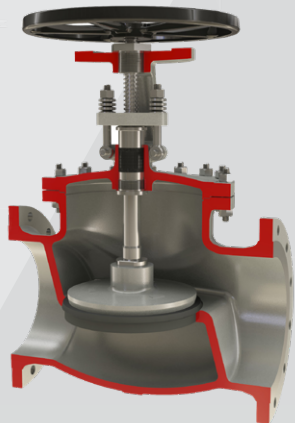
Key Features – Gate, Globe and Swing Check



Modular stuffing box facilitates changeover for low fugitive emissions and monitoring port options



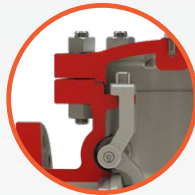
PTFE Packing and Gaskets available



Integral ISO 5210 mounting is available in larger sizes for ease of actuation



PTFE Packing and Gaskets available



Disc fastener is restrained by the bonnet to eliminate the risk of a displaced disc and prevent damage to downstream equipment



Internal hung disc pin arrangement eliminates leak path from pressure boundary

High Alloy Offering

STAINLESS STEEL

- 303
- 304
- 304L
- 304H
- 309
- 310
- 316
- 316L
- 316H
- 317
- 317L
- 321
- 347
- 347H

DUPLEX STAINLESS STEEL

- DUPLEX 1B
- DUPLEX 4A
- DUPLEX 5A
- DUPLEX 6A

NICKEL BASE ALLOYS

- ALLOY 20
- ALLOY 20 (LOW CARBON)
- 254-SMO
- AL6XN
- HASTELLOY C276
- HASTELLOY C4
- INCOLOY 800
- INCOLOY 825
- INCONEL 600
- INCONEL 625
- MONEL (WELDABLE)
- MONEL
- MONEL K500
- NICKEL 200



High Alloy. High Integrity.

From 316 Stainless Steel to Incoloy™ 825, Pacific® offers a large selection of metallurgies to handle corrosive and demanding conditions. Pacific's high alloys can be used in a wide range of industries such as **Refining, Chemical, Marine, Pulp & Paper and Mining**. For special metallurgy request, please consult your local Pacific® Sales Engineer.

	Material ASTM Classification	Chemical Composition	UNS	Service Conditions	Common Media
Stainless Steel	316 SS A351 CF8M	16Cr-12Ni- 2Mo	J92900	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.	Acetic Acid , Acetic Anhydride, Ammonium Chloride, Ammonium Chlorostannate, Ammonia Production , Arsenic Acid, Hydrocyanic Acid, Magnesium Chloride, Naphthenic Acid , Sodium Hydroxide, Stearic Acid, Urea , Waste Water
	304 SS A351 CF8	18Cr - 8Ni	J92600	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.	Benzene, Chlorosulfonic Acid, Dichloroethane, Ethylene Chloride , Methylene Chloride, Nitric Acid , Nitro Cellulose, Phenol, Propane Dehydrogenation , Sodium Hydroxide, Waste Water
	304L SS A351 CF3	18Cr - 8Ni - .03C (max)	J92500	Corrosive or non-corrosive services to +800°F (+425°C).	Benzene, Chlorosulfonic Acid, Dichloroethane, Ethylene Chloride , Methylene Chloride, Nitric Acid , Nitro Cellulose, Phenol, Propane Dehydrogenation , Sodium Hydroxide, Waste Water
	316L SS A351 CF3M	18Cr - 8Ni - 2Mo - .03C (max)	J92800	Corrosive or non-corrosive services to +850°F (454°C).	Acetic Acid , Acetic Anhydride, Ammonium Chloride, Ammonium Chlorostannate, Ammonia Production , Arsenic Acid, Hydrocyanic Acid, Magnesium Chloride, Naphthenic Acid , Sodium Hydroxide, Stearic Acid, Urea, Waste Water
	317 SS A351 CG8M	19Cr - 13Ni - 3.5Mo	J93000	Corrosive or non-corrosive services to 1000°F (537°C).	Chlorine Dioxide, Hydrochloric Acid , Naphthenic Acid Liquor, Seawater, Sodium
	317L SS A351 CG3M	19Cr - 13Ni - 3.5Mo - .03C (max)	J92999	Corrosive or non-corrosive services to +850°F (454°C).	Chlorine Dioxide, Phosphoric Acid , Hydrochloric Acid, Naphthenic Acid, Liquor, Seawater, Sodium
	347 SS A351 CG3M	18Cr - 10Ni - Cb	J92710	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.	H2S , Molten Salt, Naphthenic Acid Nitric Acid



