METAL MATERIAL DATASHEET

KingStarMold

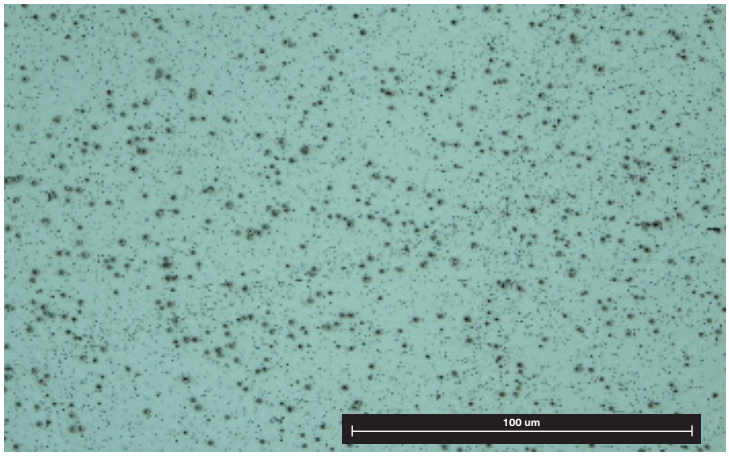
D2v2

TOOL STEEL

Other Designations: DIN 12379, ASTM A681, UNS T30402, BD 2

D2 Tool Steel is a high carbon, high chromium air-hardening tool steel that can be heat treated to high hardness and compressive strength. D2 Tool Steel offers excellent wear resistance and is widely used in cold work applications that require sharp edges, abrasion resistance, and compressive strength. **KingStar** D2 Tool Steel meets chemical requirements of ASTM A681.

Composition	Weight%
Chromium	11-13
Carbon	1.4-1.6
Molybdenum	0.7-1.2
Vanadium	0.5-1.1
Nickel + Copper	0.75 max
Manganese	0.1-0.6
Silicon	0.1-0.6
Phosphorus	0.03
Sulfur	0.03
Iron	bal



Physical Properties	Test	KingStar Heat-Treated	Wrought Heat-Treated
0.2 Compressive Yield Strength [MPa]	ASTM E9	1714	2200
Elastic Modulus [GPa]	ASTM E9	178	210
Hardness[3,5]	ASTM E18	55	62
Relative Density[4]	ASTM B923	97	100

Heat Treatment

D2 Tool Steel can be heat-treated to increase hardness and durability after an optional annealing step and machining work. KingStar recommends heat-treating D2 Tool Steel to optimize material properties for target applications.

1. Slowly heat to 760°C (1400°F), hold at temperature for 30 minutes minimum.
2. Heat to 1040°C (1904°F). Hold part at temperature for 30-45 minutes.
3. Air quench part to below 65°C (150°F).
4. Temper part. For each temper, heat part to 200°C (392°F) and temper for 30 minutes. If double tempering, let part cool to room temperature between tempers. Note: Higher temperature tempers may also be used — which will increase toughness but reduce hardness.

1. KingStar heat-treated D2 Tool Steel was heated to 1040°C (1904°F) and single tempered at 200°C (392°F) for 30 minutes.
2. Wrought heat treatment data from Bohler-Uddeholm.
3. KingStar hardness was measured on sample coupons that were printed with solid fill.
4. Relative density for D2 Tool Steel assumes a density of 7.7 g/cm^3.
5. As-sintered hardness can vary significantly based on furnace loading and ambient environment. KingStar recommends post-sinter heat treatment for maximum hardness and compression strength.

These data represent typical values for KingStar D2 Tool Steel v2. KingStar samples were printed with solid fill. Density data was tested in house, and all other data were tested and confirmed by outside sources. These representative data were tested, measured, or calculated using standard methods and are subject to change without notice. KingStar makes no warranties of any kind, express or implied.