

## ***GATEWAY P-20 MQ/FM***

### **Prehardened Mold Quality P-20 Modified Tool Steel**

**Gateway P-20 MQ/FM** is supplied in the prehardened condition. Special melting and refining practices are utilized to produce a uniform product with exceptional cleanliness. These characteristics allow Gateway P-20 MQ/FM to be polished to an extremely high finish required for plastic molding. The material is tested to rigorous tool steel standards to ensure uniformity of structure and freedom from defects.

Gateway P-20 MQ/FM provides substantially improved machinability while retaining full capability for plastic mold applications, holder blocks and mechanical applications.

Gateway P-20 MQ/FM is supplied prehardened to 269/321 BHN. The balanced alloy composition ensures a very uniform cross-sectional hardness.

### **Typical Chemistry**

Carbon	.36/.42		Manganese	1.10/1.30
Phosphorus	.010 max		Sulfur	.010/.022
Silicon	.35/.45		Chromium	1.0/1.20
Molybdenum	.15/.35		Nickel	.25/.50
Oxygen	.002 max		Hydrogen	.0002 max

### **Stress Relief**

Heat slowly and uniformly to 800/900degrees F, and soak one hour per inch of section thickness. Air cool or furnace cool to room temperature.

### **Annealing**

It is recommended that Gateway P-20 MQ/FM be annealed prior to rehardening. Heat slowly and uniformly to 1500/1600 degrees F for four hours. Cool slowly (50 degrees F per hour max) to 1200 degrees F, and air cool.

### **Heat Treating**

Gateway P-20 MQ/FM may be heat treated to higher hardness levels for higher strength. Pre-heat to 1250 degrees F, and hold one hour. Heat to 1500/1600 degrees F, and soak one half hour when material is up to temperature. Oil quench or air cool to hand warm (approximately 150 degrees F), and temper immediately.

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### **Tempering**

Temper one hour per inch of section thickness to desired hardness. Representative hardness levels after tempering are tabulated below.

Oil Quenched from 1600 degrees F - Tempered 4 hours		
(Section Size - 4" X 4")		
Tempering Temperature (F)		Hardness (RC)
400		42
500		41
600		40
700		39
800		37
900		36
1000		34
1100		29
1200		25

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.

### **EDM**

Electro-discharge machining is widely used in the production of plastic molds and other tooling. However, this operation produces recast, rehardened, and retempered layers on the die surface. It is recommended that Gateway P-20 MQ/FM be stress relieved after electro-discharge machining to temper the rehardened layer produced by EDM.

### **Nitriding**

Gateway P-20 MQ/FM may be nitrided to a surface hardness in excess of RC 60 for improved wear resistance.