

Ameralloy[®]-60

AIR HARDENING STEEL **AISI A-6**



Color Code:
BLUE WITH
WHITE STRIPE



Ameralloy-60 is an air hardening, cold work die steel that shows less distortion during heat treatment than water or oil hardening steels, and most high alloy air hardening die steels. A 6-inch cube of Ameralloy-60 will harden to Rockwell C 60 in still air. A major advantage is its low hardening temperature range of 1500°–1600°F, usually available only with oil hardening steels.

The minimum distortion characteristics of Ameralloy-60 make it perfectly suited for dies and punches in blanking and forming operations, or for tools where close size tolerance is critical.

Typical Analysis

- Carbon .70
- Manganese 2.10
- Silicon .30
- Chromium 1.00
- Molybdenum 1.35
- Sulfur .09

Heat Treatment

- **Forging** Ameralloy-60 should be heated slowly to the forging temperature of 2000°–2025°F. Do not hot work below 1600°F. Cool slowly in the furnace or bury in Sil-o-cel, fine dry ashes, lime, expanded mica, or other insulating material.
- **Annealing** Ameralloy-60 may be annealed in either a controlled atmosphere furnace or packed in spent pitched coke, spent cast iron chips, lime, fine dry ashes, sand, or ground mica with approximately 10% burned

charcoal added. Heat to 1325°–1375°F and hold approximately 4 hours for each inch of thickness. Cool very slowly at a rate of 20°F per hour to approximately 1000°F. Annealed hardness range is normally Brinell 235 to 245

- **Hardening** The hardening temperature range for Ameralloy-60 is 1500°–1600°F. Tools with simple shapes may be heated to the hardening temperature directly from room temperature. A preheat of 1200°–1250°F should be used for tools with intricate shapes. A slightly oxidizing furnace atmosphere should be used for hardening. Cool in still air or in an air blast.
- **Tempering** To obtain high hardness with minimum distortion, Ameralloy-60 should be tempered at temperatures between 300°–400°F. Tempering time varies with the size of the piece being hardened, but even the smallest tools should be tempered for a minimum of 1 hour. Refer to the hardening and tempering table to determine approximate hardness obtained from various tempering temperatures.

Ameralloy-60

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Hardened from 1500°F

Tempering Temperature (°F)	Energy-Absorbed Hardness (Ft-Lb)	Rockwell C
As Quenched	78	59
300°	81	58.5
350°	56	58
400°	52	57
450°	45.5	57
500°	63.5	56
600°	52	54
800°	99.5	49.5
1000°	Beyond Machine Capacity	45

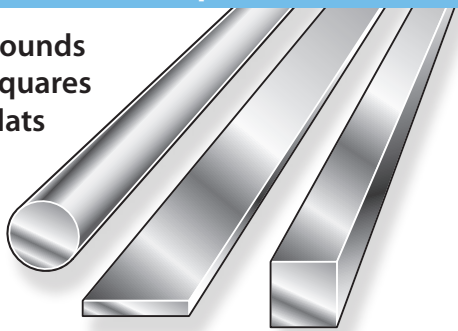
Hardened from 1600°F

Tempering Temperature (°F)	Energy-Absorbed Hardness (Ft-Lb)	Rockwell C
As Quenched	51	63
300°	66	61
350°	106	60
400°	81	59
450°	80.5	58
500°	38	57
600°	100	55
800°	83.5	51
1000°	Beyond Machine Capacity	48

Typical results. Actual data may vary. Not to be construed as maximum or minimum values for final design specification.

Available Shapes And Sizes

Rounds
Squares
Flats



ROUNDS: Lengths precut to any size desired, or 10'-12' R/L lengths. FLATS & SQUARES: Standard 8'-10' R/L lengths or cut pieces. Wider widths and non-standards available upon request. Prompt forging service available.

Rounds Decarb Free Or Hot Rolled Annealed

Hot Rolled Annealed

1/2
5/8
3/4
7/8
1
1-1/8
1-1/4
1-3/8
1-1/2
1-5/8
1-3/4
1-7/8
2
2-1/4
2-1/2
2-3/4
3
3-1/4
3-1/2
3-3/4
6
6-1/2

Pre-Machined

4
7
7-1/2
8
9
10
6
6-1/2

Flats & Squares Decarb-Free Plus .015/.035

1/2

x 1/2
x 1
x 1-1/2
x 2
x 2-1/2
x 3
x 4
x 5
x 6
x 8
x 10
x 12

5/8

x 5/8
x 1
x 1-1/2
x 2
x 2-1/2
x 3
x 4
x 5
x 6
x 8
x 10
x 12

3/4

x 3/4
x 1
x 1-1/2
x 2
x 2-1/2
x 3
x 4
x 5
x 6
x 8
x 10
x 12

7/8

x 7/8
x 1
x 1-1/8
x 1-1/4
x 1-1/2
x 1-3/4
x 2
x 2-1/2
x 2-3/4
x 3
x 3-1/2
x 4
x 5
x 6
x 8
x 10
x 12

1

x 1
x 1-1/4
x 1-1/2
x 1-3/4
x 2
x 2-1/4
x 2-1/2
x 2-3/4
x 3
x 3-1/2
x 4
x 4-1/2
x 5
x 6
x 8
x 10
x 12

1-1/8

x 1-1/8
x 1-1/4
x 1-1/2
x 1-3/4
x 2
x 2-1/4
x 2-1/2
x 2-3/4
x 3
x 3-1/2
x 4
x 4-1/2
x 5
x 6
x 8
x 10
x 12

1-1/4

x 1-1/4
x 1-1/2
x 1-3/4
x 2
x 2-1/4
x 2-1/2
x 2-3/4
x 3
x 3-1/2
x 4
x 4-1/2
x 5
x 6
x 8
x 10
x 12
x 18-1/4

1-3/8

x 1-3/8
x 1-1/2
x 1-3/4
x 2
x 2-1/4
x 2-1/2
x 2-3/4
x 3
x 3-1/2
x 4
x 4-1/2
x 5
x 6
x 8
x 10
x 12

1-1/2

x 1-1/2
x 1-3/4
x 2
x 2-1/4
x 2-1/2
x 2-3/4
x 3
x 3-1/2
x 4
x 4-1/2
x 5
x 6
x 8
x 10
x 12

1-3/4

x 1-3/4
x 2
x 2-1/4
x 2-1/2
x 2-3/4
x 3
x 3-1/2
x 4
x 4-1/2
x 5
x 6
x 8
x 10
x 12

2

x 2
x 2-1/4
x 2-1/2
x 2-3/4
x 3
x 3-1/2
x 4
x 4-1/2
x 5
x 6
x 8
x 10
x 12

2-1/2

x 2-1/2
x 2-3/4
x 3
x 3-1/2
x 4
x 4-1/2
x 5
x 6
x 8
x 10
x 12

3

x 3
x 3-1/2
x 4
x 4-1/2
x 5
x 6
x 8
x 10
x 12

4

x 4
x 4-1/2
x 5
x 6
x 8
x 10
x 12

5-6

5 x 5
5 x 6
5 x 8
6 x 6
6 x 8
6 x 10