High Alloy. High Integrity.

	Material ASTM Classification	Chemical Composition	UNS	Service Conditions	Common Media
Duplex	Duplex 1B CD4MCuN	26Cr - 6Ni - 3.5Mo - Cu - N	J93372	Better corrosion and mechanical properties when compared to austenitic stainless steels. Favorable against austenitic stainless steels when intergranular corrosion and stress corrosion cracking is of concern.	Ammonium Hydrosulfide, Sour Water, Chlorides, Sulfuric Acid, Seawater, Brine , Brackish Water
	Duplex 4A CD3MN	22Cr - 5.5Ni - 3Mo - N	J92205	Better corrosion and mechanical properties when compared to austenitic stainless steels. Favorable against austenitic stainless steels when intergranular corrosion and stress corrosion cracking is of concern. For services up to 600°F (315°C).	Ammonium Hydrosulfide, Sour Water, Chlorides , Desalination Plants, Chemical Processing, Chemical Transportation, Chlorides, Sulfuric Acid, Seawater, Brine , Brackish Water
	Duplex 6A CD3MWCuN	25Cr - 7Ni - 3.5Mo - N	J93380	Better corrosion and mechanical properties when compared to austenitic stainless steels. Favorable against austenitic stainless steels when intergranular corrosion and stress corrosion cracking is of concern. For services up to 500°F (260°C).	Ammonium Hydrosulfide, Sour Water, Chlorides, Sulfuric Acid, Seawater, Brine , Brackish Water
Nickel Base Alloys	Alloy 20 A351 CN7M	20Cr - 35Ni - 2.5Mo - 3.5Cu	N08007	Good resistance to hot sulfuric acid to +600°F (+316°C).	Sodium Hydroxide, Sulfuric Acid, Nitric Acid , Phenol Vapors, Chlorine Dioxide, Potassium Chloride, Acetic Acid , Acetyl Chloride, Alkylation - Sulfuric Acid , Ammonium Chloride, Arsenic Acid, Magnesium Chloride, Dyes, SO ₂ , Pickling
	Monel M35-1	67Ni - 30Cu	N24135	Weldable grade. Good resistance to corrosion by all common organic acids and salt water. Also highly resistant to most alkaline solutions to +750°F (+400°C).	Chlorine Trifluoride , Hydrofluoric Acid, Hydrogen Fluoride , Potassium Chloride, Sodium Chloride, Aluminum Fluoride, Ammonium Chloride, Bromine , Fluorine, Propylene Oxide, Triethylene Glycol, Seawater, Naphthenic Acid
	Hastelloy (C-4) CW6M	62Ni - 16Cr - 16Mo - 2Fe	N26455	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). Resistant to stress corrosion cracking, pitting and crevice corrosion when compared to austenitic stainless steels.	Chlorine Gas-moist, Acetic Anhydride , Aniline & Ferric Chloride, Bromine, Calcium Chlorate, Chlorine , Copper Chloride, Monochloroacetic Acid, Zinc Ammonium Chloride, Sulfuric acid, Hydrogen Cyanide
	Hastelloy (C-22) CX2MW	58Ni - 21Cr - 14Mo - 4Fe - 3W	N26022	Good resistance to strong oxidation conditions. Favorable against austenitic stainless steels when stress corrosion cracking, crevice and pitting corrosion is of concern.	Acetic Anhydride , Aniline & Ferric Chloride, Calcium Chlorate, Chlorine, Monochloroacetic Acid, Zinc Ammonium Chloride, Hydrogen Cyanide
	Inconel 600 CY40	78Ni - 15Cr - 5Fe	N06040	Good for high temperature service. Good resistance to strongly corrosive media.	Sodium Hydroxide , Potassium Hydroxide, Brine
	Inconel 625 CW6MC	65Ni - 22Cr - 9Mo - 3.5Nb	N26625	Good for high temperature service. Good resistance to strongly corrosive media.	Sodium Hydroxide , Potassium Hydroxide, Seawater, Brine
	Incoloy 825 CU5MCuC	43Ni - 22Cr - 3Mo - 30Fe - Nb	N08826	Good resistance to stress-corrosion cracking, intergranular corrosion, crevice & pitting corrosion	Potassium Hydroxide, Acid Production , Pickling operations, Radioactive waste, Brine

