RoyAlloy™

US Patents NO. 6,045,633 and 6,358,334

EDRO #6

Free Machining Stainless Holder Steel

RoyAlloy™ is a 400 series martensitic stainless steel supplied prehardened. RoyAlloy™ is characterized by:

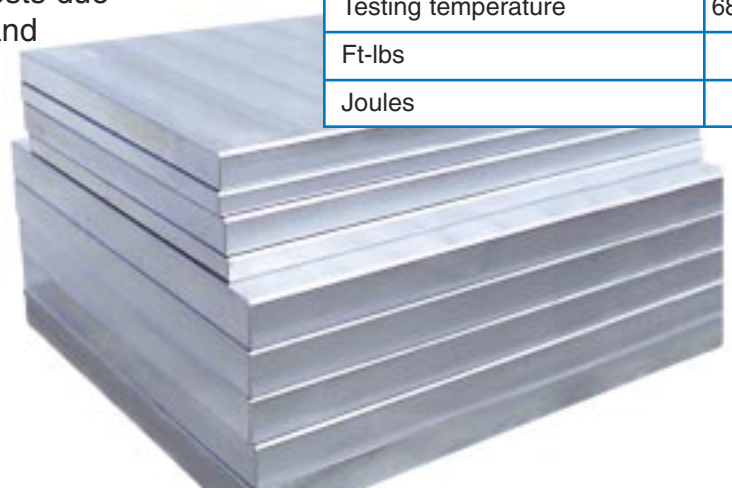
- Excellent machinability
- Good corrosion resistance
- Uniform and consistent hardness in all dimensions
- Good resistance to indentation (compressive strength)
- Excellent ductility
- Excellent flatness
- Dimensionally stable
- Smooth as rolled surfaces
- Excellent weldability
- Good thermal conductivity

RoyAlloy™ is an improved stainless 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 and simple 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
- Plastic mold inserts
- Constructional parts
- Plastic extrusion



PROPERTIES

PHYSICAL DATA

Prehardened to 321 HB. Data at room and elevated temperatures.

Temperature	68ºF (20ºC)	390ºF (200ºC)
Density kg/m³ lbs/in³	 7,800 .284	 7,750 .282
Modulus of elasticity N/mm²(Mpa) psi	 200 x 10^3 29.0 x 10^6	 190 x 10^3 27.6 x 10^6
Coefficient of thermal expansion per ºF from 68ºF per ºC from 20ºC	 – –	 6.1 x 10^{-6} 11.0 x 10^{-6}

TENSILE STRENGTH

Longitudinal Tests from 3” (76mm) rolled plate at 321 HB.

Testing temperature	68ºF (20ºC)	390ºF (200ºC)
Ultimate tensile strength psi N/mm²	 155,000 1069	 152,000 1048
Yield strength @ .2% offset psi N/mm²	 129,000 890	 126,000 869
% Elongation in 2”	12	12
% Reduction in area	34	34

IMPACT STRENGTH

Longitudinal Charpy V-notch Tests from a 3” (76mm) rolled plate at 321 HB.

Testing temperature	68ºF (20ºC)	390ºF (200ºC)
Ft-lbs	16	26
Joules	22	36

General

RoyAlloy™ 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. RoyAlloy™ is also suitable for texturing and photoetching.

Corrosion Resistance

Tooling made from RoyAlloy™ will have excellent resistance to rusting caused by corrosive plastic elements, and humid working and storage conditions, which may be encountered under normal molding production conditions.

Heat Treatment

RoyAlloy™ is provided prehardened to approximately 321 Brinell.

Welding

RoyAlloy™ is readily weldable without pre or post heating.

Documented testing has shown that RoyAlloy™ does not develop an over-hardened heat affected zone (HAZ) surrounding the weld deposit. This eliminates the risk of weld induced cracking during repairs or in future service.

For best results special RoyAlloy™ welding electrodes, available from EDRO, should be used. RoyAlloy™ 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 stainless 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.

RoyAlloy™ is available from stock in flat sizes up to 12” thick and rounds up to 12” diameter.
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.

RoyAlloy™

EDRO

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