Gateway Metals Inc.

DATA SHEET

# *GATEWAY H-13*

## Hot Work Tool Steel

**Gateway H-13** is an excellent hot work steel, featuring a combination of shock resistance, red hardness and abrasion resistance. It is capable of withstanding rapid cooling and resists premature heat checking. Meets ASTM A-681.

## Typical Chemistry

| | | | | |
|---|---|---|---|---|
| Carbon | .40 | | Vanadium | 1.0 |
| Manganese | .40 | | Chromium | 5.0 |
| Silicon | 1.00 | | Molybdenum | 1.20 |
| Sulfur | .030 max | | Phosphorus | .030 max |

## Applications

Gateway H-13 provides highest performance in typical applications such as cores, die casting dies, die holder blocks, hot forging dies, hot extrusion dies, hot press dies and hot work punches.

## Annealing

Vacuum furnaces or atmosphere-controlled furnaces should be used when available. If unavailable, tools should be wrapped in stainless foil or packed in a neutral protective compound. Heat uniformly to 1550/1650 F and hold at the annealing temperature for one hour per inch of cross section. Cool in the furnace at a rate not exceeding 50 F per hour down to a temperature of 1000 F, after which a faster rate may be allowed.

## 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

Vacuum furnaces or atmosphere-controlled furnaces are highly recommended to obtain the best surface condition. If these are not available, pack harden by wrapping in paper and packing in a container with fine, spent pitch coke. Preheat thoroughly to 1400/1500 F, then transfer to hardening furnace.

Heat to 1800/1875 F and hold until the work is uniformly and thoroughly heated. Soaking at the hardening temperature aids in maintaining the hardness at high working temperatures. Quench in still air or dry air blast. If complicated forms are to be hardened, an interrupted oil quench can be used. Quench work in oil and remove from the bath when it has just lost it's color (1000/1100 F). Finish cooling to below 150/125 F in air, then temper immediately.

# GATEWAY H-13

## Tempering

The usual temperature is 1000/1150 F, but may be varied to suit individual requirements. A double tempering treatment is recommended. Heat to desired tempering temperature, hold two to three hours and cool to room temperature; reheat to the same temperature, hold two and allow to cool to room temperature.

| Air quenched from 1800 F - Tempered 4 hours | | |
|---|---|---|
| Tempering Temperature (F) | | Hardness (HRC) |
| as quenched | | 48/50 |
| 1000 | | 50/52 |
| 1050 | | 47/49 |
| 1100 | | 46/48 |
| 1150 | | 43/45 |
| 1200 | | 32/34 |

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.