

1045 AISI (USA)

Standards

AISI

American Iron and Steel Institute

Chemical composition

C 0.43 - 0.50

Mn 0.6 - 0.9

P < 0.04

S < 0.04

Fe Rest

Si : By agreement

When boron treatment for killed steels is specified, the steels can be expected to contain 0.0005 - 0.003% B.

If the usual titanium additive is not permitted, the steels can be expected to contain B > 0.005.

Properties

By ASTM A311

Normal Draft Cold Drawn and Stress Relieved Annealed

Diameter or thickness: < 20 mm ;

Yield Strength: > 585 MPa

Tensile Strength: > 655 MPa

Elongation: > 12 %

Reduction of area: > 35 %

Diameter or thickness: 20 - 30 mm ;

Yield Strength: > 550 MPa

Tensile Strength: > 620 MPa

Elongation: > 11 %

Reduction of area: > 30 %

Diameter or thickness: 30 - 50 mm ;

Yield Strength: > 520 MPa

Tensile Strength: > 585 MPa

Elongation: > 10 %

Reduction of area: > 30 %

Diameter or thickness: > 50 mm ;

Yield Strength: > 485 MPa

Tensile Strength: > 550 MPa

Elongation: > 10 %

Reduction of area: > 30 %

Heavy Draft Cold Drawn and Stress Relieved Annealed

Diameter or thickness: < 50 mm ;

Yield Strength: > 690 MPa

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Tensile Strength: > 795 MPa

Elongation: > 10 %

Reduction of area: > 25 %

Diameter or thickness: 50 - 75 mm ;

Yield Strength: > 690 MPa

Tensile Strength: > 795 MPa

Elongation: > 9 %

Reduction of area: > 25 %

Diameter or thickness: > 75 mm ;

Yield Strength: > 620 MPa

Tensile Strength: > 725 MPa

Elongation: > 7 %

Reduction of area: > 20 %

By ASTM A519

Hot rolled

Yield Strength: 310 MPa

Tensile Strength: 517 MPa

Elongation: 15 %

Hardness HRB: 80

Cold rolled

Yield Strength: 552 MPa

Tensile Strength: 621 MPa

Elongation: 5 %

Hardness HRB: 90

Stress relieved

Yield Strength: 483 MPa

Tensile Strength: 552 MPa

Elongation: 8 %

Hardness HRB: 85

Annealing

Yield Strength: 241 MPa

Tensile Strength: 448 MPa

Elongation: 20 %

Hardness HRB: 72

Normalized

Yield Strength: 331 MPa

Tensile Strength: 517 MPa

Elongation: 15 %

Hardness HRB: 60