Haynes HastelloyÂ® G-35Â® Nickel Alloy Synergic Gas Metal Arc Welded (GMAW) Plate

Category : Metal , Nonferrous Metal , Nickel Alloy

Material Notes:

Known for its corrosion performance, HASTELLOYÂ® G-35Â® alloy was designed to resist â€œwet processâ€ phosphoric acid, which is widely used in the production of fertilizers. Tests indicate that it is far superior to HASTELLOYÂ® G-30Â® alloy and stainless steels, in this chemical. It was also designed to resist localized attack in the presence of chlorides, since under-deposit attack is a potential problem in evaporators used to concentrate â€œwet processâ€ phosphoric acid. As a result of its high-chromium content, G-35 alloy is extremely resistant to other oxidizing acids, such as nitric, and mixtures containing nitric acid. It possesses moderate resistance to reducing acids, as a result of its appreciable molybdenum content, and, unlike other nickel-chromium-molybdenum alloys, it is very resistant to â€œcaustic dealloyingâ€ in hot sodium hydroxide. Finally, G-35 alloy is much less susceptible to chloride-induced stress corrosion cracking than the high chromium stainless steels and nickel-chromium-iron alloys traditionally used in â€œwet processâ€ phosphoric acid. G-35 alloy is available in the form of plate, sheet, strip, billet, bar, wire, covered electrodes, pipe, and tubing. Potential Applications: â€œWet processâ€ phosphoric acid evaporators. Pickling in nitric and hydrofluoric acids. Chemical process industry systems involving nitric and chlorides. Caustic neutralizing systems. Systems requiring resistance to high temperature corrosion at 800-1200Â°F.G-35 alloy is covered by ASME, ASTM, and DIN specifications. Welding: The weldability of G-35 alloy is similar to that of C-276 alloy. To weld G-35 alloy, three processes are commonly used. For sheet welds and plate root passes, gas tungsten arc (GTAW) welding is favored. For plate welds, the gas metal arc (GMAW) process is preferred. For field welding, the shielded metal arc process, using coated electrodes, is favored. Submerged arc welding is not recommended as this process is characterized by high heat input to the base metal and slow cooling of the weld. To minimize the precipitation of second phases in regions affected by the heat of welding, a maximum interpass temperature of 93Â°C (200Â°F) is recommended for G-35 alloy. Also, welding of cold-worked materials is strongly discouraged, since they sensitize more quickly and induce residual stresses. A full solution anneal, followed by water quenching, is recommended for cold-worked structures, prior to welding. Joining Base Metal Preparation: The joint surface and adjacent area should be thoroughly cleaned before welding. All grease, oil crayon marks, sulfur compounds, and other foreign matter should be removed. Filler Metal Selections: For gas tungsten arc and gas metal arc welding, G-35 filler wire is suggested. For shielded metal arc welding, G-35 covered electrodes are suggested. Heat Treatment: Wrought forms of HASTELLOY G-35 alloy are furnished in the solution annealed condition, unless otherwise specified. The standard solution annealing treatment consists of heating to 1121Â°C (2050Â°F) followed by rapid air-cooling or water quenching. Parts which have been hot formed should be solution annealed prior to final fabrication or installation. Forming: G-35 alloy has excellent forming characteristics, and cold forming is the preferred method of shaping. The alloy can be easily cold worked due to its good ductility. The alloy is generally stiffer than the austenitic stainless steels; therefore, more energy is required during cold forming.Tensile and impact properties reported are for transverse synergic gas metal arc welded plate specimens. Other properties are typical of the alloy.Data provided by the manufacturer, Haynes International, Inc.

Order this product through the following link:
http://www.lookpolymers.com/polymer_Haynes-Hastelloy-G-35-Nickel-Alloy-Synergic-Gas-Metal-Arc-Welded-GMAW-Plate.php

