

Modentic Valves

SUPER ALLOY SERIES



The typical Austenitic Stainless Steel – 18%Cr + 10% Ni have been adopted in corrosion resistant application for decades. In accordance with more and more application, the typical Austenitic stainless steel is not capable for more severe environment. More and stronger corrosion resistant ability by manifesting the feature of various element, are demanded by the market. With wider sources of castings and bar material, this year, 2010, Modentic decide to involve more in this field. Besides the casting, Modentic also storage the bar material. **Ball valves in sizes below 6" are available in the short delivery from the warehouse, and we also accept the customized products machined from bar.**

| Material Code | Main Ingredient | Casting | | |
|---|-------------------------|---------------------|--------|--------|
| | | ASTM | DIN | UNS |
| Austenitic Stainless Steel | | | | |
| SS304 | 18Cr-8Ni | A351 CF8 | 1.4308 | J92600 |
| SS304L | 18Cr-8Ni-LC | A351 CF3 | 1.4306 | J92500 |
| SS316 | 18Cr-9Ni-2Mo | A351 CF8M | 1.4408 | J92900 |
| SS316L | 18Cr-9Ni-2Mo-C<0.03% | A351 CF3M | 1.4404 | J92800 |
| SS317 | 18Cr-12Ni-3.5Mo | A351 CG8M | 1.4412 | J93000 |
| SS317L | 18Cr-12Ni-3.5Mo-C<0.03% | A351 CG3M | 1.4438 | J92999 |
| SS347 | 18Cr-10Ni-Nb | A351 CF8C | 1.4552 | J92710 |
| 904L | 19Cr-23Ni-4.0Mo | - | 1.4539 | - |
| Alloy 20 | 29Ni-20.5Cr-3.5Cu-2.5Mo | A351 CN7M | 1.4536 | J95150 |
| Super Austenitic Stainless Steel | | | | |
| 254 Mo | 20Cr-18Ni-6.5Mo-N-Cu | A351 CK3MCuN | 1.4308 | J93254 |
| Nickel Based Alloy | | | | |
| Ni-Cu Alloy | | | | |
| Monel 400 | 67Ni-30Cu | A494 M-35-1 | 2.4365 | N24135 |
| Ni-Cr Alloy | | | | |
| Inconel 600 | 78Ni-15Cr-5Fe | A494 CY-40 | 2.4816 | N06040 |
| Ni-Mo Alloy | | | | |
| Hastelloy B | 67Ni-28Mo-5Fe | A494 N-12MV | 2.4882 | N30012 |
| Hastelloy B2 | 67Ni-30Mo-1Fe | A494 N-7M | 2.4617 | |
| Ni-Cr-Mo Alloy | | | | |
| Hastelloy C276 | 64Ni-18Cr-18Mo | A494 CW6M | 2.4819 | N30107 |
| Hastelloy C22 | 58Ni-21Cr-14Mo-4Fe-3W | A494 CX2MW | 9.4602 | N26022 |
| Hastelloy C | 58Ni-16Cr-16Mo-6Fe-4W | A494 CW12MW | 2.4686 | N30002 |
| inconel 625 | 65Ni-22Cr-9Mo-3.5Nb | A494 CW6MC | 2.4856 | N26625 |
| Nickel | | | | |
| Nickel CZ100 | 97Ni | A494 CZ-100 | 2.4066 | N02100 |
| Duplex Stainless Steel | | | | |
| 1A | 25Cr-5Ni-Mo-Cu | A890 Gr.1A CD4MCu | 1.4507 | J93370 |
| 1B | 25Cr-5Ni-Mo-Cu-N | A890 Gr.1B CD4MCuN | 1.4507 | J93372 |
| 2A | 24Cr-5Ni-Mo-N | A955 Gr.2A CE8MN | | J93345 |
| 2205/4A | 22Cr-5Ni-Mo-N | A955 Gr.4A CD3MN | 1.4462 | J92205 |
| Super Duplex Stainless Steel | | | | |
| 2507/5A | 25Cr-7Ni-4Mo-N | A890 Gr.5A CE3MN | | J93404 |
| Z100/6A | 25Cr-7Ni-3Mo-Cu-N-W | A890 Gr.6A CD3MWCuN | 1.4468 | J93380 |
| 329 | 25Cr-7Ni-3Mo-N | | 1.4507 | |

