

# MARSHALLOY™ STD

*Deluxe Plate*

## Prehardened Alloy Steel

Precision Marshall's MARSHALLOY™ STD is a prehardened, high-quality, 4142 modified, alloy steel intended for all mechanical uses where improved machinability, uniform hardness and excellent flatness are required. Product hardness range is 262-321 Brinell.

## Typical Analysis

|            |          |            |     |
|------------|----------|------------|-----|
| Carbon     | .40      | Chromium   | .95 |
| Manganese  | .85      | Molybdenum | .20 |
| Phosphorus | .035 max | Silicon    | .25 |
| Sulfur     | .040 max |            |     |

## Applications

MARSHALLOY™ STD is a high quality prehardened alloy steel intended for use in a variety of mechanical applications where the combination of good machinability and medium hardness is required. Specific applications include short run tools and dies, prototype dies, guide rails, back up plates and support tooling, jigs and fixtures and holder blocks. MARSHALLOY™ STD can also be used for molds with less critical cleanliness and polishability requirements.

## Stress Relief

Heat slowly and uniformly to 1000°F and soak one hour per inch of section thickness. Air cool or furnace cool to room temperature.

## Annealing

It is recommended that MARSHALLOY™ STD be annealed prior to rehardening. Heat slowly and uniformly to 1500/1600° for four hours. Cool slowly (50°F per hour max.) to 1200°F and air cool.

## Heat Treating

MARSHALLOY™ STD may be heat treated to higher levels of hardness for higher strength. Preheat to 1250°F and hold for one hour. Heat to 1550/1600°F and soak one half hour when material is up to temperature. Oil quench or air cool to hand warm (approximately 150°F) and temper immediately.

## Tempering

Temper one hour per inch of section thickness to desired hardness. Representative hardness levels after tempering are tabulated below.

Oil quenched from 1600°F • Tempered 4 Hours  
(Section Size — 4" x 4")

| Tempering Temperature (°F) | Hardness (RC) |
|----------------------------|---------------|
| 400                        | 42            |
| 500                        | 41            |
| 600                        | 40            |
| 700                        | 39            |
| 800                        | 37            |
| 900                        | 36            |
| 1000                       | 34            |
| 1100                       | 29            |
| 1200                       | 25            |



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Note: Variations in section size, heating rate, soak time, quench rate and tempering will cause deviations from the above values. Precision Marshall should be consulted for specific applications.



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**EDM**

Electro-discharge machining is used in the production of various tooling. This process produces recast, rehardened and retempered layers on the EDM surface. It is recommended that MARSHALLOY™ STD be stress relieved at 50°F below the final tool tempering temperature, after the EDM process, to temper the rehardened layer produced by EDM.

**Condition**

MARSHALLOY™ STD is provided completely decarb free and stress relieved.

**Finish**

Ground oversize to typical rms 50/75, maximum 125.

**Sizes**

Available in standard thickness increments 1/4" through 8".

**Additional Products**

**Deluxe Plates**

- MARSHALLOY MQ®/FM
- PRESCO O-1
- AIRTRUE A-2
- DIECRAT A-6
- SUPER 7 MQ® S-7
- ARISTOCRAT D-2
- FIRECHROME H-13
- TRM-2 M-2
- RUETOM SPECIAL 420 ESR

**Ground Flat Stock**

- PRESCO O-1
- AIRTRUE A-2
- SUPER 7 S-7
- NUTEC 42® 4142
- ARISTOCRAT D-2
- MARSHALLCRAT® LC

**Drill Rod**

- WATERCRAT W-1
- OILCRAT O-1
- AIRTRUE A-2
- SUPER 7 S-7
- ARISTOCRAT D-2
- TRM-2 M-2
- WATERCRAT W-1 Cold-drawn

**Inventory Locations**

**Headquarters**

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**National Distribution Center**

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*The Deluxe Company's Guarantee of Quality*

Precision Marshall's conformance to specifications is the highest in the industry. Precision Marshall assumes complete liability for any costs directly relating to a deviation from our published specifications. Any such costs, properly documented, will be reimbursed.

For more information, visit our Web site at [www.pmsteel.com](http://www.pmsteel.com).

