Technical Datasheet

CarTech® Micro-Melt® M62 Alloy

Type Analysis

Single figures are nominal except where noted.

Carbon (Maximum)	1.30 %	**Manganese**	0.70 %
Sulfur (Maximum)	0.050 %	**Silicon**	0.60 %
Chromium (Maximum)	3.75 %	**Molybdenum**	10.50 %
Vanadium	2.00 %	**Tungsten**	6.25 %
Iron	Balance		

In addition, the alloy can be produced with increased sulfur levels, up to 0.30%, for tools requiring improved machinability.

General Information

(Equivalent in hardness, heat treating response and wear resistance to CPM* REX* 20)
*CPM and REX are trademarks of Crucible Materials Corporation.

Description

CarTech Micro-Melt M62 alloy is a high speed powder metal tool steel capable of reaching hardnesses in excess of HRC 67 without the use of cobalt. The alloy provides performance similar to AISI Type M42 in terms of hot hardness and heat treatment response. In addition, the alloy provides good toughness and excellent abrasion resistance.

Applications

CarTech Micro-Melt M62 alloy may be considered for many types of tooling applications where a combination of good hot hardness, toughness, and abrasion resistance is required.

Possible applications for this alloy may include:
Hobs
Punches
Form Tools
End Mills
Milling Cutters
Thread Roll Dies
Taps
Broaches

Properties

Physical Properties

Specific Gravity	8.17	
Density	0.2950	lb/in³
Modulus of Elasticity (E)	34.0	x 10 ³ ksi

Typical Mechanical Properties

Hot Hardness

The hot hardness of Micro-Melt M62 alloy is similar to that of AISI Type M42.

Toughness

The toughness of Micro-Melt M62 is quite good, and significantly better than that of conventional AISI Type M42 at similar hardness levels.

Heat Treatment

Decarburization

Being a molybdenum-containing high speed steel, Micro-Melt M62 alloy is susceptible to decarburization during hardening; however, a controlled atmosphere furnace should insure that there is no decarburization during heat treatment. Salt bath or vacuum furnace treating is preferred for this alloy.

Annealing

Suitable precautions should be taken to prevent excessive decarburization or carburization.

Heat slowly to 1550/1600ºF (843/871ºC), hold until the entire mass is heated through, and cool slowly (do not exceed 20 ºF [11ºC] per hour) in the furnace to about 1000ºF (538ºC), after which the cooling rate may be increased. The annealed hardness should be approximately BHN 262/285 (HRC 26/31).

Hardening

Preheat at 1500/1550ºF (816/843ºC) long enough to ensure a thorough soak. Austenitize at 2100/2200ºF (1149/1204ºC) for 3-10 minutes, then air, oil, or salt quench. For oil quenching, an interrupted quench is recommended. Parts should be oil quenched to approximately 1000ºF (538ºC), removed from the bath, and air cooled. Similarly, parts may be quenched into a salt bath held at 1000ºF (538ºC), equalized, and air cooled. Vacuum furnaces with positive pressure quench capability can be used, but resultant hardness may be approximately 1-2 points HRC lower than that obtained with other heat treating methods. Parts should be allowed to cool to below 150ºF (66ºC) prior to tempering.

Stress Relieving

To relieve the stresses of machining, heat slowly to 1150/1250ºF (621/677ºC), hold 1 to 2 hours, then cool in still air.

Tempering

Tools should be tempered immediately after the completion of the quench. The tempering temperature may be varied according to the desired hardness, but is usually in the range 1000/1100ºF (538/593ºC). A triple temper is required to ensure the elimination of excessive retained austenite. Each temper should be 2 hours at temperature, with parts cooled to room temperature between tempers.

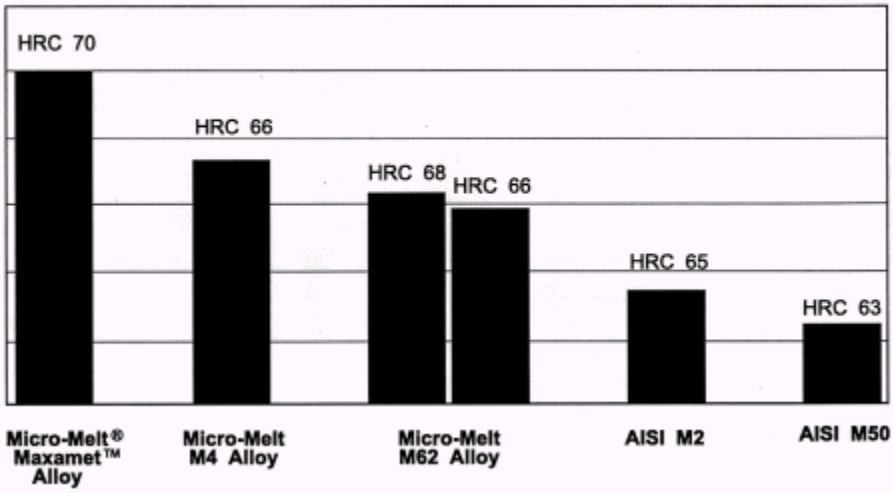
Hardness Results—Carpenter Micro-Melt M62 Alloy
All samples were preheated at 1550°F (843°C), austenitized 5 minutes in salt at the indicated temperature, oil quenched and tempered at the indicated temperature for 2 hours + 2 hours + 2 hours. Vacuum hardening may result in slightly lower hardness values.

Tempering Temperature		Hardening Temperature		
°F	°C	2100°F (1149°C)	2150°F (1177°C)	2200°F (1204°C)
As-quenched		66.0	65.0	63.0
1000	538	66.5	67.5	68.0
1025	552	66.0	67.5	68.0
1050	566	64.5	66.5	67.5
1100	593	62.5	64.5	65.5

Other Information

Wear Resistance

Relative Wear Resistance of High Speed Steels—Carpenter Micro-Melt M62 Alloy
Typical working hardness as shown.



Forms Manufactured

- Bar-Flats
- Bar-Squares
- HIP'd Shapes
- Bar-Rounds
- Billet
- Powder

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