Physical Properties	Metric	English	Comments
Density	8.22 g/cc	0.297 lb/inÂ³	

Mechanical Properties	Metric	English	Comments
Tensile Strength, Ultimate	501 MPa @Thickness 12.7 mm, Temperature 538 Â°C	72700 psi @Thickness 0.500 in, Temperature 1000 Â°F	
	555 MPa @Thickness 12.7 mm, Temperature 260 Â°C	80500 psi @Thickness 0.500 in, Temperature 500 Â°F	
	724 MPa @Thickness 12.7 mm, Temperature 25.0 Â°C	105000 psi @Thickness 0.500 in, Temperature 77.0 Â°F	
Tensile Strength, Yield	246 MPa @Thickness 12.7 mm, Temperature 538 Â°C	35700 psi @Thickness 0.500 in, Temperature 1000 Â°F	0.2% Offset
	335 MPa @Thickness 12.7 mm, Temperature 260 Â°C	48600 psi @Thickness 0.500 in, Temperature 500 Â°F	0.2% Offset
	459 MPa @Thickness 12.7 mm, Temperature 25.0 Â°C	66600 psi @Thickness 0.500 in, Temperature 77.0 Â°F	0.2% Offset
Elongation at Break	31.5 % @Thickness 12.7 mm, Temperature 25.0 Â°C	31.5 % @Thickness 0.500 in, Temperature 77.0 Â°F	
	43 % @Thickness 12.7 mm, Temperature 260 Â°C	43 % @Thickness 0.500 in, Temperature 500 Â°F	
	51 % @Thickness 12.7 mm, Temperature 538 Â°C	51 % @Thickness 0.500 in, Temperature 1000 Â°F	
Modulus of Elasticity	170 GPa @Temperature 649 Â°C	24700 ksi @Temperature 1200 Â°F	Dynamic
	177 GPa @Temperature 538 Â°C	25700 ksi @Temperature 1000 Â°F	Dynamic
	183 GPa @Temperature 427 Â°C	26500 ksi @Temperature 801 Â°F	Dynamic
	189 GPa	27400 ksi	

Mechanical Properties	Metric	English	Comments
	@Temperature 316 Â°C	@Temperature 601 Â°F	Dynamic
	204 GPa @Temperature 25.0 Â°C	29600 ksi @Temperature 77.0 Â°F	Dynamic
Charpy Impact	207 J @Thickness 12.7 mm, Temperature -196 Â°C	153 ft-lb @Thickness 0.500 in, Temperature -321 Â°F	Notch Position at Mid-Weld
	273 J @Thickness 12.7 mm, Temperature 25.0 Â°C	201 ft-lb @Thickness 0.500 in, Temperature 77.0 Â°F	Notch Position at Mid-Weld
	>= 358 J @Thickness 12.7 mm, Temperature 25.0 Â°C	>= 264 ft-lb @Thickness 0.500 in, Temperature 77.0 Â°F	Notch Position at Heat Affected Zone
	>= 358 J @Thickness 12.7 mm, Temperature -196 Â°C	>= 264 ft-lb @Thickness 0.500 in, Temperature -321 Â°F	Notch Position at Heat Affected Zone
	107 J @Treatment Temp. 649 Â°C, Thickness 12.7 mm	78.9 ft-lb @Treatment Temp. 1200 Â°F, Thickness 0.500 in	Notch Position at Mid-Weld, aged for 2000h and tested at RT
	169 J @Treatment Temp. 593 Â°C, Thickness 12.7 mm	125 ft-lb @Treatment Temp. 1100 Â°F, Thickness 0.500 in	Notch Position at Mid-Weld, aged for 2000h and tested at RT
	297 J @Treatment Temp. 482 Â°C, Thickness 12.7 mm	219 ft-lb @Treatment Temp. 900 Â°F, Thickness 0.500 in	Notch Position at Mid-Weld, aged for 2000h and tested at RT
	302 J @Treatment Temp. 427 Â°C, Thickness 12.7 mm	223 ft-lb @Treatment Temp. 801 Â°F, Thickness 0.500 in	Notch Position at Mid-Weld, aged for 2000h and tested at RT
	304 J @Treatment Temp. 538 Â°C, Thickness 12.7 mm	224 ft-lb @Treatment Temp. 1000 Â°F, Thickness 0.500 in	Notch Position at Mid-Weld, aged for 2000h and tested at RT

Thermal Properties	Metric	English	Comments
CTE, linear	12.3 Âµm/m-Â°C @Temperature 21.0 -	6.83 Âµin/in-Â°F @Temperature 69.8 -	

