

PRODUCT MANUAL
ALLOY STEELS - 8620

AISI /SAE 8620 (UNS G 86200)
NICKEL-CHROMIUM-MOLYBDENUM CASE HARDENING STEEL

TYPICAL ANALYSIS

| C. | Mn. | P. | S. | Si. | Cr. | Ni. | Mo. |
|-----------|------------|-----------|-----------|------------|------------|------------|------------|
| .18/.23 | .70/.90 | .035 MAX. | .040 MAX. | .15/.35 | .40/.60 | .40/.70 | .15/.25 |

AN ALLOY STEEL DESIGNED FOR CASE HARDENING APPLICATIONS. THE NICKEL IMPROVES GOOD TOUGHNESS AND DUCTILITY. THE CHROMIUM AND MOLYBDENUM CONTRIBUTE INCREASED HARDNESS PENETRATION AND WEAR, THAT MAY BE CARBURIZED. THE WELL BALANCED ALLOY CONTENT PERMITS HARDENING TO PRODUCE A HARD WEAR RESISTANT CASE COMBINED WITH A CORE STRENGTH IN THE ORDER OF 125,000 PSI. IT HAS EXCELLENT MACHINABILITY AND RESPONDS WELL TO POLISHING APPLICATIONS. WITH THE BALANCED ANALYSIS, THIS STEEL PROVIDES, UNIFORM CASE DEPTH, HARDNESS AND WEAR PROPERTIES, AND GIVES THE ADVANTAGE OF LOW DISTORTION.

TYPICAL APPLICATIONS

CARBURIZED SPLINED SHAFTS, PISTON PINS, CAM SHAFTS, GUIDE PINS, BUSHINGS
 AUTOMOTIVE DIFFERENTIAL PINIONS AND TRANSMISSIONS, ARBORS, BEARINGS, SLEEVES
 KING PINS, CARBURIZED GEARS, GENERAL ENGINEERING PURPOSES.

MECHANICAL PROPERTIES - AS SUPPLIED

THE FOLLOWING ARE AVERAGE VALUES AND MAY BE CONSIDERED AS REPRESENTATIVE:

| | |
|-------------------------------|---------------|
| TENSILE STRENGTH, PSI. | 85,500 |
| YIELD STRENGTH, PSI. | 52,000 |
| ELONGATION, % IN 2" | 28.0 |
| REDUCTION IN AREA, % | 61.0 |
| BRINELL HARDNESS | 186 |

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THERMAL TREATMENTS
DEGREES IN CELSIUS
FORGING
COMMENCE AT 1200 ° MAX. FINISH AT 950 °
ANNEALING
856/885 ° COOL IN FURNACE
NORMALIZING
898/926 ° AIR COOL
HARDENING & TEMPERING
{UNCARBURIZED) -
**815/855 ° OIL OR WATER QUENCH, TEMPER AT 200 ° TO 650 °
 ACCORDING TO STRENGTH LEVEL REQUIRED**
{CARBURIZING) - DIRECT OIL QUENCHED

1. **OIL QUENCH DIRECT FROM CARBURIZING TEMPERATURE
 DRAW AT DESIRED TEMPERATURE FOR AT LEAST 1 - 2
 HOURS PER INCH OF SECTION.**

2. **SINGLE REFINE - BOX COOL FROM PACK CARBURIZING
 OR AIR COOL FROM OTHER MEDIA. REHEAT TO 829/842².
 OIL QUENCH. DRAW AT DESIRED TEMPERATURE FOR MIN.
 1 - 2 HOURS PER INCH OF SECTION.**

{PROVIDES GOOD CASE HARDNESS AND CORE PROPERTIES)

3. **DOUBLE REFINE - BOX COOL FROM CARBURIZING MEDIA.
 REHEAT TO 829/842 °, OIL QUENCH. REHEAT TO 760/787²,
 OIL QUENCH. DRAW AT DESIRED TEMPERATURE FOR MIN.
 1 - 2 HOURS PER INCH OF SECTION.**

**{ PROVIDES OPTIMUM COMBINATION OF CASE HARDNESS, CORE
 STRENGTH AND TOUGHNESS)**

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MACHINABILITY

8620 IN THE ANNEALED CONDITION HAS A MACHINABILITY RATING OF 68% OF AISI B-1112
AVERAGE SURFACE CUTTING SPEED IS 110 FEET PER MINUTE.

SHEAR STRENGTH

THE ULTIMATE SHEAR STRENGTH IS APPROXIMATELY 70% OF THE ULTIMATE TENSILE STRENGTH.

WELDABILITY

8620 IS SAFE FOR MANUAL ARC WELDING WITHOUT PRE-HEATING. HOWEVER, EVEN AT THIS LOW CARBON LEVEL, PREHEAT IS ADVISABLE IN SECTIONS GREATER THEN 1" OR WHERE A WELDMENT IS SUBJECT TO RESTRAINT AND IS UNABLE TO CONTRACT FREELY DURING COOLING. AS STEEL HARDENABILITY INCREASES, SO SHOULD THE PREHEAT TEMPERATURE.