

# S-7 STANDARD



## Deluxe Plate

### Shock Resistant Tool Steel

Precision Marshall's S7 Standard is a premium shock resistant tool steel which provides a unique combination of machinability, exceptional toughness, ease of heat treatment and minimum distortion. 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-A681.

### Chemistry

Element	Range	Aim
Carbon	.48/.55	.50
Manganese	.60/.80	.70
Phosphorus	.010 max	.005
Sulfur	.002 max	.005
Copper	.25 max	

Element	Range	Aim
Chromium	3.10/3.50	3.30
Molybdenum	1.30/1.55	1.35
Silicon	.20/1.00	.50
Vanadium	.20/.30	.25
Tungsten	.30 max	
Nickel	.40 max	

### Applications

S7 Standard is suitable for use in applications requiring high impact strength such as shears, punches, blanking dies, chisels, and zinc die casting dies.

### Annealing

Heat slowly and uniformly to 1500/1550°F and hold for two hours. Cool slowly (50°F per hour max) to 1100°F and air cool to room temperature. Hardness 229 BHN maximum.

### Heat Treating

Precision Marshall's S7 Standard is subject to decarburization during heat treatment, so protective atmosphere furnace or vacuum furnace should be used.

After preheating 1200°F/1250°F, soak material for one half hour per inch of thickness. When material reaches this temperature, heat to 1725°F, then soak material for one half hour per inch of thickness when material is up to this temperature. Air cool or oil quench to hand warm (approximately 150°F) and temper immediately. Note: Sections over two inches thick should be interrupted oil quenched or full oil quenched to attain full hardness.

### Tempering

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

#### Oil quenched from 1750°F • Tempered 4 hours (Section Size — 4" x 4")

Tempering Temperature (°F)	Rockwell Hardness (RC)	Tempering Temperature (°F)	Rockwell Hardness (RC)
400	56/58	900	51/53
500	54/56	1000	49/52
600	53/55	1100	46/48
700	52/54	1200	39/41
800	52/54		

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. The tempering range from 600°F to 800°F should be avoided due to drop in impact strength. Recommended working hardness ranges are RC 56/58 or RC 50/52.

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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 S-7 Standard 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

S7 Standard is supplied fully spheroidize annealed and decarb free.

### Finish

Oversize to typical rms 50/75, maximum 125.

### Sizes

Available in standard thickness increments 1/2" thru 8"

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)



#### ***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](http://www.pmsteel.com).*

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