Effect of Major Alloying Elements

Comparative Corrosion Performance

CHROMIUM

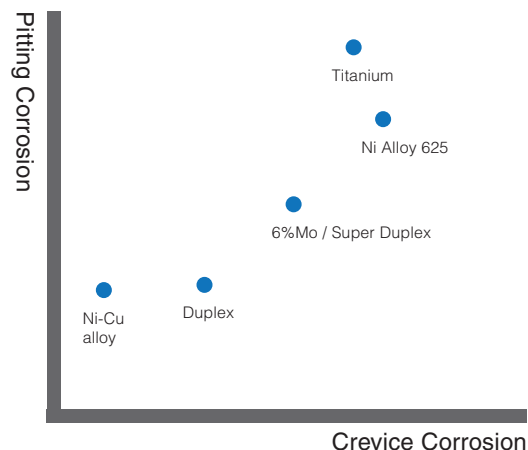
A stainless steel contains a minimum of 10.5% chromium because this level of chromium causes the spontaneous formation of a stable, transparent, passive, protective film. Increasing the level of chromium enhances corrosion resistance. At elevated temperatures, chromium provides resistance to oxidation and sulfur-containing and other corrosive atmospheres; contributes to high temperature creep and rupture strength; and, in some alloys, increases resistance to carburization.

NICKEL

Nickel in stainless steels promotes the stability of austenite. Austenite is stronger and more stable at higher temperatures than ferrite. Less nickel is needed to retain an austenitic structure as the nitrogen or carbon levels increase. When sufficient nickel is added to a chromium stainless steel, the structure changes from ferritic to austenitic. Adding nickel improves toughness, ductility, and weldability. Nickel increases resistance to oxidation, carburization, nitriding, thermal fatigue, and strong acids, particularly reducing acids. It is an important alloying element in stainless steel and nickel-base alloys used for corrosive and high temperature applications.

MOLYBDENUM

Molybdenum additions improve resistance to pitting and crevice corrosion in chloride-containing environments and corrosion by sulfuric, phosphoric, and hydrochloric acids. The elevated temperature mechanical properties of austenitic stainless steels and the strength and tempering resistance of martensitic stainless steels are improved by molybdenum.