Thermal Properties	Metric	English	Comments
	100 Â°C	212 Â°F	
	12.6 Âµm/m-Â°C @Temperature 21.0 - 200 Â°C	7.00 Âµin/in-Â°F @Temperature 69.8 - 392 Â°F	
	13.2 Âµm/m-Â°C @Temperature 21.0 - 300 Â°C	7.33 Âµin/in-Â°F @Temperature 69.8 - 572 Â°F	
	13.4 Âµm/m-Â°C @Temperature 21.0 - 400 Â°C	7.44 Âµin/in-Â°F @Temperature 69.8 - 752 Â°F	
	13.6 Âµm/m-Â°C @Temperature 21.0 - 500 Â°C	7.56 Âµin/in-Â°F @Temperature 69.8 - 932 Â°F	
	14.4 Âµm/m-Â°C @Temperature 21.0 - 600 Â°C	8.00 Âµin/in-Â°F @Temperature 69.8 - 1110 Â°F	
Specific Heat Capacity	0.450 J/g-Â°C @Temperature 25.0 Â°C	0.108 BTU/lb-Â°F @Temperature 77.0 Â°F	
	0.470 J/g-Â°C @Temperature 100 Â°C	0.112 BTU/lb-Â°F @Temperature 212 Â°F	
	0.490 J/g-Â°C @Temperature 200 Â°C	0.117 BTU/lb-Â°F @Temperature 392 Â°F	
	0.510 J/g-Â°C @Temperature 300 Â°C	0.122 BTU/lb-Â°F @Temperature 572 Â°F	
	0.530 J/g-Â°C @Temperature 400 Â°C	0.127 BTU/lb-Â°F @Temperature 752 Â°F	
	0.530 J/g-Â°C @Temperature 500 Â°C	0.127 BTU/lb-Â°F @Temperature 932 Â°F	
	0.600 J/g-Â°C @Temperature 600 Â°C	0.143 BTU/lb-Â°F @Temperature 1110 Â°F	
Thermal Conductivity	10.0 W/m-K @Temperature 25.0 Â°C	69.4 BTU-in/hr-ftÂ²-Â°F @Temperature 77.0 Â°F	

Thermal Properties	Metric	English	Comments
	12.0 W/m-K @Temperature 100 Â°C	83.3 BTU-in/hr-ftÂ²-Â°F @Temperature 212 Â°F	
	14.0 W/m-K @Temperature 200 Â°C	97.2 BTU-in/hr-ftÂ²-Â°F @Temperature 392 Â°F	
	16.0 W/m-K @Temperature 300 Â°C	111 BTU-in/hr-ftÂ²-Â°F @Temperature 572 Â°F	
	18.0 W/m-K @Temperature 400 Â°C	125 BTU-in/hr-ftÂ²-Â°F @Temperature 752 Â°F	
	19.0 W/m-K @Temperature 500 Â°C	132 BTU-in/hr-ftÂ²-Â°F @Temperature 932 Â°F	
	23.0 W/m-K @Temperature 600 Â°C	160 BTU-in/hr-ftÂ²-Â°F @Temperature 1110 Â°F	
Melting Point	1332 - 1361 Â°C	2430 - 2482 Â°F	
Solidus	1332 Â°C	2430 Â°F	
Liquidus	1361 Â°C	2482 Â°F	

Component Elements Properties	Metric	English	Comments
Aluminum, Al	<= 0.40 %	<= 0.40 %	
Carbon, C	<= 0.050 %	<= 0.050 %	
Chromium, Cr	33 %	33 %	
Iron, Fe	<= 2.0 %	<= 2.0 %	
Manganese, Mn	<= 0.50 %	<= 0.50 %	
Molybdenum, Mo	8.0 %	8.0 %	
Nickel, Ni	55.5 %	55.5 %	as balance
Silicon, Si	<= 0.60 %	<= 0.60 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.000118 ohm-cm @Temperature 25.0 Â°C	0.000118 ohm-cm @Temperature 77.0 Â°F	

Electrical Properties	Metric	English	Comments
	0.000119 ohm-cm @Temperature 100 Â°C	0.000119 ohm-cm @Temperature 212 Â°F	
	0.000120 ohm-cm @Temperature 200 Â°C	0.000120 ohm-cm @Temperature 392 Â°F	
	0.000121 ohm-cm @Temperature 300 Â°C	0.000121 ohm-cm @Temperature 572 Â°F	
	0.000122 ohm-cm @Temperature 400 Â°C	0.000122 ohm-cm @Temperature 752 Â°F	
	0.000124 ohm-cm @Temperature 500 Â°C	0.000124 ohm-cm @Temperature 932 Â°F	
	0.000125 ohm-cm @Temperature 600 Â°C	0.000125 ohm-cm @Temperature 1110 Â°F	

Processing Properties	Metric	English	Comments
Annealing Temperature	1120 Â°C	2050 Â°F	Followed by rapid air cooling or water quench

Descriptive Properties	Value	Comments
Thermal Diffusivity	0.028 cm^2/s	25Â°C
	0.031 cm^2/s	100Â°C
	0.034 cm^2/s	200Â°C
	0.038 cm^2/s	300Â°C
	0.042 cm^2/s	400Â°C
	0.045 cm^2/s	500Â°C
	0.048 cm^2/s	600Â°C

Contact Songhan Plastic Technology Co.,Ltd.

Website : www.lookpolymers.com
Email : sales@lookpolymers.com
Tel : +86 021-51131842
Mobile : +86 13061808058
Skype : lookpolymers
Address : United North Road 215,Fengxian District, Shanghai City,China