

WHEN PERFORMANCE IS EVERYTHING

POWDER ALLOYS FOR TOOL AND HIGH SPEED STEEL APPLICATIONS

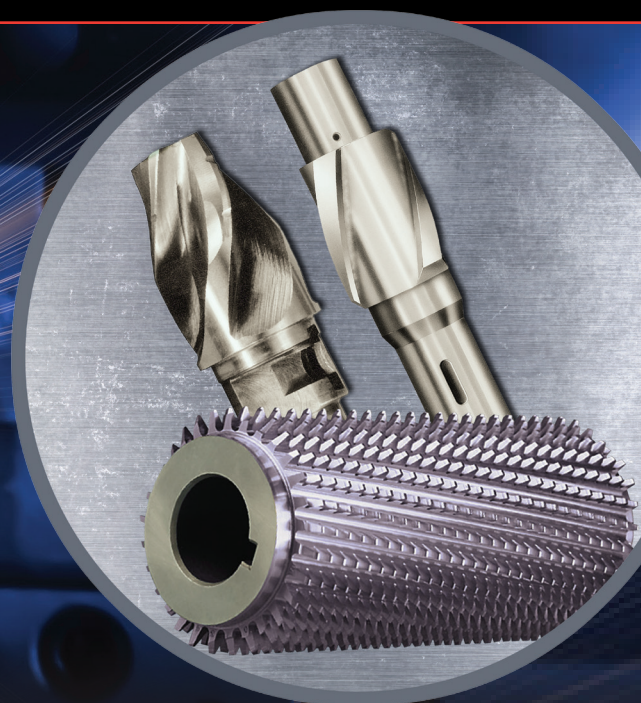
Manufacturers require tool and high speed steels with durability and reliability, but performance is only as good as the materials.

Alloys for hot and cold forming tools, fabricating tools, shaping tools, cutting tools, blades, drill bits, and other applications require materials with specific combinations of hardness, wear resistance, toughness, corrosion resistance, and edge retention, often at elevated temperatures. Evaluating and choosing the right alloy for the job is essential for optimum performance.

Your Solutions Partner

The leading provider of metal powders, Carpenter has both the capability and capacity to provide materials solutions for your design challenges. CarTech® Micro-Melt® powder alloys offer a homogeneous, fine, and super clean microstructure that provide many improvements and benefits over cast-wrought products.

- Improved machinability in the annealed condition
- Improved grindability in the hardened and tempered condition
- Improved cutting performance
- Increased tool life



Strategically Located, At Your Service

As the only major powder metals manufacturer with production facilities in both North America and Europe, we supply customers in a timely and cost-effective manner.

Our materials experts can provide guidance on materials selection, machine optimization, or development of custom solutions to meet your specifications. With Carpenter, you have access to:

- Broad portfolio of metal powder grades
- Highest quality standards for performance applications
- Technical expertise to provide complete life cycle solutions.

To learn more about how our metal powders can help maximize your company's performance, contact Carpenter today.

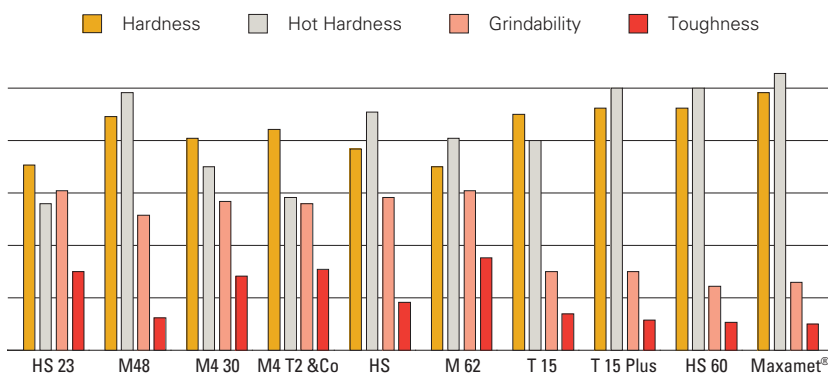
Carpenter produces many Tool and Die Steel grades. Those listed here are some of our most requested grades. Customized compositions can be developed to your specifications.

