# 1.4418 STAINLESS

*EN Number: EN 1.4418*
*AISI Number: N/A*
*DIN Number: DIN X4CrNiMo 16-5-1*

## Type analysis

*Single figures are nominal except where noted*

| | | | | | |
|---|---|---|---|---|---|
| **Iron** | Balance | **Chromium** | 16.00 % | **Nickel** | 5.00 % |
| **Manganese (Maximum)** | 1.50 % | **Molybdenum** | 1.20 % | **Silicon (Maximum)** | 0.70 % |
| **Carbon (Maximum)** | 0.06 % | **Phosphorus (Maximum)** | 0.040 % | **Sulfur (Maximum)** | 0.030 % |
| **Nitrogen (Minimum)** | 0.02 % | | | | |

## Forms manufactured

| | |
|---|---|
| **Bar-Rounds** | **Wire-Rod** |

## Description

1.4418 Stainless is a martensitic stainless steel specially designed for those applications requiring high mechanical properties combined with improved corrosion resistance relative to traditional martensitic steels.

1.4418 Stainless is also offered as an enhanced machining variant, 1.4418 EM Stainless, which obtains an enhanced machinability characteristic through controlled addition of sulfur without degrading strength or corrosion resistance. 1.4418 EM Stainless contains differentiated micro constituents for easier machining production.

**Key Properties:**

- High strength
- High hardness
- Corrosion resistance similar to 304 stainless

**Markets:**

- Automotive
- Industrial

**Applications:**

- Direct injected engines
- Fittings on fuel rails
- Fuel pumps
- Injector bodies

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## Corrosion resistance

This alloy shows good corrosion resistance to mild atmospheres, both in annealed and heat-treated conditions. It resists corrosion in many industrial and domestic environments, as well as potable and mine waters.

For optimum corrosion resistance, surfaces must be free of scale, lubricants, foreign particles, and coatings applied for drawing and heading. After fabrication of parts, cleaning and/or passivation should be considered.

*IMPORTANT NOTE:*
*The following 4-level rating scale is intended for comparative purposes only. Corrosion testing is recommended; factors that affect corrosion resistance include temperature, concentration, pH, impurities, aeration, velocity, crevices, deposits, metallurgical condition, stress, surface finish, and dissimilar metal contact.*

| | | | |
|---|---|---|---|
| **Nitric Acid** | Moderate | **Sulfuric Acid** | Restricted |
| **Phosphoric Acid** | Restricted | **Acetic Acid** | Moderate |
| **Sodium Hydroxide** | Moderate | **Salt Spray (NaCl)** | Moderate |
| **Sea Water** | Restricted | **Sour Oil/Gas** | Restricted |
| **Humidity** | Good | | |

## Physical properties

| PROPERTY | English Units | Metric Units |
|---|---|---|
| SPECIFIC GRAVITY | 7.68 | 7.68 |
| DENSITY | 0.2832 lb/in$^3$ | 7839 kg/m$^3$ |

## Typical mechanical properties

**THIS PRODUCT IS COMMONLY HEAT TREATED TO THE QT900 CONDITION.**

**TYPICAL ROOM TEMPERATURE MECHANICAL PROPERTIES AT QT900 TEMPERING**

| FORM | ORIENTATION | 0.2% YIELD STRENGTH | | ULTIMATE TENSILE STRENGTH | | ELONGATION IN 4D | REDUCTION OF AREA | CHARPY V-NOTCH | | HRC |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ksi | MPa | ksi | MPa | % | % | FT-LBS | J | |
| Treated | Long | 120 | 827 | 138 | 951 | 21 | 65 | 108 | 146 | 31 |
| Treated + cold drawn | Long | 129 | 890 | 150 | 1034 | 17 | 61 | 72 | 98 | 34 |

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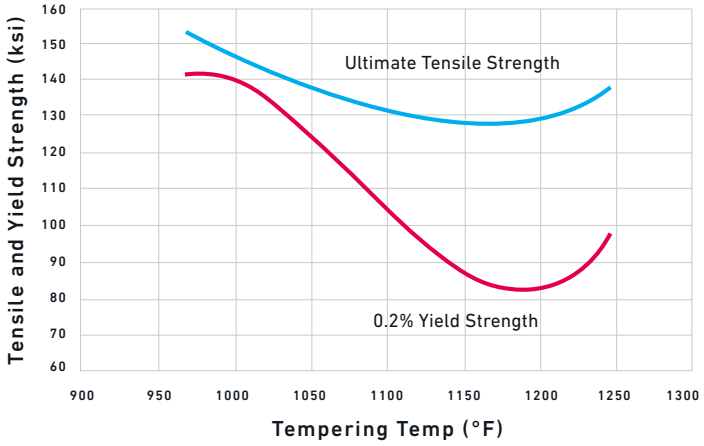
## Heat treatment

| | |
|---|---|
| **Annealing** | This alloy is typically annealed at 1112°F - 1200°F (600°C - 650°C), followed by slow cooling in air. Heat uniformly to the selected temperature. |
| **Hardening** | Heat to 1740°F - 1920°F (950°C - 1050°C), followed by oil quench. Small sections can be hardening by air cool. |
| **Tempering** | T900 properties are achieved by tempering at 1025°F - 1145°F (550°C - 620°C) for 8 hours followed by oil or air cool. Alternately, material may be treated using two cycles, 4 hours each followed by oil or air cool. This alloy may suffer temper embrittlement if tempered at 785°F - 1022°F (450°C - 550°C), or slow cool at this temperature range. |

**TEMPERING CURVE 1.4418**




**Hardened 1800°F (982°C) 1 hour, oil quench, tempered 8 hours.**

**For additional information, please contact your nearest sales office:**
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