

AI-1706

Specifications

AWS/ASME SFA 5.21 ER : CoCr-A

Description and Applications

AI-1706 is the most universally used grade of the Cobalt based surfacing alloys providing excellent resistance to the single or combined effects of wear due to mechanical and chemical degradation over a wide temperature range.

AI-1706 is a tough; impact and corrosion resistant alloy, which does not readily heat check under pressure at elevated temperatures and has excellent anti-galling properties. It resists chipping, spalling and oxidation at red heat while maintaining reasonable ductility and good high temperature hardness. The alloy has a low coefficient of friction and even after prolonged exposure to temperatures over 1000°C will recover full room temperature hardness.

AI-1706 is virtually unaffected by most common corrosive chemicals as well as atmospheric corrosion. When heated in air, the alloy begins to tarnish at 400°C, but no appreciable oxidation takes place until it is heated to temperatures above 750°C. Due to the formation of a tightly adherent scale after the initial heating cycle, subsequent oxidation, up to 1000°C is negligible. At temperatures above 1000°C, oxidation is more noticeable but not appreciably affected by the presence of moisture. Decarburization is negligible below 1000°C. However, molten salts and alkali carbonates and hydrozides are somewhat corrosive, especially if allowed to collect and remain on the surface.

AI-1706 is considered to be readily machineable with selected Tungsten Carbide Tools.

Applications include: diesel engine exhaust valves and seats; steam control valves; hot work shearing parts; edger rolls; hot trim dies; swaging mandrels; hot shear blades; cams; steam turbine parts; plastic extruder screws; scrapers; pit points; pump parts; components in hot zinc baths.

Typical Weldmetal Analysis

C	Mn	Si	Cr	Fe	W	Co
1.35	0.90	1.50	27.00	3.00	3.50	Bal

AI-1706 is a quaternary alloy consisting nominally of 27% Chromium, 3.5% Tungsten and 1.2% Carbon. It essentially consists of M_7C_3 and M_6C type carbides in an alloyed austenitic matrix of cobalt, chromium and tungsten.

Hot Hardness

Temp (°C)	20	100	200	300	400	500	600	700	800	900
Hardness DPH ₃₀₀	410	390	356	345	334	301	235	155	138	95
Hardness HRc	42	40	36	35	35	30	22	20		



Mechanical Properties of Weldmetal

	As Welded
Melting Point	1282°C
Specific Gravity	8.46
Density	7.6g/cc
Tensile Strength	828MPa
Plastic Deformation	5% in 2 inches
Hardness	42.0 HRc
Shock Resistance	Very Good
Metal-to-Metal Wear Resist	Excellent
High Temperature Resistance	Excellent
Thermal Shock Resistance	Exceptional
Shielding Gas	Argon 98% + 2% Oxygen or Argon 100%

Coefficient of Thermal Expansion (inches/inch/°F)

Temp (°C)	50	100	150	200	250	400	600	650
Hardness DPH ₃₀₀	6.72	7.02	7.25	7.49	7.72	8.37	9.21	9.78

Welding Instructions

For reduced levels of dilution and an improved weldability, we recommend using a pulsed MIG mode.

Welding Parameters

Diameter (mm)	Current type	Pulsed Arc Welding	Spray Transfer
1.2	DC (+)	22V/150A	28V/220A
1.6	DC (+)	25V/180A	30V/250A

Also available as Bare Rod **AI-0606B**, Coated Electrode **AI-0606E** and Submerged Arc Wire

Welding Positions

(1G, 1F) Downhand/flat position, (2F) Horizontal position, (2G) Horizontal vertical position

Disclaimer

All figures in this datasheet should be considered indicative only. No guarantee is made as to their accuracy.

All figures subject to change without notice. Batch analysis is available for all products sold. Should you require any further information, please contact us at sales@alloysint.com.au

