



420 SS ESR MOLD QUALITY

AISI Standard Nominal Chemical Composition (Typical %)	<u>C</u> 0.38	<u>Si</u> 0.80	<u>Cr</u> 13.00	<u>V</u> 0.30	<u>Mn</u> 0.50
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Characteristics

420 Stainless ESR is an Electro Slag-Refined (ESR) or Vacuum Arc Remelted (VAR-ARC) 13% Chromium tool steel. 420 ESR is characterized by excellent polishability, good corrosion resistance, and good wear resistance. It is a superb choice for lens quality molds where mirror finishes are desired.

Applications

420 Stainless ESR Annealed is suitable to both injection molds and compression molds that require high hardness and moderate corrosion resistance. It is well suited for molding poly-vinyl chlorides because of its corrosion resistance at elevated temperatures. These features also help minimize rusting during extended storage in humid environments thus decreasing die maintenance costs. Some typical applications for **420 Stainless ESR Annealed** include plastic molds, cutlery, surgical and dental instruments, gauges, valves, gears, shafts, cams and ball bearings.

HEAT TREATMENT

Annealing - 420 stainless should be heated thoroughly to 1650 ° F in an atmosphere controlled furnace, then furnace cooled at 25 ° F per/hr to 1100 ° F and then air cooled to room temperature. A maximum hardness of 229 BHN should result.

Hardening - 420 stainless should be heated slowly between 1800 ° F - 1900 ° F. Large or complicated mold sections should be pre-heated between 1200 ° F – 1400 ° F before raising to the higher temperature. The material should be held at the soaking temperature for about 30 min per inch of greatest thickness and then oil or air quenched to 120 ° F—150 ° F. Air quenching is recommended for greater assurance against quench cracking and for the best size stability. However, for higher hardnesses, an oil quench may be utilized.

Tempering - To obtain a hardness of 51-53 HRC, stainless should be tempered in the range of 400 ° F—700 ° F for cycles of 2 hours. Tempering in the range 800 ° F - 1000 ° F should be avoided since it results in a decrease in corrosion resistance. Double tempering is suggested.

Mechanical Properties -

Tensile & yield strength at RT	52 HRC	46 HRC
Tensile strength, psi	255,000	210,000
0.2% yield strength , psi	215,000	185,000

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