

GATEWAY O-1

Cold Work Tool Steel

Gateway O-1 is a general purpose, non-deforming oil hardening tool steel for applications where maximum accuracy is required during the hardening of the end product. Gateway O-1 has deep hardening properties and fine grain structure with unusual toughness. Meets ASTM A-681.

Typical Chemistry

Carbon	.85/1.00		Chromium	.40/.70
Manganese	1.00/1.40		Vanadium	.30 max
Silicon	.10/.50		Tungsten	.40/.60
Sulfur	.03 max		Phosphorus	.03 max

Applications

Gateway O-1 applications include gauges, stamps, jigs, cutters, templates, cams, guides, levers, saws, knives, straight edges, fixtures, machine parts, punches, blanking dies, molding dies, swaging dies, screw dies and trim dies.

Annealing

Heat uniformly to 1400/1450 F and hold two hours 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 can be allowed.

Heat Treating

Preheat thoroughly to 1200/1250 F, then heat to 1450/1500 F depending on the section size. Hold until uniformly heated through. Use high side of hardening range for thicker sections. Quench in warm thin quenching oil to about 125 F. To prevent soft spots, the tools should be rapidly agitated in oil when a circulating oil bath is not available. The material should be tempered as soon as it has cooled to 125 F.

Tempering

Temper immediately to desired hardness. For most applications, a tempering temperature of 400/450 F is employed. However, for cutting tools requiring higher hardness, low temperatures of 300/350 F are suitable. Temper a minimum of two hours for sections under two inches and a minimum of one hour per inch of thickness over two inches.

The following table shows the hardness values obtained at various tempering temperatures on a two inch cube hardened from 1475 F and tempered two hours.

Tempering Temperatures (F)	Rockwell Hardness (HRC)
as quenched	63/65
300	62/64
400	60/62
500	57/59
600	55/57

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.

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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

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