

P1-FM™



EDRO #31™

Free Machining Holder Steel

P1-FM™ is an alloy steel supplied prehardened. P1-FM™ is characterized by:

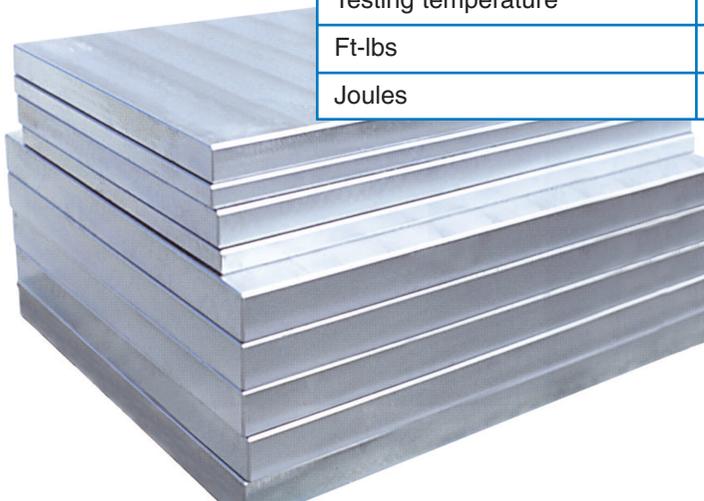
- Excellent machinability
- Uniform and consistent hardness in all dimensions
- Good resistance to indentation (compressive strength)
- Excellent ductility
- Excellent flatness
- Dimensionally stable
- Smooth as rolled surfaces
- Weldable
- Excellent thermal conductivity

P1-FM™ is an improved grade designed specifically for plastic and rubber molding applications. Chemical composition and thermal treatments provide physical properties and microstructures designed to provide:

- Reduced mold maintenance costs
- Safe weld repair
- Dimensional stability
- Lower mold production costs due to less cutting tool wear and increased cutting speeds

Applications

- Plastic and rubber molds
- Plastic mold bases
- Constructional parts
- Plastic extrusion



PROPERTIES

PHYSICAL DATA

Prehardened to 293 HB. Data at room and elevated temperatures.

Temperature	68°F (20°C)	390°F (200°C)
Density kg/m ³ lbs/in ³	7,800 .284	7,750 .282
Modulus of elasticity MPa psi	200,000 30.0 x 10 ⁶	190,000 27.0 x 10 ⁶
Coefficient of thermal expansion per °F from 68°F per °C from 20°C	– –	6.1 x 10 ⁻⁶ 11.0 x 10 ⁻⁶

TENSILE STRENGTH

Longitudinal Tests from 3" (76mm) rolled plate at 293 HB.

Testing temperature	68°F (20°C)
Ultimate tensile strength psi MPa	137,000 945
Yield strength @ .2% offset psi MPa	116,000 800
% Elongation in 2"	18
% Reduction in area	58

IMPACT STRENGTH

Longitudinal Charpy V-notch Tests from a 3" (76mm) rolled plate at 293 HB.

Testing temperature	68°F (20°C)	572°F (300°C)
Ft-lbs	35	55
Joules	47	74

General

P1-FM™ was developed by EDRO to provide superior performance in all important areas of manufacturing and operation for the plastic and rubber mold tooling industries. Extensive machining trials have shown that this material is readily machined, provides excellent surface finishes and thread quality. Special production procedures provide superior surface quality and flatness. Bend tests have demonstrated that this material can tolerate moderate amounts of cold flattening without breakage. Heat treating and microstructure of the material provides excellent dimensional stability after machining, without need for stress relieving or excess stock oversize. P1-FM™ is also suitable for texturing and photoetching.

Heat Treatment

P1-FM™ is provided prehardened to approximately 293 Brinell.

Welding

P1-FM™ is readily weldable. Preheating part to 200-300°F (95-150°C) prevents over hardening in the heat affected zone (HAZ), reduces risk of cracking and improves dimensional stability. Post weld stress relief, although not required, will further improve dimensional stability around the weld.

For best results special P1-FM™ welding electrodes, available from EDRO, should be used. P1-FM™ electrodes will provide optimal chemical and mechanical properties, in order to match the filler with the base metal.

Alternatively, processes such as GMAW and SMAW may be employed, using several standard filler metals. However, welding with dissimilar materials may cause a galvanic reaction, which could lead to localized corrosion. This can be attributed to a chemical mismatch between the filler metals and the base steel.

P1-FM™ is available from stock in flat sizes up to 8" thick.

Services: Saw cutting, rotary grinding, surface grinding, machining, gundrilling.

EDRO will be pleased to provide additional information on our full line of quality specialty steels, machining capabilities, and custom mold bases.

P1-FM™

EDRO

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