

Material Sheet

Carbon Steel A105

Description

This standard cover forged carbon steel piping components for ambient- and higher-temperature service in pressure systems. Flanges are ordered either to dimensions specified by the purchaser or to dimensional specifications such as ASME 16.5 and API 6A. Forgings made to ASTM A 105 are normally limited to maximum weight of 10,000 lbs.

Specifications

ASTM: A105

ASME: SA105, B16.5

NACE: MRO175

MSS: SP 44

Chemical Composition%

C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V
0.35	0.60-1.05	0.035	0.04	0.10-0.35	0.4	0.4	0.3	0.12	0.08
max	–	max	max	–	max (1)	max (1)	max (1-2)	max (1-2)	max

1. The sum of Copper, Nickel, Niobium, Molybdenum and Vanadium shall not exceed 1.00%.
2. The sum of Niobium and Molybdenum shall not exceed 0.32%.

Note: For each reduction of 0.01% below the specified carbon maximum (0.35%), an increase of 0.06% Manganese above the specified maximum (1.05%) will be permitted up to a maximum of 1.35%.

Tensile Requirements

Tensile Strength: (KSI) = 70

Yield Strength: (KSI) = 36

(KSI converts to MPA {Megapascals} by multiplying by 6.895)

Alloy200 (UNS N02201t)

Description:

Alloy 200 is an unalloyed wrought nickel. It offers excellent corrosion resistance, good mechanical, magnetic and magnetostrictive properties and useful thermal and electrical conductivities.

Specifications

ASTM: B161, B162, B366, B160, B564

ASME: SB161, SB162, SB366, SB160, SB564

Chemical Composition%

C	Cu	Mn	Ni	S	Si	Fe
MAX	MAX	MAX	MIN	MAX	MAX	MAX
0.02	0.25	0.35	99.0	0.01	0.35	0.40

Tensile Requirements

Tensile Strength: (KSI) = 50

Yield Strength: 5" < (KSI) = 10

5" > (KSI) = 12

(KSI converts to MPA {Megapascals} by multiplying by 6.895)

Alloy 400 (UNS N04400)

Description:

Alloy 400 is used for its excellent combination of corrosion resistance, strength, ductility and weld-ability. The corrosion resistance in seawater is especially good under high velocity conditions. Alloy 400 also is generally not susceptible to stress corrosion cracking.

Specifications

ASTM: B165, B127, B366, B164, B564

ASME: SB165, SB366, SB564, SB164, SB127

Chemical Composition%

C	Cu	Mn	Ni	S	Si	Fe
MAX	MAX	MAX	MIN	MAX	MAX	MAX
0.30	28.0-34.0	2.00	63.0	0.024	0.50	2.50

Tensile Requirements

Tensile Strength: (KSI) = 70

Yield Strength: 5" < (KSI) = 28

5" > (KSI) = 25

(KSI converts to MPA {Megapascals} by multiplying by 6.895)

Alloy 600 (UNS N06600)

Description

Alloy 600 is a nickel-chromium-iron alloy used for applications which require resistance to corrosion and heat. The alloy also has excellent mechanical properties and presents the desirable combination of high strength and good workability under a wide range of temperatures.

Specifications

ASTM: B167, B366, B166, B564

ASME: SB167, SB366, SB564, SB166

Chemical Composition%

C	Cr	Cu	Fe	Mn	N	S	Si
MAX	-	MAX	-	MAX	MIN	MAX	MAX
0.15	14.0-17.0	0.50	6.00-10.00	1.00	72.0	0.015	0.50

Tensile Requirements

Tensile Strength: (KSI) = 80-100

Yield Strength: (KSI) = 30-50

(KSI converts to MPA {Megapascals} by multiplying by 6.895)

304/304L (UNS S30400/S30403)

Description

304 stainless is a low-carbon (0.08% max) version of the basic 18-8, also known as 302. Type 302 has 18% chromium and 8% nickel. Type 304 has a slightly lower strength than 302 due to its lower carbon content. Type 304 is used in welding applications, because the low carbon permits some exposure in the carbide precipitation range of 800° F - 1500° F without the need for post-annealing operations. However the severity of the corrosive environments may necessitate annealing after welding or the use of 304L. Type 304L has a carbon content of 0.03% or less.