The above information is based upon historical data and is meant as an educational tool for the reader. These should not be considered as a material recommendation because various factors such as dissolved salts, pH, various process compounds, temperature and flow velocity influence the corrosion resistance of metals and alloys. Hastelloy® is a registered trademark of Haynes International, Inc. Monel® is a registered trademark of Huntington Alloys Corporation. INCOLOY® is a registered trademark of Special Metals Corporation. Inconel® is trademark of Huntington Alloys Corporation.



Foundry

Pacific® has partnered with a world renowned foundry to deliver the highest quality valves within the industry. Through this partnership, Pacific® has control over the entire process flow map from the pour to delivery of assembled valve.



Foundry Excellence

ARGON is purged into induction furnace to improve quality by reduction of pin holing, removal of inclusions, reduction in gas content, temperature homogenization and distribution of alloying elements and de-oxidants. Commonly used for Stainless, Duplex & Super Duplex Grades.



Argon Oxygen Decarburization (AOD)

Utilized for metallurgies with Chromium minimum 5% such as Stainless Steel, Duplex & Super Duplex Steel & Creep Resistant Steel. Decarburization, Reduction & Desulphurization all occur once molten metal is transferred to the AOD Vessel.

Cerebeads, Chromite & Zircon Sand

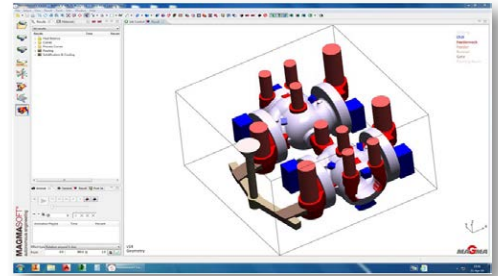
Used as an alternate to Silica Sand to ensure a better surface finish and to avoid fusion of sand during casting



Foundry

Technical Excellence

Utilize MAGMASOFT 5.4 simulation software to predict the evolution of CORE GAS which can cause porosity during the casting solidification process if not vented out properly.



