
EVERETT STEEL COMPANIES

ALLOY ROUND

AISI 4140

Chromium-Molybdenum Steel

AISI 4140 steels are a chromium-molybdenum alloy grade which must be heat treated to obtain its maximum strength and hardness levels. They respond readily to heat treatment and have good hardenability or through hardness, especially when compared to carbon steel grades. Any of the common heat treating methods can be employed. This grade can be readily forged and welded when proper welding precautions are used.

Specifications: Round stock is available in hot rolled and cold finish steel in various conditions, such as: Forging Quality (As Rolled); Annealed; Heat Treated and Stress Relieved; or Heat Treated, Stress Relieved and Turned, Ground and Polished.

Chemical Analysis: (Average Range)

Carbon	Manganese	Phosphorus	Sulphur
.38/.43	.75/1.00	.035 Max.	.04 Max.
Silicon	Chromium	Molybdenum	
.20/.35	.80/1.10	.15/.25	

The analysis of the leaded grade is the same as above with the addition of .15/.35 Lead.

Mechanical Properties: (Approximate)

	Tensile (P.S.I.)	Yield (P.S.I.)	Brinell Hardness	Rockwell Hardness
Annealed	95,000	60,000	187	90B
Heat Treated	144,000	128,000	302	32C

Machinability: Based on B-1112 as 100%, 4140 in the annealed condition has a machinability rating of approximately 66%, as compared with 78% in the annealed leaded condition.

Weldability: Difficult to weld, but can be welded by any of the common welding processes providing section is preheated, and stress relieved after welding. The grade of welding rod used depends upon thickness of section, design, service requirements, etc.

Forging: Heat to 2150-degree-2250-degree F.

Normalizing: Heat to 1600-degree-1700-degree F. Cool in air. Average Brinell hardness, 285. (Rc29).

EVERETT STEEL COMPANIES

Hardening: Hardening range is between 1525° and 1625° F. Quench in oil. A wide range of mechanical properties can be obtained by tempering between 400° and 1100° F.

Annealing: Heat to 1450°-1500° F. Cool slowly in furnace. Average Brinell hardness, 187.

1/2" x 12' mechanical plate shear