

# STELLITE 1

## STELLITE™ 1 ALLOY

### TECHNICAL DATA

TIG WELD DEPOSITION | MMA WELD DEPOSITION | MIG WELD DEPOSITION | PTA & LASER WELD DEPOSITION | CASTINGS & POWDER METALLURGY

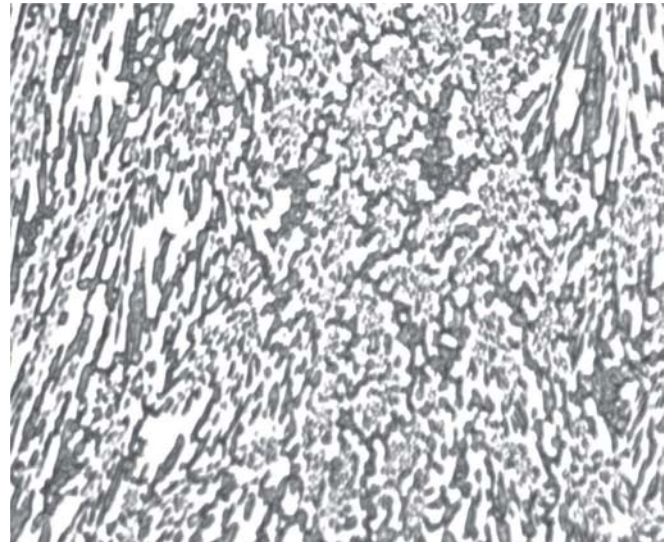
#### NOMINAL COMPOSITION (MASS %) AND PHYSICAL PROPERTIES

Co	Cr	W	C	Others	Hardness	Density	Melting Range
Base	28-32	11-13	2.0-3.0	Ni, Fe, Si, Mn, Mo	50-58 HRC 550-720 HV	8.69 g/cm <sup>3</sup> 0.314 lb/in <sup>3</sup>	1248-1290°C 2278-2355°F

**STELLITE COBALT-BASED 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.

**Stellite 1** possesses excellent abrasion and corrosion resistance for applications such as pump sleeves, rotary seal rings, wear pads, expeller screws, and bearing sleeves. It retains its hardness at temperatures in excess of 760°C (1400°F).

**Stellite 1** contains a high proportion of hard, wear-resistant primary carbides. These render the alloy well suited to applications involving extreme low-angle erosion and severe abrasion, with some sacrifice in toughness. Compared to other **Stellite** alloys, it is more crack-sensitive, and care should be taken to minimize the cooling stresses experienced during casting and hardfacing processes. Due to its high hardness and wear resistance, **Stellite 1** should only be finished by grinding.



Optical micrograph of a Stellite 1 weld overlay

#### CORROSION RESISTANCE

**Stellite 1** has good general corrosion resistance. The typical electrode potential in sea water at room temperature is approximately -0.4 V (SCE). **Stellite 1** corrodes primarily by a pitting mechanism and not by general mass loss in seawater and chloride solutions. More detailed 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)
µm/m.K	10.5	11.3	11.8	12.1	12.5	12.8	13.5	13.9	14.4
µ-inch/inch.°F	5.8	6.3	6.5	6.7	6.9	7.1	7.5	7.7	8.0

## 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	79	550	-	-	<1	36.0x10 <sup>6</sup>	248

## 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)
606	573	540	508	485	453	406	330	217	140

## THERMAL AND ELECTRICAL PROPERTIES

	Approximate Value at Room Temperature	
Thermal conductivity	14.5 W/m.K	100.5 Btu-in/hr/ft²/°F
Electrical resistivity	94.0 µ-ohm.cm	37.0 µ-ohm.inch

SPECIFICATION	PRODUCT FORM
UNS R30001	Rod, castings, powder for PTA or laser processing
UNS W73031	Wire
UNS W73001	Electrode

## PRODUCT FORMS AND CROSS-REFERENCE SPECIFICATIONS

**Stellite 1** is available as welding wire, rod, powder, electrodes, finished castings, and powder metallurgy components.

**Stellite 1** can be supplied to the following specifications:

SPECIFICATION	PRODUCT FORM
AWS A5.21 / ASME BPVC IIC SFA 5.21 ERCoCr-C	Rod
AWS A5.21 / ASME BPVC IIC SFA 5.21 ERCCoCr-C	Wire
AWS A5.13 / ASME BPVC IIC SFA 5.13 ECoCr-C	Electrode

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