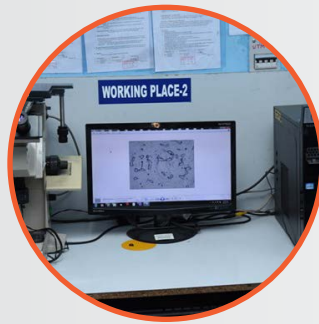
NABL Accredited Testing Laboratory



32 CHANNEL SPECTRO METER



METALLURGICAL EVALUATIONS



MECHANICAL TESTING



NITROGEN & OXYGEN ANALYZER

Certifications	Scope
ISO 9001:2015 - LRQA	Quality Management System
ISO 14001:2015 - LRQA	Environmental Management System
Approval Certificate for Steel Castings - BV	General & Marine Application
Certificate of Foundry Facility and Process Approval - ABS	General & Marine Application
Certification Level CL1 according to DIN EN 15085-2- TUV	Welding of railway vehicles and components
Transport and Power Generation Accreditation program - PRI	Transport & Power, Railway Application
Pressure Equipment Directive - 2014/68/EU - LRQA	PED Application / Valve Application
Approval of Manufacturer Certificate - LR	General & Marine Application
DIN EN ISO 3834-2-TUV	Repair Welding of Steel castings
Approval of Manufacturer Certificate - DNV - GL	General & Marine Application
Certificate of Approval for Well Known Foundry - IBR	Valve & Boiler Application
Material manufacturer according to AD2000 - Merkblet - W0 - TUV Nord	Materials for Pressure Vessels
Pressure Equipment Directive - 2014/68/EU - TUV Nord	PED Application / Valve Application
IS 12117 Class "A" Foundry Certification - RDSO	Railway Application
Foundry Approval Certificate - DMRCL	Railway Application
ISO 17025 Accreditation - NABL	SMML - Laboratory



High Alloy Applications

Applications

REFINING

- High TAN Crudes
- Crude & Coker Tower Bottoms
- FCCU fractionator overhead
- Hydrotreating
- Heat Exchangers
- Ammonium Hydrosulfide
- Chlorides
- Hydrogen
- H₂S / Wet H₂S
- Naphthenic Acid
- Propane DeHydrogenation
- Sour Water
- Waste Water

CHEMICAL

- Acetic Acid
- Ammonia
- Ammonium Chloride
- Ammonium Hydrosulfide
- Benzene
- Bromine
- Ethylene Chloride
- Hydrochloric Acid
- Nitric Acid
- Phosphoric Acid
- Propylene Oxide
- Sodium Hydroxide / Caustic
- Sulfuric Acid

CHEMICAL (CONT.)

- Triethylene Glycol
- Urea
- Vinyl Chloride Monomer

WATER

- Brackish Water
- Brine
- Sea Water
- Sour Water
- Waste Water
- Desalination
- Water Treatment

MINING

- Copper Mining
- Chlorine
- Sulfuric Acid
- Cyanide

GENERAL INDUSTRIAL

- Pulp & Paper
- Steel Mills
- Salt Manufacturing



High Alloy. High Integrity.



Figure Number

First 11 Figure Number Characters*

Size		Type	Class	Material	Trim	Operator	End	Schedule	Weld End Prep	Mounting
1	2	A	1	A	8	H	F	4	B	0

*The remaining 6 characters are used for Options, Features, Special Material Processes and Special Requirements. N is used to signify "No" requirement.

Figure Number Rules for Size, Type and Class

(1st four characters)

SIZE		TYPE		CLASS	
02	2"	A	GATE (Flex-Wedge)	1	150#
2H	2.5"	B	GLOBE (T-Globe)	3	300#
03	3"	C	CHECK (Swing type)	6	600#
04	4"				
-	-				
18	18"				
20	20"				
24	24"				

Figure Number Rules for Material

(5th character)

MATERIAL		
No.	ASTM	Material
A	A216 WCB	Carbon Steel
B	A352 LCB	Low Carbon Steel
C	A352 LCC	Low Carbon Steel
D	A216 WCC	Carbon Steel
E	A217 WC6	1¼ CR, ½ Mo
F	A217 WC9	2¼ CR, 1 Mo
G	A217 C5	5% CR, ½ Mo
H	A217 C12	9% CR, 1 Mo
J	A351 CF8M	316 SS
L	A351 CF8	304 SS
M	A351 CF3	304L SS
N	A351 CF3M	316L SS
P	A351 CG8M	317 SS
Q	A351 CG3M	317L SS
R	A351 CF8C	347 SS
S	A351 CN7M	Alloy 20
T	M35-1	Monel
U	CW6M	Hastelloy (C-4)
V	CX2MW	Hastelloy (C-22)
W	CD4MCuN	Duplex 1B
X	CD3MN	Duplex 4A
Y	CD7MCuN	Duplex 6A
Z	Special	
1	CY40	Inconel 600
2	CW6MC	Inconel 625
3	CU5MCuC	Inconel 825

