420 SS ESR Mold Quality Data Sheet

*Chemical Composition (Nominal Values Weight %)

C	Si	Cr	V	Mn
0.38	0.75	13.50	0.30	0.50

***Composition shown is nominal. Actual chemical composition may vary.**

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 of 420 SS ESR

Annealing
420 SS ESR should be heated thoroughly to 1650°F in an atmosphere controlled furnace. Hold 2 hours, furnace cool at 25°F per/hr to 1100°F, then air cool to room temperature. A maximum hardness of 229 BHN should result.

Hardening
Preheat: 1400-1500°F, equalize temperature, hold 2 hours.
Austenitize: 1850-1925°F, equalize temperature, hold 30 minutes.
Quench: Positive pressure (2 bar minimum) quench to below 125°F.
Temper: Double temper at 400-800°F, equalize temperature, hold 2 hours minimum. Double temper recommended.
Typical hardness: 42-50 HRC.

Stress Relieving
Annealed material: Heat to 1000-1200°F, hold 2 hours, then air cool.
Hardened material: Heat to 25-50°F below heat treat tempering temperature, hold 2 hours, then air cool.

EDM
Hardened material: Heat to 25-50°F below heat treat tempering temperature, hold 2 hours, then air cool.

Approximate Mechanical Properties 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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Rev_1 July 19/2019