| Material Code | Bar or Forged | | | Typical Application |
|---|---------------|--------|----------------|--|
| | ASTM | DIN | UNS | |
| Austenitic Stainless Steel | | | | |
| SS304 | A276 304 | 1.4301 | S30400 | Pulp and paper mills, chemical processes, and seawater service |
| SS304L | A276 304L | 1.4306 | S30403 | |
| SS316 | A276 316 | 1.4401 | S31600 | |
| SS316L | A276 316L | 1.4404 | S31603 | |
| SS347 | A276 347 | 1.455 | S34700 | |
| SS317 | A276 317 | 1.4449 | S31700 | |
| SS317L | A276 317L | 1.4438 | S31703 | Power generation, seawater service, and oil pipelines |
| 904L | AISI 904L | 1.4539 | N08904 | Production and transport of sulfuric acid Paper and allied industries Gas washing Chemical and pharmaceutical industries |
| Alloy 20 | A473 N08020 | 2.4460 | N08020 | Chemical processes handling acetic acid, alkali, dilute hydrochloric acid, dilute hydrofluoric acid, dilute fluorosilic acid and phosphoric acid, also for oil refining |
| Super Austenitic Stainless Steel | | | | |
| 254 Mo | A276 S31254 | | S31254 | Chemical processes for highly concentrated chloride, flue gas desulfurization, acid and alkali reactor, salt manufacturing processes and seawater desalination |
| Nickel Based Alloy | | | | |
| Ni-Cu Alloy | | | | |
| Monel 400 | B164 N04400 | 2.4360 | N04400 | Chemical processes handling alkali chloride and boiled acid, also for oil refining |
| Ni-Cr Alloy | | | | |
| Inconel 600 | B166 N06600 | 2.4817 | N06600 | Chemical and food processes |
| Ni-Mo Alloy | | | | |
| Hastelloy B | B335 N10001 | 2.4819 | N10001 | Corrosion resistant processes handling chlorine, sulfuric acid, phosphoric acid, acetic acid and hydrogen chloride gas, also for processes handling chloride with high concentration at high temperature |
| Hastelloy B2 | B335 N10665 | 2.4856 | N10665 | |
| Ni-Cr-Mo Alloy | | | | |
| Hastelloy C276 | B574 N10276 | 2.4819 | N10276, N10002 | Processes handling oxidizing acid, formic acid, acetic anhydride and seawater, also for chemical processes handling fluoride |
| Hastelloy C22 | B574 N06022 | 2.4602 | N06022 | |
| Hastelloy C | B574 N10276 | 2.4819 | N10276 | |
| Inconel 625 | B446 N06625 | 2.4856 | N06625 | High tensile, creep, rupture strength, outstanding fatigue and thermal-fatigue strength; oxidation resistance; and excellent weldability and brazeability |
| Nickel | | | | |
| Nickel CZ100 | B160 N02200 | 2.4068 | N02200 | Equipment handling corrosives such as caustics; applications where it is necessary to avoid contamination of a product with metals such as copper and iron. |
| Duplex Stainless Steel | | | | |
| 1A | A790 S31260 | - | S31260 | Pulp and paper mills, chemical processes, and seawater service |
| 1B | A790 S31260 | - | S31260 | |
| 2A | | | | |
| 2205/4A | A276 S32205 | 1.4462 | S32205 | |
| Super Duplex Stainless Steel | | | | |
| 2507/5A | A479 S32750 | 1.4460 | S32750 | salt/seawater application, sulfuric acid, phosphoric acid, formic acid, acetic acid |
| Z100/6A | A479 S32750 | 1.4460 | S32750 | |
| 329 | A479 S32750 | 1.4460 | S32750 | |

Application and Selection of Stainless Steel Material

| Typical Application | | Service Environment | | ASTM Material Designations |
|-------------------------------|---|--|--|----------------------------|
| Seawater | Seawater handling | Seawater desalination | Pitting corrosion resistance Crevice corrosion resistance | A351 CD3MWCuN (UNS S32760) |
| | | Heat exchangers | | A351 CD3MWCuN (UNS S32760) |
| | | Pumps | | A351 CN3MN |
| | Salt Manufacturing | Salt manufacturing process Bittern making process | Pitting corrosion resistance Crevice corrosion resistance | A351 CF3M |
| | | | | A351 CD3MWCuN (UNS S32760) |
| | | | | A351 CN3MN |
| Chemical | Sulfuric acid | Lower concentration | Acid resistance (whole surface corrosion) Intergranular corrosion resistance | A351 CK3MCuN |
| | | | | A351 CK3MCuN |
| | | | | A351 CF3M |
| | | | | Hastelloy C276 |
| | Nitric acid | Any concentration | Acid resistance (whole surface corrosion) | A351 CF3M |
| | Hydrochloric acid | Lower concentration | Acid resistance (whole surface corrosion) | A351 CD3MWCuN (UNS S32760) |
| | | | | Alloy 20 |
| | | | | Hastelloy C276 |
| | | | | Hastelloy B |
| | Acetic acid | Any concentration | Acid resistance (whole surface corrosion) Pitting corrosion resistance | A351 CF3M |
| | | | | A351 CD3MWCuN (UNS S32760) |
| | | | | A351 CF3MN |
| A351 CK3MCuN | | | | |
| Alloy 20 | | | | |
| Urea synthesizing | Carbamide | Acid resistance (whole surface corrosion) Delta ferrite (selective corrosion) | Hastelloy C276 | |
| | | | A351 CF3M | |
| Soda manufacturing | 30 to 50% NaOH | Whole surface corrosion resistance | A351 CD3MWCuN (UNS S32760) | |
| | Higher temperature and higher concentration | Whole surface corrosion resistance Stress corrosion cracking resistance | Alloy 20 | |
| Oil Refining Petrochemical | Hydro desulfurization | H ₂ -H ₂ S | Polytheonic acid resistance Stress corrosion cracking resistance | A351 CF8C |
| | | Wet H ₂ S | H ₂ S corrosion resistance | A351 CF3M |
| | Heat exchangers Piping | Seawater (cooling water) | Pitting corrosion resistance Crevice corrosion resistance (seawater resistance) | A351 CD3MWCuN (UNS S32760) |
| Environment | Flue gas desulfurization (wet) | Absorption | Pitting corrosion resistance Crevice corrosion resistance | A351 CF3M |
| | | | | A351 CD3MWCuN (UNS S32760) |
| | | | | A351 CN3MN |
| City garbage furnace | Superheater (for high heat efficiency at 400°C) | Molten salt corrosion resistance | A351 CK3MCuN | |
| Energy | Boilers | Seawater piping | Pitting corrosion resistance Crevice corrosion resistance (seawater resistance) | A351 CF3M |
| | | | | A351 CD3MWCuN (UNS S32760) |