We offer a number of standard powder packaging options, including:

- Bottles (5 kg)
- Buckets (25 kg)
- Drums (100-250 kg)

Customized packaging and labeling are also available; please ask.

Micro-Melt® Powder High-Speed Steels Comparative Properties



Nominal Chemistries, Applications, and Comparable Alloys (additional alloys are available)

CarTech® Micro-Melt® Powders	Nominal Chemical Composition (Typ. Wt. %)							International Codes		
	C	Cr	Mo	W	Co	V	Other	UNS	W Nr	AISI
High Speed Steels										
CarTech Micro-Melt HS-23	1.20	4.00	4.90	6.20	—	2.90	—	T11323	1.3344	M3
CarTech Micro-Melt M3 Class 2	1.25	4.00	6.00	6.25	—	3.00	S: 0.07, Mn: 0.30, Si: 0.40, Fe: Bal.	T11323	—	M3-2
CarTech Micro-Melt M4	1.35	4.30	5.00	5.60	—	4.10	—	T1304	—	M4
CarTech Micro-Melt M42	1.10	3.75	9.50	1.50	8.25	1.15	S: 0.06, Mn: 0.30, Si: 0.60, Fe: Bal	T11342	—	M42
CarTech Micro-Melt M48	1.55	4.00	5.25	10.00	9.00	3.10	—	T11348	—	M48
CarTech Micro-Melt M62	1.30	3.75	10.50	6.25	—	2.00	—	T11362	—	M62
CarTech Micro-Melt T15	1.55	4.00	—	12.00	5.00	5.00	—	T2015	1.3202	T15
CarTech Micro-Melt T15 Plus	1.60	4.80	2.00	10.50	8.00	5.00	—	—	—	—
CarTech Micro-Melt HS-30	1.30	4.20	5.10	6.40	8.50	3.20	—	—	1.3207	—
CarTech Micro-Melt HS-60	2.30	4.00	6.90	6.40	10.30	6.40	—	—	1.3241	—
CarTech Micro-Melt Maxamet®	2.15	4.75	—	13.00	10.00	6.00	—	—	—	—
Cold Work Tool Steels										
CarTech Micro-Melt A11	2.45	5.30	1.30	—	—	9.80	—	T30111	—	A11
CarTech Micro-Melt A11-LVC	1.85	5.30	1.30	—	—	9.00	—	—	—	—
CarTech Micro-Melt CD#1	0.70	8.25	1.40	—	—	1.00	Si: 1.0, Ni: 1.5, Mn: 0.40, N: 0.09, Fe: Bal.	—	—	—
CarTech Micro-Melt PD#1	1.10	7.75	1.60	1.10	—	2.35	—	—	—	—
CarTech Micro-Melt 420 CW	2.25	12.80	1.30	—	—	9.25	S: 0.30, Mn: 0.50, Fe: Bal	—	—	—
CarTech Micro-Melt 440C	0.95-1.20	16.0-18.0	0.75	—	—	—	P: 0.04, Si: 1.0, Mn: 1.0, S: 0.03, Fe: Bal	S44004	—	—
CarTech Micro-Melt 440-XH	1.60	16.0	0.80	—	—	0.45	Si: 0.40, Ni: 0.35, Mn: 0.50, Fe: Bal	—	—	—
CarTech Micro-Melt 20-4	1.90	20.00	1.00	0.65	—	4.00	Mn: 0.35, Fe: Bal	—	—	—
Ultra-High Combined Strength and Toughness Alloy										
CarTech Micro-Melt AerMet® for-Tooling	0.25	3.10	1.20	—	13.40	Ni: 11.10	—	K2580	—	—
Hot Work Tool and Die Steel										
CarTech Micro-Melt Pyrotool® 7	0.05	19.00	3.00	—	—	—	Cb & Ta: .25, Ni & Co: 52.50, Ti: 1.00, Al: .60	N07718	—	—

The information and data presented herein are typical or average values and are not a guarantee of maximum or minimum values. Applications specifically for material described herein are made solely for the purpose of illustration to enable the reader to make his or her own evaluation and are not intended as warranties, either express or implied, of fitness for these or other purposes. There is no representation that the recipient of this literature will receive updated editions as they become available. Registered trademarks are the property of CRS Holdings, Inc.



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