Deloro Wear Solutions

TECHNICAL DATA

STELLITE™ 21 ALLOY

STELLITE™ COBALT-BASED ALLOYS consists 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™ 21 consists of a CoCrMo alloy matrix containing dispersed hard carbides which strengthen the alloy and increase its hardness, but also decrease the ductility. The type, shape, size, and distribution of the carbides is strongly influenced by the processing history of the alloy, and for this reason the mechanical properties of Stellite™ 21 are very dependent upon the manufacturing route and any subsequent heat treatments. Due to the low volume fraction of carbides, the Co-based alloy matrix dominates the wear and corrosion properties. Stellite™ 21 has excellent cavitation, galling and metal-to-metal sliding wear resistance, but is not recommended for severe hard particle abrasion. The surface can work harden considerably during wear or even during machining, and the use of correct machining tools and techniques is important to achieve optimal results. Stellite™ 21 has excellent resistance to thermal and mechanical shock.
Stellite™ 21 is similar to the medical implant alloy ASTM F-75 and was previously also known as Stellite™ 8.

CORROSION RESISTANCE

Stellite™ 21 is resistant to oxidizing and reducing gaseous atmospheres up to 1150°C (2100°F). Because its ternary alloying element is Mo and not W, it has higher resistance to reducing or complex environments (e.g. sulphuric acid, hydrochloric acid, and sour gas) than CoCrW alloys such as Stellite™ 6. The typical electrode potential in sea water at room temperature is approx. -0.3 V (SCE). Like stainless steels, Stellite™ 21 corrodes primarily by a pitting mechanism and not by general mass loss in seawater and chloride solutions.

NOMINAL CHEMICAL COMPOSITION (MASS%)

ALLOY	Co	Cr	Ni	Fe	Mo	Others
Stellite™ 21	Bal.	27,0	2,5	1,5	5,5	C, B, Si, Mn

PHYSICAL PROPERTIES

ALLOY	Hardness	Density	Melting Range
Stellite™ 21	27 - 40 HRC / 290 - 430 HV	~ 8,33 g/cm³	~ 1295 – 1435°C

Stellite™, Tribaloy™, Nistelle™, Stelcar™, Jet Kote™, and Delcrome™
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NOMINAL HOT HARDNESS (HV resp. DPH) OF UNDILUTED WELD DEPOSIT

20 °C	100 °C	200 °C	300 °C	400 °C	500 °C	600 °C	700 °C	800 °C	900 °C
347	279	248	228	208	197	181	153	123	92

EXAMPLE FOR TENSILE PROPERTIES AT ROOM TEMPERATURE

PRODUCT FORM	Ultimate Tensile Strength Rm	Yield Stress Rp (0,2%)	Elongation A
Casting, As cast	~ 710 MPa	~ 565 MPa	< 3 %

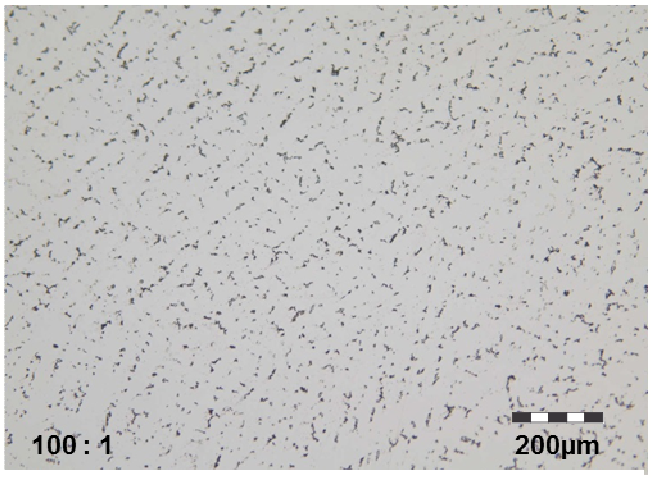
PRODUCT FORMS

Components			
Castings	Cladded / Hardfaced	PM / HIP parts*	ALM parts*

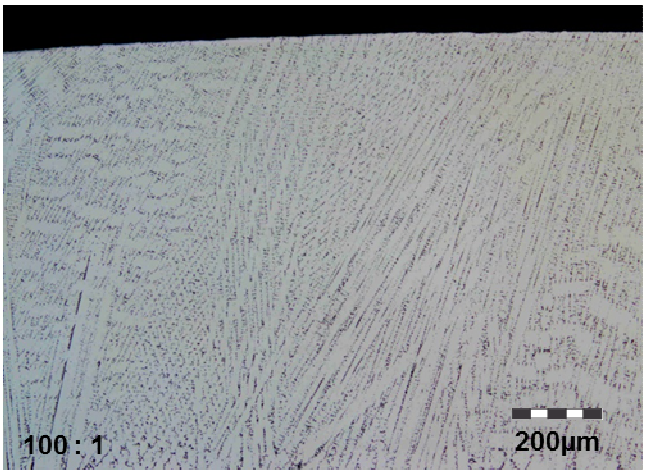
* On special request.

Consumables for Cladding / Hardfacing and Additive Layer Manufacturing (ALM)				
Rods	TIG-Welding		Oxy-Acetylene Welding	
Electrode	MMA Welding			
Cored Wire	MIG Welding		Submerged Arc Welding	
Powder	PTA Cladding	Laser Cladding	HVOF Spraying	ALM

TYPICAL STRUCTURES



Casted Stellite™ 21 Alloy (Resin Shell Casting)



Welded Stellite™ 21 Alloy (TIG Cladding)

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