Specifications

ASTM: A312, A376, A358, A269, A249, A403, A182, A351

ASME: SA312, SA376, SA358, SA269, SA249, SA403, SA182, SA351

Chemical Composition%

C	Cr	Mn	Ni	P	S	Si
MAX	-	MAX	-	MAX	MAX	MAX
0.035	18.0- 20.0	2.00	8.0-13.0	0.045	0.030	1.00

Tensile Requirements

Tensile Strength: (KSI) = 70

Yield Strength: (KSI) = 25

(KSI converts to MPA {Megapascals} by multiplying by 6.895)

316/316L (UNS S31600/S31603)

Description

Type 316 is a molybdenum steel processing improved resistance to pitting by solutions containing chlorides and other halides. In addition, it provide excellent tensile, creep and stress-rupture strengths at elevated temperatures. Type 316 is available in low carbon (316L) and high carbon (316H) alloys.

Specifications

ASTM: A312, A376, A358, A269, A249, A403, A182, A351, A479, A276

ASME: SA312, SA376, SA358, SA269, SA249, SA182, SA276, SA403, SA479, SA351

Chemical Composition%

C	Cr	Mn	Mo	Ni	P	S	Si
MAX		MAX			Max	MAX	MAX
0.035	16.0- 18.0	2.00	2.0-3.0	10.0-14.0	0.045	0.030	1.00

Tensile Requirements

Tensile Strength: (KSI) = 70

Yield Strength: (KSI) = 25

(KSI converts to MPA {Megapascals} by multiplying by 6.895)

Duplex 2205 (UNS S31803/S32205)

Description

Avesta Sheffield 2205 is a ferritic-austenitic stainless steel which combines many of the beneficial properties of both ferritic and austenitic steels. As a result of high chromium and molybdenum contents, the steel has very good pitting and uniform corrosion resistance, as well as a high mechanical strength. 2205 has good weld-ability and can be welded using most of the techniques for stainless steels. Due to the balance composition, when welded correctly the heat-affected zone contains sufficient austenite to avoid risk of localized corrosion.

Specifications

ASTM: B790, B815, B182

ASME: SB790, SB815, SB182

Chemical Composition%

C	Cb	Fe	Mn	Mo	N	Ni	P	S	Si
MAX	–	–	MAX	–	–	–	MAX	MAX	MAX
0.03	22.0-23.0	BAL	2.0	3.00-3.50	0.14-0.20	4.50-6.50	0.03	0.02	1.0

Tensile Requirements

Tensile Strength: (KSI) = 95

Yield Strength: (KSI) = 65

(KSI converts to MPA {Megapascals} by multiplying by 6.895)

Alloy 20 (UNS N08020)

Description

Alloy 20 is one of the so-called "Super" stainless steels that was designed for maximum resistance to acid attack. Its nickel, chromium, molybdenum and copper content contribute to its overall resistance to chloride stress corrosion cracking and general pitting attack. Although the alloy was designed for use in applications involving sulfuric acid, it also can be used for processing pharmaceuticals, food, gasoline, solvents, plastics, explosives, synthetics fibers and many more products.

Specifications

ASTM: B729, B464, B366, B473, B462

ASME: SB729, SB464, SB366, SB473, SB462

Chemical Composition%

C	Nb + Ta	Cr	Cu	Fe	Mn	Mo	Ni	P	S	Si
MAX	8x Carbon	–	–	–	MAX	–	–	MAX	MAX	MAX
0.07	1.00	19.0 - 21.0	3.0 - 4.0	BAL	2.00	2.0 - 3.0	32.0 - 38.0	0.045	0.035	1.00

Tensile Requirements

Tensile Strength: (KSI) = 80

Yield Strength: (KSI) = 35

(KSI converts to MPA {Megapascals} by multiplying by 6.895)