

Assab Steels CALMAX Plastic Mold Material

Category : Metal , Ferrous Metal , Alloy Steel , Chrome-moly Steel

Material Notes:

CALMAX is a chromium-molybdenum-vanadium alloyed steel characterized by: High toughness Good wear resistance Good through hardening properties Good dimensional stability in hardening Good polishability Good weldability Good flame and induction hardenability Applications: Cold work applications: General blanking and forming, heavy duty blanking and forming, deep drawing, coining, cold extrusion dies with complicated geometry, rolls, shear blades, prototype tooling. Plastic moulding applications: Long run moulds, moulds for reinforced plastics, moulds for compression molding.

Order this product through the following link:

http://www.lookpolymers.com/polymer_Assab-Steels-CALMAX-Plastic-Mold-Material.php

Physical Properties	Metric	English	Comments
Density	7.78 g/cc	0.281 lb/in ³	
	7.64 g/cc	0.276 lb/in ³	
	@Temperature 400 °C	@Temperature 752 °F	
Density	7.72 g/cc	0.279 lb/in ³	
	@Temperature 200 °C	@Temperature 392 °F	

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	200	200	hardness supplied.
Hardness, Rockwell C	43	43	tempering temperature (2h + 2h) 600°C (1110°F)
	54	54	tempering temperature (2h + 2h) 400°C (750°F)
Hardness, Rockwell C	58	58	Hardness as a function of austenitizing temperature. 900°C (1650°F) Austenitizing temperature
	59	59	tempering temperature (2h + 2h) 200°C (390°F)
Hardness, Rockwell C	62	62	Hardness before tempering at 950°C (1740°F) Austenitizing temperature: Holding time: 30 minutes.
	63	63	Hardness before tempering at 960°C (1760°F) Austenitizing temperature: Holding time: 30 minutes.
Hardness, Rockwell C	63	63	Hardness as a function of austenitizing temperature. 960°C (1785°F) Austenitizing temperature
	64	64	Hardness before tempering at 970°C (1780°F) Austenitizing temperature: Holding time: 30 minutes.

Mechanical Properties	Metric	English	Comments
Modulus of Elasticity	194 GPa	28100 ksi	
	178 GPa	25800 ksi	
	@Temperature 400 °C	@Temperature 752 °F	
	188 GPa	27300 ksi	
	@Temperature 200 °C	@Temperature 392 °F	
Compressive Yield Strength	1900 MPa	276000 psi	Rc0.2. Hardness HRC 56.
	2000 MPa	290000 psi	Rc0.2. Hardness HRC 58.
	2100 MPa	305000 psi	Rc0.2. Hardness HRC 60.
Compressive Strength	2300 MPa	334000 psi	Rcm. Hardness HRC 56.
	2500 MPa	363000 psi	Rcm. Hardness HRC 58.
	2700 MPa	392000 psi	Rcm. Hardness HRC 60.
Fracture Toughness	29.0 - 32.0 MPa-m ^{1/2}	26.4 - 29.1 ksi-in ^{1/2}	tempering range 200-450°C (390-842°F) respectively. Hardened at 960°C (1760°F). Quenched in air. Tempered twice.
Charpy Impact	12.0 J	8.85 ft-lb	tempering at 300°C (570°F). Hardened at 960°C (1760°F). Quenched in air. Tempered twice.
	15.0 J	11.1 ft-lb	tempering at 450°C (842°F). Hardened at 960°C (1760°F). Quenched in air. Tempered twice.
	32.0 J	23.6 ft-lb	tempering at 600°C (1110°F). Hardened at 960°C (1760°F). Quenched in air. Tempered twice.

Thermal Properties	Metric	English	Comments
CTE, linear	11.7 µm/m-°C	6.50 µin/in-°F	
	@Temperature 20.0 °C	@Temperature 68.0 °F	
	12.0 µm/m-°C	6.67 µin/in-°F	
	@Temperature 20.0 - 200 °C	@Temperature 68.0 - 392 °F	
	13.0 µm/m-°C	7.22 µin/in-°F	
	@Temperature 20.0 - 400 °C	@Temperature 68.0 - 752 °F	
Specific Heat Capacity	0.456 J/g-°C	0.109 BTU/lb-°F	
	@Temperature 20.0 °C	@Temperature 68.0 °F	

Thermal Properties	0.527 J/g-°C Metric	0.125 BTU/lb-°F English	Comments
	@Temperature 200 °C	@Temperature 392 °F	
	0.607 J/g-°C	0.145 BTU/lb-°F	
	@Temperature 400 °C	@Temperature 752 °F	
Thermal Conductivity	3.89 W/m-K	27.0 BTU-in/hr-ft ² -°F	
	@Temperature 200 °C	@Temperature 392 °F	
	4.61 W/m-K	32.0 BTU-in/hr-ft ² -°F	
	@Temperature 400 °C	@Temperature 752 °F	

Component Elements Properties	Metric	English	Comments
Carbon, C	0.60 %	0.60 %	
Chromium, Cr	4.5 %	4.5 %	
Iron, Fe	93.05 %	93.05 %	
Manganese, Mn	0.80 %	0.80 %	
Molybdenum, Mo	0.50 %	0.50 %	
Silicon, Si	0.35 %	0.35 %	
Vanadium, V	0.20 %	0.20 %	

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