

Haynes Ultimet® alloy, plate, GMAW weld (short)

Category : Metal , Nonferrous Metal , Cobalt Alloy , Superalloy

Material Notes:

Co content as balance, excellent corrosion resistance, outstanding wear resistance, high tensile strength combined with excellent impact toughness and ductility. Ideal welding material with exceptional ductility and resistance to weld cracking, very easy to apply as an overlay, multiple layers applicable with little to no preheat. Applications include agitators, blenders, bolts, dies, extruders, fan blades, filters, glass plungers, nozzles, pumps, rolls, screw conveyors, and valve parts. Data provided by the manufacturer, Haynes International, Inc.

Order this product through the following link:

http://www.lookpolymers.com/polymer_Haynes-Ultimet-alloy-plate-GMAW-weld-short.php

Physical Properties	Metric	English	Comments
Density	8.47 g/cc	0.306 lb/in ³	

Mechanical Properties	Metric	English	Comments
Tensile Strength, Ultimate	676 MPa	98000 psi	
	@Thickness 19.0 mm, Temperature 538 Å°C	@Thickness 0.750 in, Temperature 1000 Å°F	
	786 MPa	114000 psi	
	@Thickness 12.7 mm, Temperature 538 Å°C	@Thickness 0.500 in, Temperature 1000 Å°F	
	800 MPa	116000 psi	
	@Thickness 19.0 mm, Temperature 260 Å°C	@Thickness 0.750 in, Temperature 500 Å°F	
Tensile Strength, Yield	834 MPa	121000 psi	
	@Thickness 12.7 mm, Temperature 20.0 Å°C	@Thickness 0.500 in, Temperature 68.0 Å°F	
	834 MPa	121000 psi	
	@Thickness 12.7 mm, Temperature 260 Å°C	@Thickness 0.500 in, Temperature 500 Å°F	
	848 MPa	123000 psi	
	@Thickness 19.0 mm, Temperature 20.0 Å°C	@Thickness 0.750 in, Temperature 68.0 Å°F	
Tensile Strength, Yield	310 MPa	45000 psi	0.2% offset
	@Thickness 19.0 mm, Temperature 538 Å°C	@Thickness 0.750 in, Temperature 1000 Å°F	
Tensile Strength, Yield	365 MPa	52900 psi	0.2% offset
	@Thickness 12.7 mm, Temperature 538 Å°C	@Thickness 0.500 in, Temperature 1000 Å°F	

Mechanical Properties	Metric	English	Comments
	427 MPa	61500 psi	
	@Thickness 19.0 mm, Temperature 260 Å°C	@Thickness 0.750 in, Temperature 500 Å°F	0.2% offset
	448 MPa	65000 psi	
	@Thickness 12.7 mm, Temperature 260 Å°C	@Thickness 0.500 in, Temperature 500 Å°F	0.2% offset
	593 MPa	86000 psi	
	@Thickness 19.0 mm, Temperature 20.0 Å°C	@Thickness 0.750 in, Temperature 68.0 Å°F	0.2% offset
	676 MPa	98000 psi	
	@Thickness 12.7 mm, Temperature 20.0 Å°C	@Thickness 0.500 in, Temperature 68.0 Å°F	0.2% offset
Elongation at Break	6.0 %	6.0 %	
	@Thickness 12.7 mm	@Thickness 0.500 in	in 50.8 mm
	10 %	10 %	
	@Thickness 19.0 mm	@Thickness 0.750 in	in 50.8 mm
	19 %	19 %	
	@Thickness 12.7 mm, Temperature 260 Å°C	@Thickness 0.500 in, Temperature 500 Å°F	in 50.8 mm
	20 %	20 %	
	@Thickness 19.0 mm, Temperature 260 Å°C	@Thickness 0.750 in, Temperature 500 Å°F	in 50.8 mm
	26 %	26 %	
	@Thickness 19.0 mm, Temperature 538 Å°C	@Thickness 0.750 in, Temperature 1000 Å°F	in 50.8 mm
	28 %	28 %	
	@Thickness 12.7 mm, Temperature 538 Å°C	@Thickness 0.500 in, Temperature 1000 Å°F	in 50.8 mm
Modulus of Elasticity	180 GPa	26100 ksi	
	@Temperature 649 Å°C	@Temperature 1200 Å°F	(heat treated at 1121Å°C (2050Å°F), water quenched plate)
	189 GPa	27400 ksi	
	@Temperature 538 Å°C	@Temperature 1000 Å°F	(heat treated at 1121Å°C (2050Å°F), water quenched plate)
	197 GPa	28600 ksi	
	@Temperature 427 Å°C	@Temperature 801 Å°F	(heat treated at 1121Å°C (2050Å°F), water quenched plate)

Mechanical Properties	205 GPa Metric	29900 ksi English	Comments
	@Temperature 316 Â°C	@Temperature 601 Â°F	(heat treated at 1121Â°C (2050Â°F), water quenched plate)
	215 GPa	31200 ksi	(heat treated at 1121Â°C (2050Â°F), water quenched plate)
	@Temperature 204 Â°C	@Temperature 399 Â°F	
Charpy Impact	127 J	93.7 ft-lb	V Notch

