

6 ALLOY

TECHNICAL DATA

TIG & OXY-ACETYLENE WELDING

MMA WELD DEPOSITION

MIG WELD DEPOSITION

PTA & LASER WELD DEPOSITION

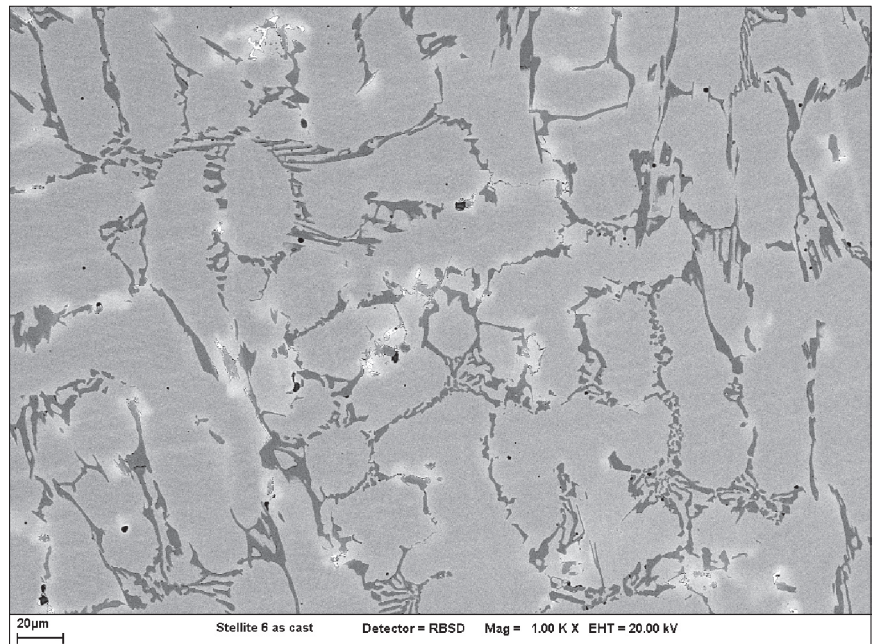
HVOF & PLASMA SPRAY DEPOSITION

Nominal Composition (mass %) and Physical Properties

Co	Cr	W	C	Others	Hardness	Density	Melting Range
Base	27 - 32	4 - 6	0.9-1.4	Ni, Fe, Si, Mn, Mo	36-45 HRC 380-490 HV	8.44 g/cm ³ 0.305 lb/in ³	2340-2570 °F 1285-1410 °C

Soonv® cobalt base alloys consist of complex carbides in an alloy matrix. They are resistant to wear, galling and corrosion and retain these properties at high temperatures. Their exceptional wear resistance is due mainly to the unique inherent characteristics of the hard carbide phase dispersed in a CoCr alloy matrix.

Soonv® 6 is the most widely used of the wear resistant cobalt based alloys and exhibits good all-round performance. It is regarded as the industry standard for general-purpose wear resistance applications, has excellent resistance to many forms of mechanical and chemical degradation over a wide temperature range, and retains a reasonable level of hardness up to 500°C (930°F). It also has good resistance to impact and cavitation erosion. Soonv® 6 is ideally suited to a variety of hardfacing processes and can be turned with carbide tooling. Examples include valve seats and gates; pump shafts and bearings, erosion shields and rolling couples. It is often used self-mated.



Scanning Electron Micrograph of Cast Soonv 6 at 1000x magnification.

Corrosion Resistance

The typical electrode potential in sea water at room temperature is -0.25V (SCE). Like stainless steels, Soonv® 6 corrodes primarily by a pitting mechanism and not by general mass loss in seawater and chloride solutions. Its mass loss in sea water is below 0.05mm per year at 22°C. More information regarding corrosion resistance can be provided on request.

Nominal Thermal Expansion Coefficient (from 20°C/68°F to stated temperature)

	100°C (212°F)	200°C (392°F)	300°C (572°F)	400°C (752°F)	500°C (932°F)	600°C (1112°F)	700°C (1292°F)	800°C (1472°F)	900°C (1652°F)	1000°C (1832°F)
μm/m.K	11.35	12.95	13.6	13.9	14.2	14.5	14.7	15.05	15.5	17.5
μ-inch/inch.°F	6.31	7.20	7.56	7.72	7.89	8.06	8.17	8.36	8.61	9.72

Nominal Tensile Properties at Room Temperature

	Ultimate Tensile Strength Rm		Yield Stress Rp(0.2%)		Elongation	Elastic Modulus	
	ksi	MPa	ksi	MPa	A(%)	psi	GPa
Castings	123	850	101.5	700	<1	30.3x10 ⁶	209
Soonv [®] HS-6 (*)	183.5	1265	109	750	3 - 5	34x10 ⁶	237

(*) "HS" = HIP-consolidated. Ref: Ashworth et al. Powder Metal. 1999 42[3] p.243-249 and internal tests.

Nominal Hot Hardness (DPH) as-cast

20°C (68°F)	100°C (212°F)	200°C (392°F)	300°C (572°F)	400°C (752°F)	500°C (932°F)	600°C (1112°F)	700°C (1292°F)	800°C (1472°F)	900°C (1652°F)
410	390	356	345	334	301	235	155	138	95

Thermal and Electrical Properties

	Approximate value at Room Temperature	
Thermal conductivity	14.82 W/m.K	102.7 Btu-in/hr/ft²/°F
Electrical resistivity	106 μ-ohm.cm	41.7 μ-ohm.inch

Product Forms and Cross Reference Specifications

Soonv[®] 6 is available as welding wire, rod, powder, and electrodes; finished castings and P/M parts. Deloro Soonv also offers hardfacing services. A separate brochure is available for the wrought forms of this alloy, namely Soonv[®] 6B and Soonv[®] 6K. Soonv[®] 6 can be supplied to the following specifications:

SPECIFICATION	PRODUCT FORM	SPECIFICATION	PRODUCT FORM
UNS R30006	Rod, Castings	AWS A5.21 / ASME BPVC IIC SFA 5.21 ERCoCr-A	Rod
UNS R30106	P/M Parts	AWS A5.21 / ASME BPVC IIC SFA 5.21 ERCCoCr-A	Wire
UNS W73006	Electrode	AWS A5.13 / ASME BPVC IIC SFA 5.13 ECoCr-A	Electrode
UNS W73036	Wire		
UNS 5387	Castings		
AMS 5788	Rod, Wire		