AK Steel 409 ULTRA FORM® Stainless Steel

Category : Metal , Ferrous Metal , Stainless Steel

Material Notes:

AK Steel 409 ULTRA FORM Stainless Steel provides an outstanding combination of improved forming and welding characteristics, while providing superior resistance to oxidation, corrosion, ridging and roping in both automotive exhaust and non-exhaust applications. These benefits are achieved through precise control of chemistry and thermo-mechanical processing from melting to finishing. AK Steel 409 ULTRA FORM is essentially non-hardenable by heat treatment because of its titanium and low-carbon levels. The titanium additions not only stabilize the steel to prevent hardening during welding, but also prevent the formation of harmful chromium carbides which can lead to intergranular corrosion in service. Available Forms AK Steel produces 409 ULTRA FORM Stainless Steel coils and cut lengths in thicknesses of 0.015" to 0.250" (0.381 to 6.350 mm) in widths up to and including 48" (1219 mm). For applications over 0.120" (3.048mm) thick, AK Steel 409 Ni Stainless Steel will provide improved toughness and weldability. The surface finish of the alloy is obtained by annealing and pickling after rolling. The pickled surface is relatively dull and, like other titanium-stabilized stainless steels, may have cosmetic titanium streaks and will appear similar to typical Type 409.Information provided by AK Steel.

Order this product through the following link:
http://www.lookpolymers.com/polymer_AK-Steel-409-ULTRA-FORM-Stainless-Steel.php

Physical Properties	Metric	English	Comments
Density	7.74 g/cc	0.280 lb/in³	

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell B	66.9	66.9	Annealed
	70	70	5% Cold Worked
	85.3	85.3	10% Cold Worked
	85.3	85.3	50% Cold Worked
	88.7	88.7	15% Cold Worked
	93.5	93.5	30% Cold Worked
	64 - 70 @Thickness 1.27 - 2.16 mm	64 - 70 @Thickness 0.0500 - 0.0850 in	Annealed, Transverse Orientation
Tensile Strength, Ultimate	434 MPa	62900 psi	5% Cold Worked
	490 MPa	71100 psi	10% Cold Worked
	545 MPa	79000 psi	15% Cold Worked
	657 MPa	95300 psi	30% Cold Worked
	730 MPa	106000 psi	50% Cold Worked

Mechanical Properties	Metric	English	Comments
	@Temperature 816 °C	@Temperature 1500 °F	
	73.0 MPa @Temperature 704 °C	10600 psi @Temperature 1300 °F	
	145 MPa @Temperature 649 °C	21000 psi @Temperature 1200 °F	
	246 MPa @Temperature 538 °C	35700 psi @Temperature 1000 °F	
	320 MPa @Temperature 371 °C	46400 psi @Temperature 700 °F	
	340 MPa @Temperature 204 °C	49300 psi @Temperature 400 °F	
	418 MPa @Temperature 22.2 °C	60600 psi @Temperature 72.0 °F	
	379 - 455 MPa @Thickness 1.27 - 2.16 mm	55000 - 66000 psi @Thickness 0.0500 - 0.0850 in	Annealed, Transverse Orientation
Tensile Strength, Yield	186 - 262 MPa @Strain 0.200 %	27000 - 38000 psi @Strain 0.200 %	Annealed, Transverse Orientation, 0.05"-0.085"
	352 MPa @Strain 0.200 %	51100 psi @Strain 0.200 %	5% Cold Worked
	486 MPa @Strain 0.200 %	70500 psi @Strain 0.200 %	10% Cold Worked
	541 MPa @Strain 0.200 %	78500 psi @Strain 0.200 %	15% Cold Worked
	652 MPa @Strain 0.200 %	94600 psi @Strain 0.200 %	30% Cold Worked
	721 MPa @Strain 0.200 %	105000 psi @Strain 0.200 %	50% Cold Worked
	22.0 MPa @Strain 0.200 %, Temperature 816 °C	3190 psi @Strain 0.200 %, Temperature 1500 °F	

Mechanical Properties	Metric	English	Comments
	@Strain 0.200 %, Temperature 704 °C	@Strain 0.200 %, Temperature 1300 °F	
	89.0 MPa @Strain 0.200 %, Temperature 649 °C	12900 psi @Strain 0.200 %, Temperature 1200 °F	
	127 MPa @Strain 0.200 %, Temperature 538 °C	18400 psi @Strain 0.200 %, Temperature 1000 °F	
	152 MPa @Strain 0.200 %, Temperature 371 °C	22000 psi @Strain 0.200 %, Temperature 700 °F	
	154 MPa @Strain 0.200 %, Temperature 204 °C	22300 psi @Strain 0.200 %, Temperature 400 °F	
	225 MPa @Strain 0.200 %, Temperature 22.2 °C	32600 psi @Strain 0.200 %, Temperature 72.0 °F	
Elongation at Break	3.5 %	3.5 %	50% Cold Worked, in 2"
	4.0 %	4.0 %	30% Cold Worked, in 2"
	9.5 %	9.5 %	15% Cold Worked, in 2"
	17 %	17 %	10% Cold Worked, in 2"
	31.9 %	31.9 %	5% Cold Worked, in 2"
	36.3 %	36.3 %	Annealed, in 2"
	33 - 43 % @Thickness 1.27 - 2.16 mm	33 - 43 % @Thickness 0.0500 - 0.0850 in	Annealed, Transverse Orientation
Modulus of Elasticity	208 GPa	30200 ksi	In tension
Fatigue Strength	10.0 MPa @# of Cycles 1.00e+7 , Temperature 816 °C	1450 psi @# of Cycles 1.00e+7 , Temperature 1500 °F	r=0.1
	34.0 MPa @# of Cycles 1.00e+7 , Temperature 704 °C	4930 psi @# of Cycles 1.00e+7 , Temperature 1300 °F	r=0.1

Component Elements Properties	Metric	English	Comments
Carbon, C	<= 0.020 %	<= 0.020 %	Ti, min. = 8X(C+N)
Chromium, Cr	10.5 - 11.7 %	10.5 - 11.7 %	
Iron, Fe	86 - 89.5 %	86 - 89.5 %	as balance
Manganese, Mn	<= 0.75 %	<= 0.75 %	
Nickel, Ni	<= 0.50 %	<= 0.50 %	
Phosphorous, P	<= 0.040 %	<= 0.040 %	
Silicon, Si	<= 1.0 %	<= 1.0 %	
Sulfur, S	<= 0.010 %	<= 0.010 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000600 ohm-cm	0.0000600 ohm-cm	

Descriptive Properties	Value	Comments
Typical rm value	1.5	0.050"-0.085", Annealed, Transverse Orientation

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