Figure Number Rules for Trim Material (6th character)

TRIM MATERIAL				
No.	API Trim No.	Nominal Trim	Seating Surfaces	Stem Material
	1	Obsolete (Offer Trim 8)		
5	5	HF / HF ⁽²⁾	Alloy 6	13 Cr (410)
9	9	Monel [®] / Monel [®] (4)	Monel [®]	Monel [®]
8	8*	F6 / HF ⁽¹⁾⁽²⁾	13 Cr / Alloy 6	13 Cr (410)
1	11	Monel [®] / HF ⁽⁴⁾⁽²⁾	Monel [®] / Alloy 6	Monel [®]
2	12	316 / HF ⁽³⁾⁽²⁾	316SS / Alloy 6	316 SS
6	16	316/HF / 316/HF ⁽³⁾⁽²⁾	316SS / Alloy 6 (both)	316 SS
3	13	Alloy 20 / Alloy 20	Alloy 20 / Alloy 20	B473
4	14	Alloy 20 / HF ⁽²⁾	Alloy 20 / Alloy 6	B473
C	15	304/HF / 304/HF ^{(3) (2)}	304SS / Alloy 6	304 SS
7	17	347 / HF ⁽²⁾	347SS / Alloy 6	347SS
E	8 to NACE MR0103 / MR0175		(1) 13% Chromium AISI Type 410 Stainless Steel.	
N	12 to NACE MR0103 / MR0175		(2) Hard Facing is weld deposited Cobalt base alloy	
Z	Special / Custom		(3) Ni-Cr-Mo stainless steel in the AISI Type 316 category	
			(4) Ni-Cu Alloy	
			* Standard Offering	

Figure Number Rules for Operator, Valve Ends and Schedule

(7th, 8th & 9th & 10th characters)

OPERATOR		SCHEDULE	
0	N/A (e.g. check valves)	0 = N/A (e.g. flanged end)	F = Schedule 60
H	Handwheel	D = Schedule STD	G = Schedule 80 ⁽²⁾
G	Bevel Gear	A = Schedule 10	H = Schedule XS
S	Bare Stem	B = Schedule 10S	J = Schedule 100
P	Pneumatic Cylinder	C = Schedule 20	X = Different Inlet & Outlet
E	Electric Motor	K = Schedule 30	Z = Custom
C	Customer Supplied	E = Schedule 4 ⁽¹⁾	
M	Electric Motor with Bevel Gear		
Y	Hydraulic Actuator		
Z	Special / Custom		

VALVE ENDS		WELD END PREP	
F	Raised Face	0 = N/A (e.g. flanged end)	
W	Butt Weld End	B = 2B Or 3B Based on wall thickness	
		C = 2C or 3C Based on wall thickness	
		Z = Custom	

(1) same as Schedule STD for size 2" - 10"
(2) same as Schedule XS for size 2" - 8"

Figure Number Rules for Mounting

(11th character)

MOUNTING	
0 = N/A ⁽¹⁾	
1 = F10	A = FA10
2 = F12	B = FA12
3 = F14	C = FA14
4 = F16	D = FA16
5 = F25	E = FA25
6 = F30	F = FA30
7 = F35	G = FA35
8 = F40	H = FA40
Z = Other / Special	

(1) e.g. Handwheel / Check Valve

SPECIAL REQUIREMENT (digit 17)	
N = None	M = MSS SP-61 testing
2 = API 600 12 th edition	P = PTFE packing & gasket
C = CE/PED	Z = Other

Note: Characters 12-16 refer to Options, Features and Special Material Processes. Consult the Factory for details



Notes



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brands you trust.



COMPAC-NOZ®



DEPA®

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NOZ-CHEK®



RESISTOFLEX®



STOCKHAM®

UNI-CHEK®

WESTLOCK CONTROLS

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