

GATEWAY M-2

High Speed Tool Steel

Gateway M-2 is a tungsten-molybdenum high speed tool steel. It has a wider heat treat range than most of the high speed steels, and has a resistance to decarburization. It offers an excellent combination of good red hardness, toughness and wear resistance.

Typical Chemistry

Carbon	.85		Chromium	4.0
Manganese	.30		Vanadium	2.0
Silicon	.30		Molybdenum	5.0
Tungsten	6.0		Phosphorus	.030 max
Sulfur	.30 max			

Applications

Gateway M-2 is suitable for use in high speed tooling applications requiring a combination of good red hardness, toughness and wear resistance. Typical applications include drills, taps, punches, reamers, broaches, planer knives, lathe tools, form cutters, milling cutters, end mills and gear cutters.

Annealing

Heat slowly to 1600 F, and hold for uniformity, cool at a rate of 30 F per hour to 900 F, then air cool. Expected BHN 241 max.

Heat Treating

Preheat slowly to 1550 F, soak until uniformly heated, and heat rapidly to 2250 F-2250F. Heating vary from a few minutes to a maximum of 15 minutes, depending on the size of the tool. Cool in air, oil or a molten salt bath operating at 1000 F-1100 F. In case of oil quenching, it is usually good practice to interrupt the quench by removing the tool after it has reached about 1000 F, and allow the cooling to continue in still air. Tools should be allowed to cool to 150 F, or when they can be held by the bare hand and then tempered immediately.

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Tempering

A tempering range of 1000 F - 1050 F is recommended. Parts should be held a minimum of 2 hours per inch of thickness. Double tempering is recommended. The following tempering table may be used as a guide. 1" dia specimens were used for this test, it may be found that heavier sections are several points lower. Table is based on 2250 F hardening temperature.

Tempering Temperature (F)	Oil Quenched Hardness (hrc)	Air Quenched Hardness (hrc)
300	65.0	65.0
400	64.0	63.0
500	63.0	62.5
600	62.5	62.5
700	63.0	62.5
800	63.5	63.5
850	63.5	63.5
900	65.0	64.0
950	66.0	65.0
1000	66.0	65.5
1050	66.0	63.5
1100	64.5	61.5
1150	62.0	60.0
1200	53.5	53.0
1300	43.0	39.5

Note: Variations in section size, heating rate, soak time, quench rate and tempering will cause deviations from the above values. Gateway Metals should be consulted for specific applications.

Gateway Metals

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