



# FIRECHROME H-13

*Deluxe Plate*

## Hot Work Tool Steel

Precision Marshall's FIRECHROME is an excellent hotwork tool steel, featuring a combination of shock resistance, red hardness and abrasion resistance. It is capable of withstanding rapid cooling and resists premature heat checking. Meets ASTM A-681 and W 2344.

## Typical Analysis

Carbon	.40	Chromium	5.00
Manganese	.40	Vanadium	1.00
Phosphorus	.03 max	Molybdenum	1.20
Sulfur	.03 max	Silicon	1.00

## Applications

Typical applications of FIRECHROME includes cores, diecasting dies, die holder blocks, hot forging dies, hot extrusion dies, hot press dies and hot work punches.

## Annealing

Vacuum furnaces or atmosphere-controlled furnaces should be used when available. If unavailable, tools should be wrapped in stainless foil or packed in a neutral protective compound. Heat uniformly to 1550/1650°F and hold at the annealing temperature for one hour per inch of cross section. Cool in the furnace at a rate not exceeding 50°F per hour down to a temperature of 1000°F, after which a faster rate may be allowed.

## Heat Treating

Vacuum furnaces or protective atmosphere furnaces are recommended to prevent decarburization. Preheat thoroughly to 1450/1500°F and heat to 1800/1875°F, hold 30 minutes at temperature. Pressure quench in vacuum or air cool to 150°F, then temper immediately. If complicated designs or large sections are to be heat treated, an interrupted oil quench to 1000°F may be used.

## Tempering

Double temper one hour per inch of section thickness, two hours minimum per temper. Representative hardness levels after tempering are tabulated below.

Air quenched from 1800°F • Tempered 4 to 6 Hours  
(Section Size — 4" x 4")

Tempering Temperature (°F)	Rockwell Hardness (RC)
As quenched	
1000	48/50
1050	50/52
1100	47/49
1150	46/48
1200	43/45
	32/34



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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 FIRECHROME 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**

FIRECHROME H-13 is provided completely decarb free and stress relieved.

**Finish**

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

**Sizes**

Available in standard thickness increments 1/2" through 6".

**Additional Products**

**Deluxe Plates**

- MARSHALLOY MQ®/FM
- MARSHALLOY™ STD 4142
- PRESO O-1
- AIRTRUE A-2
- DIECRAT A-6
- SUPER 7 MQ® S-7
- ARISTOCRAT D-2
- TRM-2 M-2
- RUETOM SPECIAL 420 ESR

**Ground Flat Stock**

- PRESO 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**

99 Berry Road  
Washington, PA 15301  
T • 800 537 7528  
F • 800 350 1353

**National Distribution Center**

1 Northpoint Court  
Bolingbrook, IL 60440  
T • 800 537 7528  
E • sales@pmsteel.com

*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).

