Ameralloy®-6

OIL HARDENING STEEL AISI L-6

Color Code:
RED & ORANGE

Ameralloy-6 is in the general class of oil hardening alloy tool steels. Due to its lower carbon content, it has slightly better shock resistance than more highly alloyed types, and should be used in applications where some wear resistance may be sacrificed for increased toughness.

Typical Analysis

- Carbon .75
- Manganese .75
- Chromium .90
- Nickel 1.75
- Molybdenum .35

Features And Advantages

- Oil hardening
- Low distortion in heat-treatment
- Good toughness at lower hardness levels
- Good wear resistance at high hardness levels

Heat Treatment

- **Forging** 2100°–2175°F, stop at 1700°F, cool slowly
- **Normalizing** Do not normalize
- **Annealing** 1400°F, furnace-cool. Brinell 217 max.
- **Hardening** 1500°–1550°F, oil-quench
- **Tempering** 400°F, average hardness after heat treatment Rockwell C 60–61

Applications

- Forming rolls
- Punches
- Blanking dies
- Forming dies
- Clutch parts
- Pawls
- Knuckle pins
- Clutch pins
- Shear blades
- Spindles

General Instructions

- **Forging** Heat Ameralloy-6 slowly and uniformly to 2100°–2175°F, and do not forge below 1700°F. If a preheater is available, hold at 1200°F until uniformly heated before increasing temperature to the forging heat. Because of its air-hardening properties, for slow cooling bury in dry lime, silocel, or other insulating medium immediately after forging.
- **Annealing** Heat to 1400°F and hold 1 hour per inch of greatest thickness. Cool at 20°F per hour to 900°F then air-cool. A maximum hardness of Brinell 217 will be obtained following this treatment. Because of it air-hardening ability, Ameralloy-6 should not be normalized.

• **Hardening** Ameralloy-6 should be preheated at 1200°F, soaked, then raised to a hardening temperature of 1500°–1550°F and held for 1 hour per inch of greatest thickness. Oil-quench to 150°F and temper immediately. Tools made of Ameralloy-6 in sections less than 1" thickness may be air-quenched from 1500°F, providing safer hardening of intricate sections. Air-quenching also results in less distortion.

Ameralloy-tested hardness and fracture grain ratings for air-blast and oil-quenching temperatures. Specimen size 1" round x 5":

Quenching Temperature (°F)	AIR-BLAST Fracture Grain Size	AIR-BLAST Rockwell C	OIL-QUENCH Fracture Grain Size	OIL-QUENCH Rockwell C
1400°	9¾	61	9¾	63
1450°	9¾	63	9¾	64
1500°	9½	63	9¾	64.5
1525°	9½	63	9¾	64.5
1550°	8¾	63	9¼	64
1600°	8½	63	8½	63
1650°	8¼	63	7½	63
1700°	8	62.5	7¼	62
1750°	8	62.5	7¼	61.5
1800°	7	62	7	61

• **Tempering** Temper Ameralloy-6 at 400°. Some hardness may be sacrificed in favor of increased toughness by using higher tempering temperatures.

Unlike many die steels, Ameralloy-6 does not become brittle when tempered in the range of 450°–800°F. Hold a minimum of 1 hour per inch of greatest thickness when tempering at 400°F. To minimize the possibility of cracking, temper immediately after hardening by heating slowly to the desired tempering temperature.

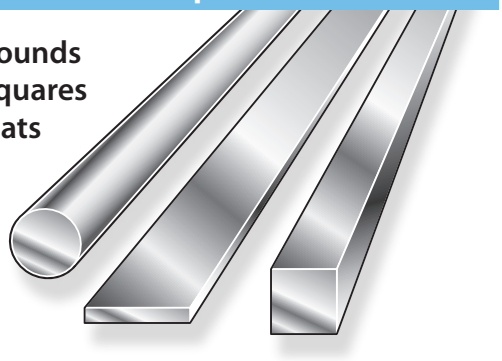
Resulting Rockwell hardness for tempering air-blast and oil-quenched specimens 7/8" round x 2-1/2" long at various temperatures:

Tempering Temperature (°F)	AIR-BLAST 1500°F Rockwell C	OIL-QUENCH 1525°F Rockwell C
No draw	63	65
300°	59.5	62
400°	57.5	61
500°	56.5	58
600°	55	56
700°	51	53
800°	49	50
900°	47.5	48
1000°	43.5	46

Above results on 7/8" diameter specimens may be used as a guide in tempering tools to desired hardness. Tools of heavy section or mass may be several points lower in Rockwell hardness for a given treatment.

Available Shapes And Sizes

Rounds
Squares
Flats



Standard lengths 10'–12' R/L lengths. Larger rounds available upon request.

Rounds Hot Rolled Annealed

1/4	5/8	1	1-1/2	2-1/4
5/16	11/16	1-1/16	1-5/8	2-3/8
3/8	3/4	1-1/8	1-3/4	2-1/2
7/16	13/16	1-1/4	1-7/8	2-5/8
1/2	7/8	1-5/16	2	2-3/4
9/16	15/16	1-3/8	2-1/8	2-7/8

Rough Turned Rounds 5" And Over

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

Squares

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

Flats Hot Rolled Annealed

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