Gateway Metals Inc.

DATA SHEET

GATEWAY 420 MQ

Stainless Plastic Mold Steel

Gateway 420 MQ is a highly-refined, Mold Quality stainless steel exhibiting excellent polishability, good corrosion resistance, and good wear resistance. The material is melted using an electric-arc furnace, is refined by the argon-oxygen-decarburation (AOD) process, and is further enhanced to aerospace quality levels using Vacuum -Arc or Electro-Slag Remelting. These special melting and forging practices result in ultra-high microcleanliness and a homogeneous microstructure.

Gateway 420 MQ is a superior material for the manufacture of plastic molds that require high hardness for good parting line retention and sealing between colored resins. The corrosion resistance also enhances extended tool storage in humid environments. The high cleanliness and homogeneity make this material a superb choice for mold cavities that require photoetching/texturing or the highest, lens-quality polished finishes.

Typical Chemistry

Carbon	.38		Molybdenum	.20
Manganese	.50		Sulfur	.003 max
Silicon	.50		Phosphurus	.015 max
Chromium	13.60		Oxygen	20 ppm max
Vanadium	.30		Hydrogen	2 ppm max.

Applications

Gateway 420 MQ is suitable for use in plastic injection, compression and transfer molding where rusting or pitting of the mold may be a problem, and molds for abrasive filled plastics requiring improved wear resistance compared to other mold steels.

Annealing

Performed after hot working and before rehardening. Heat at a rate not exceeding 400 F per hour to 1525-1625 F and hold at temperature for I hour per inch of maximum thickness; 2 hours min. Cool slowly with furnace at a rate not exceeding 40 F per hour to 1000F. Continue cooling in ambient temperature in the furnace or in air. Resultant hardness should be 235 BHN max.

Stress Relieving

To improve dimensional stability in hardening, it is recommended to stress releive tools after rough machining and prior to heat treating. Stress relieve annealed tools at 1200-1250 F, equalize, hold for 2 hours and air cool.

After EDM machining, it is important to stress relieve at 50 F per minute below final tempering temperature. Likewise, finished tools may be stress relieved after final fitting, polishing, etc..., 50 F below the final tempering temperature.

Heat Treating

To minimize distortion, double preheat complex tools. Heat at a rate not exceeding 400 F per hour to 1150-1250 F, equalize, then raise to 1400-1500 F and equalize. Normal tools should use the second temperature range as a single preheating treatment. Heat rapidly from preheat to a HH range between 1850 - 1920 F. Hardness needed will determine HH temperature used. Soak at temperature for 30 minutes min. for sections up to 5" thick. Add an additional 10 minutes of soak time for each additional inch of thickness. Quench in air, pressurized gas or warm oil. Typically sections up to 5" thick will fully harden with air. Sections greater then 5" will require excellerated cooling using forced air, pressurized gas, or an interrupted oil

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Heat Treating (continued)

quench to obtain maximum hardness, corrosion resistance and toughness.

Pressurized Gas - min. quench rate of 30 F per minute down to 1000 F.
Oil - quench until black, about 900 F then cool in still air to 150-125 F.

Tempering

Double temper the tool at once upon cooling to hand-warm. 550-750 F is recommended for best results. Hold at temperature 1 hour per inch of thickness, but not less than 4 hours.

	Hardened From:		
Tempered	1850 F	1880 F	1920 F
550 F	49.5	51	52
650 F	49.5	51	52
750 F	50.5	51.5	53.5
800 F	51	52	53

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.