

## Bohler-Uddeholm UDDEHOLM Caldie Plastic Mold Tool Steel

Category : Metal , Ferrous Metal , Tool Steel , Mold Steel

### Material Notes:

Description: Uddeholm Caldie is a chromium-molybdenumvanadium alloyed tool steel. Uddeholm Caldie which is characterized by: Very good chipping and cracking resistance Good wear resistance High hardness (>60 HRC) after high temperature tempering Good dimensional stability in heat treatment and in service Excellent through-hardening properties Good machinability and grindability Excellent polishability Good surface treatment properties Good resistance to tempering back Very good WEDM properties Applications: Uddeholm Caldie is suitable for short to medium run tooling where chipping and/or cracking are the predominant failure mechanisms and where a high compressive strength (hardness of over 60 HRC) is necessary. This makes Uddeholm Caldie an excellent problem solver for severe cold work applications where the combination of a hardness above 60 HRC and a high cracking resistance is of utmost importance e.g. as in the blanking and forming of ultra high strength steel sheets. Uddeholm Caldie is also very suitable as a substrate steel for applications where surface coatings are desirable or necessary Cold Work Applications: Blanking applications where high ductility and toughness are needed to prevent chipping/cracking Cold forging and forming operations where a high compressive strength combined with good resistance to chipping/cracking are necessary Machine knives Thread rolling dies Substrate for surface coatings

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Physical Properties	Metric	English	Comments
Density	7.82 g/cc	0.283 lb/in <sup>3</sup>	

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	215	215	Soft annealed
Hardness, Rockwell C	60 - 62	60 - 62	typical range of use after hardening/tempering
Modulus of Elasticity	180 GPa	26100 ksi	Hardened and tempered to 60-62 HRC
	@Temperature 400 °C	@Temperature 752 °F	
	192 GPa	27800 ksi	Hardened and tempered to 60-62 HRC
	@Temperature 200 °C	@Temperature 392 °F	
Compressive Strength	213 GPa	30900 ksi	Hardened and tempered to 60-62 HRC
	@Temperature 20.0 °C	@Temperature 68.0 °F	
	2230 - 2430 MPa	323000 - 352000 psi	Rc0.2; varies with tempering. This range is for HRC between 58 and 61.

Thermal Properties	Metric	English	Comments
CTE, linear	11.6 µm/m-°C	6.44 µin/in-°F	Hardened and tempered to 60-62 HRC
	@Temperature 20.0 - 200 °C	@Temperature 68.0 - 392 °F	

Thermal Properties	Metric J/g·m/m-°C	English BTU/lb/in-°F	Comments
	@Temperature 20.0 - 400 °C	@Temperature 68.0 - 752 °F	Hardened and tempered to 60-62 HRC
Specific Heat Capacity	0.460 J/g-°C	0.110 BTU/lb-°F	Hardened and tempered to 60-62 HRC
Thermal Conductivity	24.0 W/m-K @Temperature 200 °C	167 BTU-in/hr-ft <sup>2</sup> -°F @Temperature 392 °F	Hardened and tempered to 60-62 HRC
	28.0 W/m-K @Temperature 400 °C	194 BTU-in/hr-ft <sup>2</sup> -°F @Temperature 752 °F	Hardened and tempered to 60-62 HRC

Component Elements Properties	Metric	English	Comments
Carbon, C	0.70 %	0.70 %	
Chromium, Cr	5.0 %	5.0 %	
Iron, Fe	90.8 %	90.8 %	As Balance
Manganese, Mn	0.50 %	0.50 %	
Molybdenum, Mo	2.3 %	2.3 %	
Silicon, Si	0.20 %	0.20 %	
Vanadium, V	0.50 %	0.50 %	

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