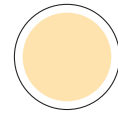


Amera-Mold™

PRE-HARDENED STEEL



Color code:
LIGHT TAN



Amera-Mold is engineered expressly for the plastics molding industry. Amera-Mold is a pre-hardened alloy steel delivered at Rockwell C 28–32 (special hardness upon request). As a result of its fine grain structure (95% of 8), close chemistry, and quality control, Amera-Mold assures our customers of excellent machinability and high lustrous finish unequaled in the industry.

Typical Analysis

- Carbon .50
- Manganese 1.00
- Chromium 1.05
- Silicon .32
- Molybdenum .20
- Nickel .61
- Vanadium .28

Features And Advantages

- Usually eliminates the cost of heat treating by the customer
- Excellent machinability
- High lustrous (mirror-like) finish
- Deep hardening
- Good compressive strength
- Retains high strength at operating temperatures as high as 900°F

Applications

- Injection or compression molding of plastics requiring high sheen on the finished product
- Plastic film extrusion dies
- Zinc casting dies

Heat Treatment

For most plastic molding operations, no further heat treatment is required. However, if the material is committed to reforging, if higher hardness is required, or if stress relieving is necessary after heavy machining, the following cycles are suggested:

- **Stress relieving** Approximately 1000°F
- **Forging** Heat to 2100°F, stop at 1800°F and cool slowly
- **Normalizing** 1600°F, air cool
- **Annealing** 1525°F, cool 20° per hour to 1195°F, air cool, Brinell 207 max.
- **Hardening** 1525°F, oil-quench
- **Tempering** Temper at 1150°F (depending on size and desired properties)
- **Nitriding** 1000°–1025°F for 25 hours produces 0.025" case depth
- **Carburizing** 1700°–1750°F for Rockwell C 63–64 surface hardness

General Instructions

Amera-Mold is delivered fully quenched and tempered to a hardness range of Brinell 285 to 321. For most operations, no further heat treatment is required. Where heat treatment is required, refer to the following procedures.

- **Stress relieving** Stress produced by cold work operations such as hobbing, straightening, deep stamping, grinding, and heavy machining continue to add distortion during heat treatment and should be removed prior to hardening. Heat to 1000°–1100°F, holding until all parts are heated uniformly, and cooling to room temperature. If the stresses are produced after machining in the heat-treated condition, the maximum stress-relieving temperature is 100°F below the tempering temperature.
- **Forging** Heat Amera-Mold to approximately 2100°F, and hold until the piece is thoroughly heated before forging. Stop forging at 1800°F and reheat if necessary. After forging, the piece should be buried in an inert, heat-insulating material and slow cooled. Then normalize and anneal.

- **Normalizing** Heat to approximately 1600°F and hold at temperature 1 hour per inch of greatest thickness. The piece should then be cooled to room temperature in still air.

- **Annealing** Heat the piece in a protective atmosphere to 1525°F and soak 1 hour per inch of greatest thickness. Maintain atmosphere control and cool at a rate of 20°F per hour to 1195°F and then air cool. This procedure should produce a hardness of Brinell 212 maximum.

- **Hardening** Heat to a temperature of 1525°F and hold for 1 hour per inch of greatest thickness. Quench in oil to 150°F and temper immediately.

- **Tempering** Temperature will vary with the size of the piece and the application. Use the chart below to achieve desired tempering properties.

Results of tests performed on 1" round specimen. For larger sections, the mechanical properties may be somewhat lower. It may be necessary to adjust the tempering temperature to obtain the same properties as those shown:

Tempering Temperature (°F)	Yield Point (psi)	Tensile Strength (psi)	Elongation (%)	Reduction (%)	Hardness (Brinell)
400°	247,500	301,500	10.25	33.95	578
500°	249,500	283,250	10.0	37.25	555
600°	240,500	268,500	10.5	40.65	534
700°	224,250	243,000	10.25	39.6	495
800°	212,000	223,500	9.5	38.8	444
900°	201,000	214,000	11.0	44.0	429
1000°	184,500	198,000	11.5	40.1	401
1050°	170,000	182,000	14.0	48.3	375
1100°	162,000	157,000	14.5	49.5	363
1150°	160,000	174,000	15.0	49.5	363
1200°	147,000	158,000	17.0	56.2	331
1250°	130,000	142,500	18.5	58.6	292
1300°	117,000	128,000	20.0	59.1	262

Rounds				Squares		Flats					
1/4	2-5/8	5-1/4	10-1/2	1/2	4-1/2	3/4	x 12	x 12	x 5	x 18	x 20
3/8	2-3/4	5-1/2	11	5/8	5	x 1	1-1/4	1-3/4	x 6	3-1/2	5
1/2	2-7/8	5-3/4	11-1/2	3/4	5-1/2	x 1-1/2	x 4	x 6	x 7	x 4	x 10
5/8	3	6	12	1	6	x 2	x 5	2	x 8	x 5	x 12
3/4	3-1/8	6-1/4	12-1/2	1-1/8	8	x 3	x 6	x 3	x 10	x 6	x 14
7/8	3-1/4	6-1/2	13-1/4	1-1/4	9	x 4	x 7	x 4	x 12	x 8	x 18
1	3-3/8	6-3/4	14-1/4	1-3/8	10	x 5	x 8	x 5	x 14	x 10	6
1-1/8	3-1/2	7	15-1/4	1-1/2	11	x 6	x 10	x 6	x 16	x 12	x 10
1-1/4	3-5/8	7-1/4	16-1/4	1-5/8	12	x 8	1-1/2	x 7	x 18	x 14	x 12
1-3/8	3-3/4	7-1/2	17-1/4	1-3/4	14	1	x 2	x 8	3	4	x 16
1-1/2	3-7/8	7-3/4		2	16	x 1-1/2	x 3	x 10	x 4	x 5	x 18
1-5/8	4	8		2-1/4		x 2	x 3-1/2	x 12	x 5	x 6	x 20
1-3/4	4-1/8	8-1/4		2-1/2		x 3	x 4	x 14	x 6	x 8	8
2	4-1/4	8-3/4		2-3/4		x 4	x 5	x 16	x 8	x 10	x 12
2-1/8	4-3/8	9		3		x 5	x 6	x 18	x 10	x 12	x 14
2-1/4	4-1/2	9-1/4		3-1/4		x 6	x 7	2-1/2	x 12	x 14	x 16
2-3/8	4-3/4	9-1/2		3-1/2		x 8	x 8	x 3	x 14	x 16	x 20
2-1/2	5	10		4		x 10	x 10	x 4	x 16	x 18	

Amera-Mold sizes available for immediate shipment. Hot rolled, cold drawn, and decarb-free.