Data Sheet

SOREL FORGE

PREMIUM QUALITY STAINLESS MOLD STEEL

SF-420 ESR

GENERAL:

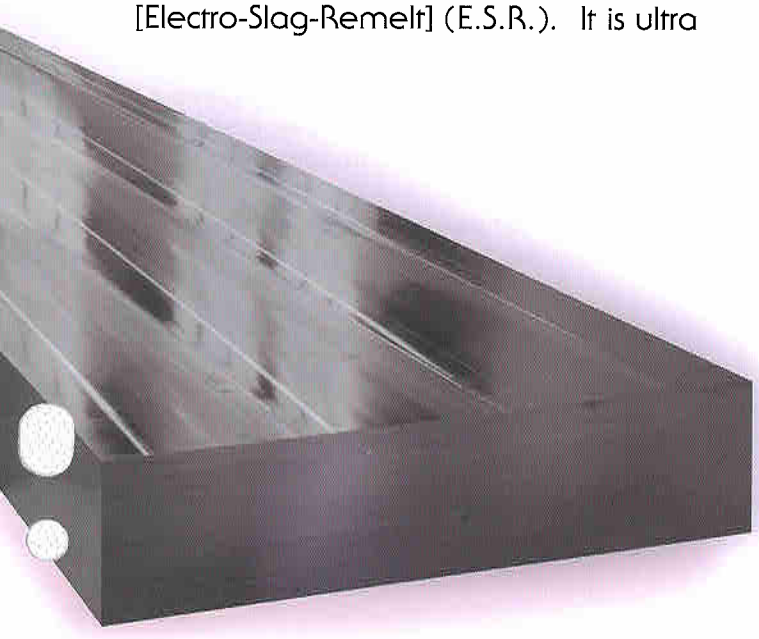
AISI-420

Delivery Condition:

Soft annealed to approx. 229 BHN (20 Rc)

SF-420 ESR is a superior product for molding vinyl base or other corrosive plastics. It can be used for injection, compression and transfer molding. It is recommended for molding abrasive/filled materials, including injection-molded thermosetting plastic grades.

SF-420 ESR is an improved product. It is the result of a special melting process; [Electro-Slag-Remelt] (E.S.R.). It is ultra refined and offers a tight chemistry control. This extra clean steel provides for the finest quality finish with high polishability and etchability.



SF-420 ESR is an air/oil hardening steel which readily responds to hardening and tempering operations. Maximum corrosion resistance is obtained when the steel is hardened and tempered. It is recommended that parts be passivated.

SF-420 ESR is forged using a special densifying process which assures optimum consolidation of centers.

SF-420 ESR is supplied in annealed condition.

SF-420 ESR is available in standard incremental sizes in premachined condition.

Typical Analysis (%)

C	Mn	S	Si	Cr	Mo
.35	.50	.003 max	.50	12.50	.20

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TYPICAL APPLICATIONS:

- Lens molds
- Mold with long production runs
- Plastic and rubber molds requiring corrosion resistance namely; PVC and PET
- Molds stored or operated in humid environment
- Blow molds
- Compression/transfer molds
- Injection mold for thermosetting materials
- Extrusion, pultrusion dies

What makes SF-420 ESR excellent?

- **Microcleanliness**
  SF-420 ESR fully conforms to a maximum rating of 1 in all categories as measured against ASTM E-45. This provides excellent polishability and improved fatigue life as well.
- **Homogeneity**
  SF-420 ESR is virtually free from microsegregation and microbanding. It has uniform carbides distribution. Homogeneity provides superior dimensional stability and improves transverse impact strength.
- **Chemistry**
  The E.S.R. process allows a tight control of chemical elements. It translates for the users in a uniform product with lot to lot consistency.

HEAT TREATMENT

• Stress Relieving

For annealed material machine to approximately 1/8" (3mm) of final dimension. Heat the mold at a rate of one hour per inch (25.4mm) of maximum thickness to 1200°F (650°C). Soak for 1/2 hour per inch (25.4mm). Cool in furnace to 930°F (500°C) then freely in air.

• Hardening

Preheat temperature : 1250°F (670°C)
Austenitizing temperature : 1850°F (1010°C)

Quench : oil or air
Sizes over 5" (127mm) should be interrupted oil quenched to assure uniformity of structure. Temper immediately when the tool reaches 150 F (65°C).

Tempering : temperature range between 480°F and 800°F (250°C and 420°C).

Temper twice with intermediate cooling to room temperature.
Hardness : 48 to 50 Rc

Tempering between 800/1100°F (425/600°C) should be avoided.

N.B. : *Protect the part against decarburization and oxidation during hardening. Tempering at low temperature gives high stress level in the mold and should be avoided.*

• Dimensional Changes

The dimensional changes during hardening and tempering vary depending on temperature, type of equipment and cooling media used during heat treatment.

Thus, the tool shall always be manufactured with enough working allowance to compensate for dimensional changes. Use 0.15% as a guideline for SF-420.

WELDING

Good results can be achieved if proper precautions are taken: elevate working temperature, good joint preparation, proper choice of consumables.

For best result after polishing and photo-etching use consumables with the same composition as in the mold.

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