Technical Datasheet

CarTech® 409Cb Stainless

Identification

UNS Number

• S40940

Type Analysis

Single figures are nominal except where noted.

Carbon (Maximum)	0.06 %	**Manganese (Maximum)**	1.00 %
Phosphorus (Maximum)	0.045 %	**Sulfur (Maximum)**	0.040 %
Silicon (Maximum)	1.00 %	**Chromium**	10.50 to 11.75 %
Nickel (Maximum)	0.50 %	**Columbium/Niobium**	10 X C Minimum/0.75%
Iron	Balance		

General Information

Description

CarTech 409Cb stainless is a stabilized ferritic stainless steel with 11.0% chromium. It is a nonhardenable alloy (by heat treatment) and is resistant to mild atmospheres. The alloy can be cold formed and welded.

Applications

CarTech 409Cb stainless has been used extensively in automotive exhaust systems.

Corrosion Resistance

Type 409Cb stainless exhibits corrosion resistance similar to that of Type 405. The alloy resists corrosion in many light industrial and domestic applications. For example, Type 409Cb stainless can resist corrosion in fresh water, organic materials, and mild acids. 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 which 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	Restricted
Sodium Hydroxide	Moderate	Salt Spray (NaCl)	Moderate
Humidity	Good		

Properties

Physical Properties

Density	0.2800	lb/in³
Mean Specific Heat (32 to 212°F)	0.1100	Btu/lb/°F
Mean CTE (75 to 1200°F)	6.82	x 10^{-6} in/in/°F
Modulus of Elasticity (E)	29.0	x 10^{3} ksi
Electrical Resistivity (70°F)	354.0	ohm-cir-mil/ft

Typical Mechanical Properties

Typical Room Temperature Mechanical Properties—Type 409Cb Stainless
0.734" round wire (coil), annealed 1436°F (780°C).

0.2% Yield Strength		Ultimate Tensile Strength		% Elongation in 2"	% Reduction of Area	Brinell Hardness
ksi	MPa	ksi	MPa			
31.4	216	59.0	407	42	80	130

Heat Treatment

Annealing

Heat uniformly to 1436°F (780°C) and soak until charge is at temperature. Remove charge from the furnace and cool in air. A combination of cold work and anneal will optimize grain size and workability.

Hardening

Type 409Cb stainless is not hardenable by heat treatment. However, hardness as well as tensile properties can be increased significantly by cold work.

Workability

Hot Working

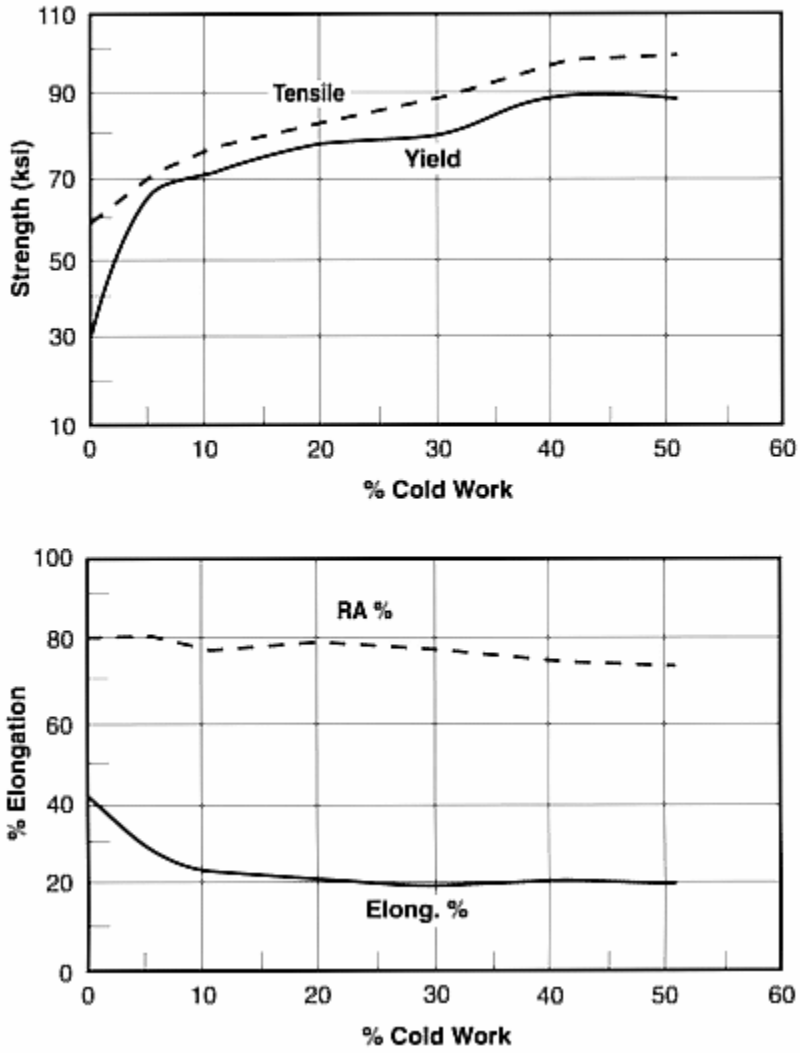
Type 409Cb stainless can be forged, upset, and hot-headed satisfactorily. Hot working temperatures should be between 1750/1850°F (954/1010°C).

Cold Working

Type 409Cb stainless can be blanked, formed, and cold drawn. Significant hardening occurs by cold work as can be seen in the work-hardening curves at the top of the following page.

The work hardening curves were produced by drawing annealed Type 409Cb stainless through a single die draw block. Standard ASTM tension tests were used to obtain typical mechanical properties of the material with a 5%, 10%, 20%, 30%, 40%, and 50% total reduction in area.

Effect of Cold Work on Typical Tensile Properties—Type 409Cb Stainless



Weldability

Type 409Cb stainless has been satisfactorily welded by the shielded fusion and resistance welding processes.

The alloy may be welded using Type 409Cb stainless as filler material. Other filler materials may be used such as Type 309/309L. In this situation, it must be satisfactory for a dissimilar weldment to be produced in a particular application.

Welding may result in limited ductility of the heat affected zone. Therefore, all weldments should be given a post-weld anneal for optimum mechanical properties and corrosion resistance.

Other Information

Applicable Specifications

- ASTM A493
- ASTM A5801
- ASTM A959

Forms Manufactured

- Bar-Rounds
- Wire
- Wire-Rod

Technical Articles

- Alloy Selection for Cold Forming (Part I)
- Alloy Selection for Cold Forming (Part II)
- How to Passivate Stainless Steel Parts
- New Stainless for Fasteners Combines Corrosion Resistance, High Hardness and Cold Formability
- Passivating and Electropolishing Stainless Steel Parts
- Selection of High Strength Stainless Steels for Aerospace, Military and Other Critical Applications

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