



REX M2®(S) (AISI M2)

CRUCIBLE DATA

REX M2 is a tungsten-molybdenum high speed steel which gives outstanding performance in all operations where a general purpose high speed steel is required. REX M2 has a wide hardening range, excellent toughness, with good wear and red hardness characteristics. REX M2S is the sulfur-bearing counterpart of REX M2. The sulfur addition provides good grindability and an improvement in machinability of 25 to 35 per cent over a comparable nonsulfurized grade.

Typical Chemistry

Carbon	0.85%
Manganese	0.30%
Silicon	0.30%
Chromium	4.15%
Vanadium	1.95%
Tungsten	6.40%
Molybdenum	5.00%
Sulfur	0.03% max. (0.10%)

Typical Applications

Broaches	Milling Cutters
Counterbores	Punches
End Mills	Taps
Form Tools	Tool Bits

Annealed Hardness: 217/255 BHN

Machinability in the annealed condition is approximately 45% of W1 Tool Steel (1%C).

Thermal Treatments

Critical Temperature: 1530F(830C).

Forging: 2075F(1135C) Do not forge below 1700F(925C). Slow cool after forging.

Annealing: 1600F(870C), hold 2 hours, slow cool 25F(15C)/ hr max. to 1000F(535C), then air or furnace cool. Hardness BHN 217/255. Stress Relieving: 1100-1300F(595-740C), hold 2 hrs. and air or furnace cool.

Straightening: Best done warm 400-800F(205-425C.)

Hardening: (Salt Baths or Vacuum Furnace preferred.)

Preheat: 1500-1550F(815-845C), equalize.

High Heat: 2100-2225F(1150-1220C), soak 2 to 5 minutes. For vacuum hardening, use the high side of the high heat range and soak times.

Quench: Salt or oil to 1000-1100F(540-595C), equalize, then air cool to hand warm, 150F(65C). Temper immediately. The vacuum quench rate to below 1000F(540C) is critical to achieve comparable results.

Temper: Tempering at 1000F(540C) or higher 2 times for at least 2 hours at temperature is recommended. Air cool to room temperature between tempers.

Hardening Data

Oil quenched.

**Chemistries
& Properties
Table**

**Heat
Treatments
Table**

Tempering Temperature		Hardness HRC		
°F	°C	2100F (1150C)	2150F (1175C)	2250F (1230C)
975	524	64	65	66
1000	540	64	65.2	66.8
OPTIMUM FOR MAXIMUM TOUGHNESS AND EFFECTIVE STRESS-RELIEVING.				
1025	550	63.5	65.1	66.8
1050	565	62.6	64.8	66
1075	580	61.3	64	65
1100	595	60	62.5	64
1125	605	58.4	60.5	62.4
1150	620	57	58	60.9
1175	635	–	–	59
1200	650	–	–	57

Size Change During Hardening

Hardening Temp.		Tempering Temp.		HRC	Longitudinal Size Change %
°F	°C	°F	°C		
2200	1204	1025	552	65	+0.22

Surface Treatments

REX M2 can be nitrided, steam tempered or titanium-nitride coated if desired. If the CVD TiN treatment is used, care is required in vacuum hardening.

Physical Properties

Modulus of Elasticity30 psi

x 10⁶ (207 GPa)

Specific gravity

.....8.14

Density0.294

lb/in³ (8144 kg/m³)

Coefficient of Thermal Expansion

Temperature Range		Coefficient of Thermal Expansion	
°F	°C	in/in/°F x 10 ⁻⁶	mm/mm/°C x 10 ⁻⁶
70- 500	21-260	6.40	11.5

70- 800	21-425	6.58	11.8
70-1000	21-540	6.72	12.1

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