

Air Hardening Tool Steel

Precision Marshall's DIECRAT is an air hardening tool steel which provides a good combination of wear resistance, toughness and strength. This grade is noted for ease of heat treatment and minimum distortion, due to its ability to be air hardened from a low hardening temperature. Special melting and refining practices are utilized to produce a uniform product with high cleanliness and minimum segregation. The material is tested to rigorous tool steel standards to ensure uniformity of structure and freedom from defects. Meets ASTM A-681.

Typical Analysis

Carbon	.70	Chromium	1.10
Manganese	2.10	Molybdenum	1.10
Phosphorus	.03 max	Silicon	.30
Sulfur	.03 max		

Applications

DIECRAT is suitable for use in cold work tooling applications requiring a combination of wear resistance and toughness such as thread roll dies, punches, blanking dies, shears and forming dies. The grade is also used for plastic molds requiring high wear resistance.

Annealing

Heat slowly and uniformly to 1350/1375° and hold two hours. Cool slowly (20°F per hour max.) to 950°F or below, then air cool to room temperature. Hardness 250 BHN maximum.

Heat Treating

Precision Marshall DIECRAT is subject to decarburization during heat treatment, so a protective atmosphere furnace or vacuum furnace should be used.

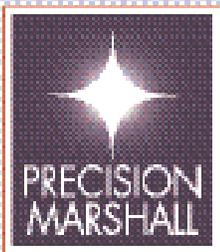
Preheat to 1250°F for one half to one hour, then heat to 1525/1600°F and soak one half hour when material is up to temperature. Air cool to hand warm (approximately 150°F) and temper immediately.

Tempering

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

Air cooled from 1550°F • Tempered 4 Hours
(Section Size — 4" x 4")

Tempering Temperature (°F)	Rockwell Hardness (RC)
300	60/61
400	58/59
500	56/57
600	55/56
700	54/55
800	52/53
900	50/51
1000	48/49



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 DIECRAT 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	DIECRAT A-6 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 4".

Additional Products

Deluxe Plates

MARSHALLOY MQ®/FM
MARSHALLOY™ STD 4142
PRESCO O-1
AIRTRUE A-2
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

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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.