

Assab Steels 8407 SUPREME Hot Work Steel

Category : Metal , Ferrous Metal , Chrome-moly Steel , Tool Steel , Hot Work Steel

Material Notes:

8407 SUPREME is characterized by: High level of resistance to thermal shock and thermal fatigue Good high temperature strength Excellent toughness and ductility in all directions Good machinability and polishability Excellent through-hardening properties Good dimensional stability during hardening The name "SUPREME" implies that by special processing techniques and close control, the steel attains high purity and a very fine structure. Further, 8407 SUPREME shows significant improvements in isotropic properties compared to conventionally produced AISI H 13 grades. These improved isotropic properties are particularly valuable for tooling subjected to high mechanical and thermal fatigue stresses, e.g. die casting dies, forging tools and extrusion tooling. In practical terms, tools may be used at somewhat higher working hardness (+1 to 2 HRC without loss of toughness. Since increased hardness slows down the formation of heatchecking cracks, improved tool performance can be expected. 8407 SUPREME meets the North American Die Casting Association (NADCA) #207-90 for premium high quality H-13 die steel. Applications: Tools for Die casting: Dies, fixed inserts cores, sprue parts, nozzles, ejector pins (nitrided), plunger, shot-sleeve (normally nitrided). Tools for Extrusion: Dies, backers, die holders, liners, dummy blocks, stems. Tools for pressing Aluminum, magnesium, copper alloys, and steel. Molds for plastics: Injection molds, compression/transfer molds. Premium AISI H13, W.-Nr. 1.2344

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http://www.lookpolymers.com/polymer_Assab-Steels-8407-SUPREME-Hot-Work-Steel.php

Physical Properties	Metric	English	Comments
Density	7.78 g/cc	0.281 lb/in ³	
	7.53 g/cc	0.272 lb/in ³	
	@Temperature 800 °C	@Temperature 1470 °F	
	7.67 g/cc	0.277 lb/in ³	
	@Temperature 399 °C	@Temperature 750 °F	

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell C	31	31	100 hour total holding time at 600°C (1110°F) tempering temperature. Austenitizing temperature 1020°C (1870°F)
	43	43	100 hour total holding time at 550°C (1020°F) tempering temperature. Austenitizing temperature 1020°C (1870°F)
	43	43	10 hour total holding time at 600°C (1110°F) tempering temperature. Austenitizing temperature 1020°C (1870°F)
	46	46	600°C tempering temperature(2h + 2h). Austenitizing temperature 1020°C (1920°F).

Mechanical Properties	Metric	English	Comments
			600°C tempering temperature(2h + 2h). Austenitizing temperature 1050°C (1920°F).
	51	51	10 hour total holding time at 550°C (1020°F) tempering temperature. Austenitizing temperature 1020°C (1870°F)
	51	51	1 hour total holding time at 600°C (1110°F) tempering temperature. Austenitizing temperature 1020°C (1870°F)
	52	52	300°C tempering temperature(2h + 2h). Austenitizing temperature 1020°C (1920°F).
	52.5	52.5	100 hour total holding time at 500°C (930°F) tempering temperature. Austenitizing temperature 1020°C (1870°F)
	51 - 55	51 - 55	Hardness before tempering. Austenitizing temperature: 1020°C (1870°F). Soaking time 30 minutes.
	53	53	300°C tempering temperature(2h + 2h). Austenitizing temperature 1050°C (1920°F).
	53.5	53.5	1 hour total holding time at 550°C (1020°F) tempering temperature. Austenitizing temperature 1020°C (1870°F)
	53.5	53.5	10 hour total holding time at 500°C (930°F) tempering temperature. Austenitizing temperature 1020°C (1870°F)
	54	54	1 hour total holding time at 500°C (930°F) tempering temperature. Austenitizing temperature 1020°C (1870°F)
	52 - 56	52 - 56	Hardness before tempering. Austenitizing temperature: 1050°C (1920°F). Soaking time 15 minutes.
Tensile Strength at Break	285 MPa	41300 psi	R _m . Austenitizing temp. 1020°C. Tempering temp. 610°C
	@Temperature 700 °C	@Temperature 1290 °F	
	930 MPa	135000 psi	R _m . Austenitizing temp. 1020°C. Tempering temp. 610°C
	@Temperature 550 °C	@Temperature 1020 °F	
Tensile Strength, Ultimate	1420 MPa	206000 psi	R _m . 45 HRC.
	1820 MPa	264000 psi	R _m . 52 HRC.
Tensile Strength, Yield	1280 MPa	186000 psi	R _{p0.2} . 45 HRC.

Mechanical Properties	1520 MPa Metric	220000 psi English	R_n02. 52 HRC. Comments
	150 MPa	21800 psi	R_p02
	@Temperature 700 °C	@Temperature 1290 °F	
	720 MPa	104000 psi	R_p02
	@Temperature 550 °C	@Temperature 1020 °F	
Elongation at Break	10 %	10 %	
	@Temperature 500 °C	@Temperature 932 °F	
	10 %	10 %	
	@Temperature 600 °C	@Temperature 1110 °F	
	20 %	20 %	
	@Temperature 700 °C	@Temperature 1290 °F	
Reduction of Area	50 %	50 %	
	@Temperature 500 °C	@Temperature 932 °F	
	65 %	65 %	
	@Temperature 600 °C	@Temperature 1110 °F	
	90 %	90 %	
	@Temperature 700 °C	@Temperature 1290 °F	
Modulus of Elasticity	202.5 GPa	29370 ksi	
	130 GPa	18900 ksi	
	@Temperature 800 °C	@Temperature 1470 °F	
	175 GPa	25400 ksi	
	@Temperature 400 °C	@Temperature 752 °F	
Impact Test	16.0 J	11.8 ft-lb	400°C Tempering temperature (2h + 2h)
	@Treatment Temp. 400 °C	@Treatment Temp. 752 °F	
	20.0 J	14.8 ft-lb	
	@Treatment Temp. 600 °C	@Treatment Temp. 1110 °F	
	21.0 J	15.5 ft-lb	200°C Tempering temperature (2h + 2h)
	@Treatment Temp. 200 °C	@Treatment Temp. 392 °F	

Thermal Properties	Metric	English	Comments
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Thermal Properties	Metric	English	Comments
CTE, linear	@Temperature 20.0 - 400 °C	@Temperature 68.0 - 752 °F	
	13.9 µm/m-°C	7.72 µin/in-°F	
	@Temperature 20.0 - 800 °C	@Temperature 68.0 - 1470 °F	
Thermal Conductivity	24.6 W/m-K	171 BTU-in/hr-ft²-°F	
	@Temperature 20.0 °C	@Temperature 68.0 °F	
	26.2 W/m-K	182 BTU-in/hr-ft²-°F	
	@Temperature 400 °C	@Temperature 752 °F	
	27.6 W/m-K	192 BTU-in/hr-ft²-°F	
	@Temperature 800 °C	@Temperature 1470 °F	

Component Elements Properties	Metric	English	Comments
Carbon, C	0.39 %	0.39 %	
Chromium, Cr	5.2 %	5.2 %	
Iron, Fe	90.71 %	90.71 %	
Manganese, Mn	0.40 %	0.40 %	
Molybdenum, Mo	1.4 %	1.4 %	
Silicon, Si	1.0 %	1.0 %	
Vanadium, V	0.90 %	0.90 %	

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