FIRECHROME H-13

PRECISION MARSHALL
The Deluxe Company

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	0.3 max	Molybdenum	1.20
Sulfur	0.3 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

Vaccum 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. After preheating to 1400°F for one half to one hour, heat to 1825/1875°F and soak one half hour when material is up to temperature. Air cool to hand warm (approximately 150°F) and temper immediately.

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	48/50
1000	50/52
1050	47/49
1100	46/48
1150	43/45
1200	32/34

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.

Conditions

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

The following additional products are available through our authorized distributors.

DELUXE PLATES

MARSHALLOY MQ®/FM
MARSHALLOY™ STD 4142
MARSHALLOY™ 4140 (Annealed)
PRESCO O-1
AIRTRUE A-2
SUPER 7 MQ® S-7
ARISTOCRAT D-2
FIRECHROME H-13
SUPER 7 S-7

GROUND FLAT STOCK

PRESCO O-1
AIRTRUE A-2
ARISTOCRAT D-2
SUPER 7 S-7
NUTEC 42® 4142
FIRECHROME H-13
PREMAR 410
RUETOM SPECIAL 420
PREMAR 440 C
MARSHALLCRAT LC

DRILL ROD

WATERCRAT W-1
OILCRAT O-1
AIRTRUE A-2
SUPER 7 S-7
ARISTOCRAT D-2
FIRECHROME H-13PH
TRM-2 M-2
WATERCRAT W-1 (Cold-drawn)

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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 us at www.pmsteel.com.

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