Thermal Properties	Metric	English	Comments
CTE, linear	14.0 Âµm/m-Â°C	7.78 Âµin/in-Â°F	
	@Temperature 26.0 - 316 Â°C	@Temperature 78.8 - 601 Â°F	
	14.5 Âµm/m-Â°C	8.06 Âµin/in-Â°F	
	@Temperature 26.0 - 427 Â°C	@Temperature 78.8 - 801 Â°F	
	14.8 Âµm/m-Â°C	8.22 Âµin/in-Â°F	
	@Temperature 26.0 - 538 Â°C	@Temperature 78.8 - 1000 Â°F	
	15.1 Âµm/m-Â°C	8.39 Âµin/in-Â°F	
@Temperature 26.0 - 649 Â°C	@Temperature 78.8 - 1200 Â°F		
15.9 Âµm/m-Â°C	8.83 Âµin/in-Â°F		
@Temperature 26.0 - 760 Â°C	@Temperature 78.8 - 1400 Â°F		
16.4 Âµm/m-Â°C	9.11 Âµin/in-Â°F		
@Temperature 26.0 - 871 Â°C	@Temperature 78.8 - 1600 Â°F		
16.9 Âµm/m-Â°C	9.39 Âµin/in-Â°F		
@Temperature 26.0 - 982 Â°C	@Temperature 78.8 - 1800 Â°F		
Specific Heat Capacity	0.456 J/g-Â°C	0.109 BTU/lb-Â°F	
	@Temperature 23.0 Â°C	@Temperature 73.4 Â°F	
	0.470 J/g-Â°C	0.112 BTU/lb-Â°F	
	@Temperature 100 Â°C	@Temperature 212 Â°F	
	0.482 J/g-Â°C	0.115 BTU/lb-Â°F	
@Temperature 200 Â°C	@Temperature 392 Â°F		
0.504 J/g-Â°C	0.120 BTU/lb-Â°F		

Thermal Properties	Metric	English	Comments
	0.525 J/g-Â°C @Temperature 300 Â°C	0.125 BTU/lb-Â°F @Temperature 572 Â°F	
	@Temperature 400 Â°C	@Temperature 752 Â°F	
	0.545 J/g-Â°C @Temperature 500 Â°C	0.130 BTU/lb-Â°F @Temperature 932 Â°F	
	0.573 J/g-Â°C @Temperature 600 Â°C	0.137 BTU/lb-Â°F @Temperature 1110 Â°F	
Thermal Conductivity	12.3 W/m-K @Temperature 23.0 Â°C	85.4 BTU-in/hr-ftÂ²-Â°F @Temperature 73.4 Â°F	
	13.8 W/m-K @Temperature 100 Â°C	95.8 BTU-in/hr-ftÂ²-Â°F @Temperature 212 Â°F	
	15.6 W/m-K @Temperature 200 Â°C	108 BTU-in/hr-ftÂ²-Â°F @Temperature 392 Â°F	
	17.5 W/m-K @Temperature 300 Â°C	121 BTU-in/hr-ftÂ²-Â°F @Temperature 572 Â°F	
	19.4 W/m-K @Temperature 400 Â°C	135 BTU-in/hr-ftÂ²-Â°F @Temperature 752 Â°F	
	21.5 W/m-K @Temperature 500 Â°C	149 BTU-in/hr-ftÂ²-Â°F @Temperature 932 Â°F	
	23.9 W/m-K @Temperature 600 Â°C	166 BTU-in/hr-ftÂ²-Â°F @Temperature 1110 Â°F	
Melting Point	1332 - 1354 Â°C	2430 - 2469 Â°F	
Solidus	1332 Â°C	2430 Â°F	
Liquidus	1354 Â°C	2469 Â°F	

Component Elements Properties	Metric	English	Comments
Carbon, C	0.060 %	0.060 %	
Chromium, Cr	26 %	26 %	
Cobalt, Co	54 %	54 %	

Component Elements Properties	Metric	English	Comments
Manganese, Mn	0.80 %	0.80 %	
Molybdenum, Mo	5.0 %	5.0 %	
Nickel, Ni	9.0 %	9.0 %	
Nitrogen, N	0.080 %	0.080 %	
Silicon, Si	0.30 %	0.30 %	
Tungsten, W	2.0 %	2.0 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000870 ohm-cm	0.0000870 ohm-cm	
	@Temperature 23.0 Â°C	@Temperature 73.4 Â°F	
	0.0000890 ohm-cm	0.0000890 ohm-cm	
	@Temperature 100 Â°C	@Temperature 212 Â°F	
	0.0000930 ohm-cm	0.0000930 ohm-cm	
	@Temperature 200 Â°C	@Temperature 392 Â°F	
	0.0000960 ohm-cm	0.0000960 ohm-cm	
	@Temperature 300 Â°C	@Temperature 572 Â°F	
0.000100 ohm-cm	0.000100 ohm-cm		
@Temperature 400 Â°C	@Temperature 752 Â°F		
0.000103 ohm-cm	0.000103 ohm-cm		
@Temperature 500 Â°C	@Temperature 932 Â°F		
0.000105 ohm-cm	0.000105 ohm-cm		
@Temperature 600 Â°C	@Temperature 1110 Â°F		

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