1. V-006



2. V-255



3. V-155FS



4. MD-82



5. MD-54



6. HPV-40/41



7. V-S05



Super Alloy Valves
CASTING

1. V-006

2 PIECES, Full Port, Threaded End
PRESSURE: 1000 psi
SIZE: 1/2" ~ 2"

2. V-255

3 PIECES, Full / Reduced Port,
Threaded / Socket / Butt Weld End
PRESSURE: 2000 / 1500 psi
SIZE: 1/2" ~ 2"
OPTION: API607 Fire Safe Approved

3. V-155FS

3 PIECES, Full / Reduced Port,
Threaded / Socket / Butt Weld End
PRESSURE: 2000 / 1500 / 1000 psi
SIZE: 1/4" ~ 2-1/2"
OPTION: API607 Fire Safe Approved

4. MD-82

2 PIECES, Full Port, Flanged End
ANSI Class 150 / 300 / PN16 / PN40
SIZE: 1/2" ~ 4"
OPTION: API607 Fire Safe Approved

5. MD-54

3 PIECES, Full Port / Trunnion Mounted
Flanged End RF
ANSI Class 150 / 300
SIZE: 14" ~ 20"

Super Alloy Valves
BAR

6. HPV-40/41

3 PIECES, Full / Reduced Port,
Threaded / Socket / Butt Weld End
PRESSURE: 3000 / 6000 psi
SIZE: 1/4" ~ 2"
OPTION: API607 Fire Safe Approved

7. V-S05

3 PIECES, Full Port,
Threaded / Socket / Butt Weld End
PRESSURE: 1000 psi
SIZE: 1/4" ~ 2"
OPTION: API607 Fire Safe Approved

1. Gate Valve
GTF



2. Globe Valve
GBF



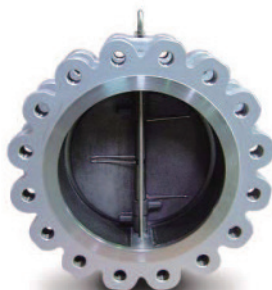
3. Check Valve
SF



4. MV-1220
Wafer Type



5. MV-1221
Lug Type



6. NV-0060
NV-0061



Super Alloy Valves

API600 / API603 Design
Gate • Globe • Check Valves

1. GTF - Gate Valve
ANSI Class 150 / 300 / 600
SIZE: 2" ~ 24"

2. GBF - Globe Valve
ANSI Class 150 / 300 / 600
SIZE: 2" ~ 24"

3. SF - Check Valve
ANSI Class 150 / 300 / 600
SIZE: 2" ~ 24"

Super Alloy Valves

API594 / API6D Design
Dual Plate Check Valves

4. MV-1220 Wafer Type
ANSI Class 150 / 300 / JIS10K / PN16 / PN40
SEAT: NBR / EPDM / Viton / Metal
SIZE: 1-1/2" ~ 60"

5. MV-1221 Lug Type
ANSI Class 150 / 300 / PN16 / PN40
SEAT: NBR / EPDM / Viton / Metal
SIZE: 2" ~ 20"

6. Needle Valve (**from bar**)
NV-0060 Female x Female
NV-0061 Male x Female
CWP: 6000 psi
SIZE: 1/4" ~ 1"