

GATEWAY PRH-13 (NADCA 207-2016)

Hot Work Tool Steel

Gateway PRH-13 (NADCA 207-2016) is a Premium Quality H-13 hot work steel that is designed to meet the highest quality standards in the die casting industry, and to excel in the most demanding hot work tooling applications. PR H-13 (NADCA 207-2016) exhibits outstanding impact toughness and resistance to thermal fatigue cracking (heat checking), and will meet or exceed a wide variety of die casting industry specifications, including all of the requirements of NADCA 207-2016.

Typical Chemistry

	Min	Max		Min	Max
Carbon	.37	.42	Vanadium	.80	1.20
Manganese	.20	.50	Molybdenum	1.20	1.75
Silicon	.80	1.20	Sulfur		.005
Chromium	5.0	5.5	Phosphorus		.025

Applications

PRH-13 (NADCA 207-2016) provides highest performance in typical applications such as inserts, cores, and cavities for die casting dies, die casting shot sleeves, hot forging dies, extrusion dies, and plastic mold cavities and components that require high toughness and excellent polishability.

Annealing

Performed after hot working and before rehardening. Heat at a rate not exceeding 400 F per hour to 1575-1625 F and hold at temperature for 1 hour per inch of maximum thickness; 2 hours min. Cool slowly with furnace at a rate not exceeding 50 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 relieve 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 100 F below final tempering temperature. Likewise, finished tools may be stress relieved after final fitting, polishing, etc...,

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 1500-1600 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 - 1875 F, equalize and soak at temperature for 1/2 hour per inch of thickness with a one hour minimum. Quench in air, pressurized gas or warm oil.

Typically sections up to 5" thick will fully harden with air. Sections greater than 5" will require accelerated cooling using forced air, pressurized gas, or an interrupted oil quench to obtain maximum hardness, corrosion resistance and toughness.



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Heat Treating (continued)

Pressurized Gas - min. quench rate of 50 F per minute down to 1000 F. For vacuum heat treatment of die casting components, the heat treatment practices detailed in NADCA 207-2016 are strongly recommended. 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. Hold at temperature 1 hour per inch of thickness, with a 2 hour minimum.

Tempering Temperature (F)		Hardness (HRC)
1000		50/52
1050		49/51
1100		46/48
1125		40/42
1150		35/37

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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