

18 Cr-Cb

STAINLESS STEEL



AK Steel 18 Cr-Cb™ Stainless Steel provides a more effective solution than Type 409 to many automotive exhaust and heat applications, due to its higher oxidation resistance, improved creep resistance and moderate formability.

AK Steel 18 Cr-Cb is a ferritic stainless steel that is stabilized with both titanium and columbium. When given a high-temperature final solution anneal, the alloy exhibits dramatic creep resistance. The dual stabilization prevents carbide sensitization during welding and high-temperature exposure, and makes the alloy thermally nonhardenable.

Potential applications include exhaust system catalytic converters, mufflers and pipes; heat exchangers and heat-exchanger tubing; and nonstructural furnace parts.

MECHANICAL PROPERTIES

Typical Mechanical Properties

UTS ksi (MPa)	0.2% YS ksi (MPa)	Elongation % in 2" (50.8 mm)	Hardness Rockwell	ASTM Grain Size	n
67-75 (462-517)	44-52 (303-359)	30-38	77-83	5-7	.180

Properties Acceptable for Material Specification

UTS ksi (MPa)	0.2% YS ksi (MPa)	Elongation % in 2" (50.8 mm)	Hardness Rockwell
60 min (414)	38 min (262)	25 min	B88 max

TYPICAL COMPOSITION

	%
Carbon	0.02
Manganese	0.30
Silicon	0.45
Chromium	18.00
Titanium	0.25
Columbium	0.55

AVAILABLE FORMS

AK Steel produces 18 Cr-Cb Stainless Steel in coils and cut lengths in thicknesses from 0.018" to 0.100" (0.457 to 2.54 mm) and widths up to and including 48" (1219 mm). For other thicknesses, inquire.

PHYSICAL PROPERTIES

Room Temperature Properties

Density, 0.277 lbs/in³
7.65 g/cm³

Electrical Resistivity, microhm-in
(microhm-cm) 23.29 (59)

OXIDATION RESISTANCE

The 17.5% minimum-chromium content of AK Steel 18 Cr-Cb Stainless Steel provides an improved oxidation-resistance level compared to lower chromium alloys such as Type 409 stainless. Under cyclic heating conditions, this alloy will outperform austenitic alloys of similar chromium content like Type 304 stainless due to the ferritic alloy's lower coefficient of thermal expansion.

Under laboratory simulated exhaust gas atmosphere, the material demonstrated lower weight gains compared to Type 409, with no indication of catastrophic attack up to 1650°F (899°C).

CORROSION RESISTANCE

AK Steel 18 Cr-Cb Stainless Steel is notably superior to Type 409 stainless steel in synthetic muffler condensate resistance and wet corrosion resistance, particularly to chlorides. The corrosion rate of AK Steel 18 Cr-Cb Stainless Steel approaches the corrosion rate of Cr-Ni stainless steel.

FORMABILITY

AK Steel 18 Cr-Cb Stainless Steel can be cut, blanked and formed. Brakes, presses and roll-forming normally used on carbon steel can be used on this alloy.

Caution: Cold weather impact loads should be avoided with material 0.100" (2.54 mm) and heavier, particularly with welds, because the ductile-to-brittle transition temperature (DBTT) could fall close to ambient temperature.

WELDABILITY

The ferritic class of stainless steels is generally considered to be weldable by the common fusion and resistance techniques. Special consideration is required to avoid brittle weld fractures during fabrication by minimizing discontinuities, maintaining low weld heat input, and occasionally warming the part somewhat before forming. This particular alloy is generally considered to have slightly poorer weldability than the most common alloy of this stainless class, Type 409. A major difference is that the weld deposits themselves, while possessing reasonable ductility, will not be as ductile as the base metal. When a weld filler is needed, W 18 Cb filler is suggested. Type 409 Stainless Steel is well known in reference literature and more information can be obtained in this way.

METRIC CONVERSION

Data in this publication are presented in U.S. customary units. Approximate metric equivalents may be obtained by performing the following calculations:

Length (inches to millimeters) –
Multiply by 25.4

Strength (ksi to megapascals or
meganewtons per square meter) –
Multiply by 6.8948

Temperature (Fahrenheit to Celsius) –
(°Fahrenheit - 32) Multiply by 0.5556.

Density (pounds per cubic inch to
kilograms per cubic meter – Multiply
by 27,670

The information and data in this product data sheet are accurate to the best of our knowledge and belief, but are intended for general information only. Applications suggested for the materials are described only to help readers make their own evaluations and decisions, and are neither guarantees nor to be construed as express or implied warranties of suitability for these or other applications.

Data referring to mechanical properties and chemical analyses are the result of tests performed on specimens obtained from specific locations with prescribed sampling procedures; any warranty thereof is limited to the values obtained at such locations and by such procedures. There is no warranty with respect to values of the materials at other locations.

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