AISI 8620
Alloy Steel

CRUCIBLE DATA

Typical Chemistry

Carbon	0.20%
Manganese	0.80%
Silicon	0.30%
Chromium	0.50%
Molybdenum	0.20%
Nickel	0.55%

Typical Applications

Camshafts	Piston Pins
Gears	Shafts
Machinery parts	Splines

Chemistries & Properties Table

Heat Treatments Table

Annealed Hardness: BHN 143/163.

Thermal Treatments

Annealing: 1600F (870C), hold 2 hours, slow cool 50°F (30°C)/ hr max. to 1200F (650C), then air or furnace cool. Hardness BHN 143/163.

Stress Relieving

Annealed Material: 1100-1300F (595-740C), hold 2 hrs, air cool.
Hardened Material: 50-100°F (30-55°C) below last tempering temperature, hold 2 hrs, air cool.
Straightening: Best done warm 400-800F (205-425C).
Hardening: (Carburizing)
The process of carburizing steel is applied to increase the carbon content of the surface, so that by suitable heat treatment the carburized surface will be substantially harder than the core. The combined process of carburizing plus hardening by thermal treatment is generally known as “case hardening”. The hardening treatment is selected in accordance with the case and core properties required for the particular application.

Although there are many hardening treatments for carburized grades, the treatments shown are typical of some that are frequently used.

The usual carburizing temperature for AISI 8620 is 1650-1700F (900-925C). Uniform temperatures must be provided to produce uniform carburizing and hardening and to control distortion. It is important the temperature of the steel be maintained rather than just furnace temperature.

1. Quench Directly From Carburizing Box.

This treatment is applied by quenching in oil directly from the carburizing temperature of 1700F (925C). The core will be fully hardened but unrefined. The case will be hardened to the extent that it will be fileproof, provided the carbon content is high, from the carburizing operation.

2. Cool From Carburizing Temperature in Carburizing Box, Reheat to Above Upper Critical Temperature of Core, Quench.

This treatment is applied by allowing the piece to cool in the box to room temperature from the carburizing temperature of 1700F (925C) The piece is then reheated to above 1535F (835C) and quenched in oil. The core will be refined and exhibit maximum strength and hardness. The case will be hardened and somewhat coarsened.

3. Cool From Carburizing Temperature In Carburizing Box, Reheat Only To Above Lower Critical Temperature of the Case, Quench.

This treatment is applied by allowing the piece to cool in the box from the carburizing temperature of 1700F (925C). The piece is then reheated to above 1350F (730C) and quenched in oil to harden and refine the case. The core will be unrefined, soft and machineable and the case will be hardened.

4. Cool From Carburizing Temperature in Carburizing Box. Reheat to Above Upper Critical Temperature of the Core, Quench. Again Reheat Above Lower Critical Temperature of the Case, Quench.

This treatment is applied by allowing the piece to cool in the box from the carburizing temperature of 1700F (925C). The piece is then reheated to above 1535F (835C) and oil quenched in oil to refine the core. The piece is again reheated to 1350F (730C) and oil quenched to refine the case. Thus, this double heating and quenching method refines both the case and core. The refined core will be soft and machineable with maximum toughness and resistance to impact. The refined case will be hardened for wear and resistance.

Physical Properties

Modulus of Elasticity .....30 psi x 10^6(207 GPa)
Specific Gravity .....(7.84)
Density .....0.283 lb/in^3(7840 kg/m^3

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