

Schmolz + Bickenbach Thermodur® E38K Hot Work Die Steel

Category : Metal , Ferrous Metal , Tool Steel , Hot Work Steel

Material Notes:

Description: Thermodur® E38K is an electro slag remelted (ESR) modified H-11 die steel, developed for hot working applications where maximum mechanical strength (toughness) properties are required. Characteristics: Superior toughness; Excellent hardenability; Good thermal conductivity; and Good polishability Applications: Large high pressure die casting dies, Large hot forging dies and Aluminum extrusion tooling Stress Relieving (Heat Treatment): 1200°F for 2 hours; Cooling: Cool slowly to 930°F in air; Hardness:

Order this product through the following link:

http://www.lookpolymers.com/polymer_Schmolz-Bickenbach-Thermodur-E38K-Hot-Work-Die-Steel.php

Physical Properties	Metric	English	Comments
Density	7.78 g/cc	0.281 lb/in ³	

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell C	34	34	
	@Treatment Temp. 700.0 °C, Time 7200 sec	@Treatment Temp. 1292 °F, Time 2.00 hour	
	47	47	
	@Treatment Temp. 650.0 °C, Time 7200 sec	@Treatment Temp. 1202 °F, Time 2.00 hour	
	50	50	
	@Treatment Temp. 600.0 °C, Time 7200 sec	@Treatment Temp. 1112 °F, Time 2.00 hour	
	51	51	
@Treatment Temp. 400 °C, Time 7200 sec	@Treatment Temp. 752 °F, Time 2.00 hour		
51	51		
@Treatment Temp. 500 °C, Time 7200 sec	@Treatment Temp. 932 °F, Time 2.00 hour		
52	52		
@Treatment Temp. 550.0 °C, Time 7200 sec	@Treatment Temp. 1022 °F, Time 2.00 hour		
Tensile Strength	1410 MPa	204000 psi	44 HRC
	1620 MPa	235000 psi	48 HRC

Mechanical Properties	Metric 1810 MPa	English 262000 psi	Comments 52 HRC
Tensile Strength, Yield	1170 MPa	169000 psi	44 HRC
	@Strain 0.200 %	@Strain 0.200 %	
	1300 MPa	188000 psi	48 HRC
	@Strain 0.200 %	@Strain 0.200 %	
	1450 MPa	210000 psi	52 HRC
	@Strain 0.200 %	@Strain 0.200 %	
Elongation at Yield	12 %	12 %	52 HRC
	13 %	13 %	48 HRC
	14 %	14 %	44 HRC
Reduction of Area	35 %	35 %	52 HRC
	38 %	38 %	48 HRC
	50 %	50 %	44 HRC

Thermal Properties	Metric	English	Comments
CTE, linear	11.9 $\mu\text{m/m}\cdot\text{Å}^\circ\text{C}$	6.60 $\mu\text{in/in}\cdot\text{Å}^\circ\text{F}$	
	@Temperature 21.1 - 93.3 $\text{Å}^\circ\text{C}$	@Temperature 70.0 - 200 $\text{Å}^\circ\text{F}$	
	12.4 $\mu\text{m/m}\cdot\text{Å}^\circ\text{C}$	6.90 $\mu\text{in/in}\cdot\text{Å}^\circ\text{F}$	
	@Temperature 21.1 - 204 $\text{Å}^\circ\text{C}$	@Temperature 70.0 - 400 $\text{Å}^\circ\text{F}$	
	12.8 $\mu\text{m/m}\cdot\text{Å}^\circ\text{C}$	7.10 $\mu\text{in/in}\cdot\text{Å}^\circ\text{F}$	
	@Temperature 21.1 - 399 $\text{Å}^\circ\text{C}$	@Temperature 70.0 - 750 $\text{Å}^\circ\text{F}$	
Thermal Conductivity	24.2 W/m-K	168 BTU-in/hr-ft $\text{Å}^2\cdot\text{Å}^\circ\text{F}$	
	@Temperature 21.1 $\text{Å}^\circ\text{C}$	@Temperature 70.0 $\text{Å}^\circ\text{F}$	
	27.2 W/m-K	189 BTU-in/hr-ft $\text{Å}^2\cdot\text{Å}^\circ\text{F}$	
	@Temperature 343 $\text{Å}^\circ\text{C}$	@Temperature 650 $\text{Å}^\circ\text{F}$	
	30.3 W/m-K	210 BTU-in/hr-ft $\text{Å}^2\cdot\text{Å}^\circ\text{F}$	
	@Temperature 704 $\text{Å}^\circ\text{C}$	@Temperature 1300 $\text{Å}^\circ\text{F}$	

Component Elements Properties	Metric	English	Comments
Carbon, C	0.35 %	0.35 %	
Chromium, Cr	5.0 %	5.0 %	
Iron, Fe	>= 92.547 %	>= 92.547 %	
Manganese, Mn	0.30 %	0.30 %	
Molybdenum, Mo	1.35 %	1.35 %	
Silicon, Si	0.30 %	0.30 %	
Sulfur, S	<= 0.0030 %	<= 0.0030 %	
Vanadium, V	0.45 %	0.45 %	

Processing Properties	Metric	English	Comments
Annealing Temperature	740.6 - 779.4 Â°C	1365 - 1435 Â°F	Soft; Cooling: Furnace 20Â°F/hour to 1200Â°F/ Then air cool; < 170 HB

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