SUPER DUPLEX STAINLESS STEEL

DATA SHEET

TYPICAL APPLICATIONS

Swimming pool support structures, Strands for mast rigging, Architectural support / restraint structures, Marine environment towing, mooring and equipment deployment, Architectural / corrosion environment balustrades, Lifting equipment, pully and support systems in chemical process industries, Civil engineering structure components.

PRODUCT DESCRIPTION

SUPER DUPLEX strand and wire rope are produced from high performance stainless steel wire, this wire having been drawn from Grade S32550 Stainless Steel Rod Coil (see separate data sheet). Grade S32550 Stainless Steel Rod Coil is described as a super duplex (austenitic / ferritic) stainless steel that combines high mechanical strength and good ductility with outstanding resistance to corrosion in marine conditions and a wide, diverse range of industrial environments. the alloy contains 25.5% chromium, 6% nickel with significant additions of molybdenum, copper and nitrogen and has been very successfully employed over many years in the form of bar, plate and forgings in applications in Defense, Oil & Gas production, Chemicals processing, Nuclear engineering and Architecture.

Now, with the availablility of SUPER DUPLEX strand and wire rope (covered by UK patent 2354264B) in this high grade stainless steel, there is a choice. It is possible to specify high performance products that have been specifically developed for demanding corrosive environments as an alternative to standard, lower strength / less corrosion resistant products in, for example, type 316 stainless steel. SUPER DUPLEX 1x19 strand has been employed successfully for up to eight years for swimming pool flume supports in a pool where flume supports in Type 316 had corroded and severely degraded after less than two years service (please see comparative photographs overleaf). It has also been installed for swimming pool ducts supports and driver training harnesses (a project list is available upon request).

MATERIAL SPECIFICATIONS

UNS S32550 (chemical composition)
EN 10088 1.4507 (chemical composition)

AVAILABILITY

Strand - 6, 8 and 10mm 1x19 available from stock. Other strand constructions and compact strand available to order. Wire rope - available to order - please enquire.

CORROSION RESISTANCE

SUPER DUPLEX, with a PREn (pitting resistance equivalent) of >40.0, offers a high resistance to pitting and crevice corrosion in seawater and other chloride ion containing environments and to general corrosion in acidic and many other industrial environments. SUPER DUPLEX 1x19 strands have proved to be an ideal choice for the support of flumes and ducting in swimming / leisure complex. Dramatic changes in the past few decades in the nature of swimming pool equipment, for example the advent of flumes, has resulted in the need for stainless steel products with the ability to perform reliably in 'safety critical' areas. Also changes in operating environments within pool halls such as higher water/air temperatures, the addition of turbulent water features and greater reliance upon chlorine based disinfectants combined with pool water contamination from bathers has resulted in potentially highly corrosive conditions. SUPER DUPLEX successfully resists these conditions and the phenomenon of stress corrosion cracking to which 300 series stainless steels can be susceptible.There have been several examples since the mid 1980's of catastrophic failure, attributed to stress corrosion cracking, of load bearing, safety critical component produced in Type 304 and 316 steels.

PRODUCT ATTRIBUTES	CUSTOMER BENEFIT
High inherent corrosion resistance	No need to protect by surface coating or sheathing
Outstanding pitting/crevice corrosion resistance	Ideal for oil & gas, defence and marine application
Excellent corrosion resistance in acids	Ideal for chemcal industry application
Highly resistant to stress corrosion cracking	Suitable for highly loaded components in chloride environments
High resistance to chloramines at high temperatures/humidity	Suitable for use for 'Safety critical' supports in swimming pools
High mechanical strength	Scope to use smaller diameters and associated fittings ➡ weight savings
Good fatigue strength	Appicable for cyclically loaded assemblies
High modulus of elasticity	Low propensity to elastic strech

FITTINGS

Compression and swage end fittings, turnbuckles and other fittings are available to order in Grade S32550 Stainless Steel. These fittings are completely compatible with SUPER DUPLEX strand / wire rope, both being produced in a material of identical highly alloyed chemical composition and are over twice as strong as similarly sized fitting in type 316 stainless steel.
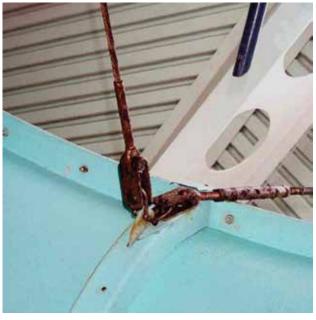
APPLICATION EXAMPLE

A typical application for SUPER DUPLEX is support strands for high chlorine environments such as swimming pools. The images overleaf show a support strand (and fitting) manufactured from tyoe 316L stainless steel showing severe corrosion after less than 2 years in service. To the right is the same component manufactured from SUPER DUPLEX after more than five years service.

SUPER DUPLEX STAINLESS STEEL

DATA SHEET

TYPE 316L STAINLESS STEEL

Severe corrosion / catastrophic degradation after less than two years in service

SUPER DUPLEX STAINLESS STEEL

Completely corrosion free after more than eight years in service

CHEMICAL COMPOSITION

Weight (%)	C	Mn	Si	S	P	Cr	Ni	Mo	Cu	N	Fe	PREn
Min.						24.00	5.50	3.00	1.50	0.15	Bal	40.0
Max.	0.04	1.50	1.00	0.030	0.040	27.00	6.50	3.90	2.50	0.25		

PREn=Cr%+3.3Mo%+16N%

MINIMUM BREAK LOADS (1x19 strand)

Strand diameter (mm)	SUPER DUPLEX (Kg)	SUPER DUPLEX (kN)	Type 316 Steel (Kg)	Type 316 Steel (kN)
6	3,640	33.9	2,880	28.2
8	5,750	56.4	4,640	45.5
10	8,950	87.8	7,250	71.1
12	12,900	126.5	10,400	102.0

TYPICAL PHYSICAL PROPERTIES

Wire density at 20°C		7.81	Kg/dm^3
Strand (1x19) weight	6mm diameter	172.6	Kg/1000m
	8mm diameter	311.7	Kg/1000m
	10mm diameter	486.3	Kg/1000m
	12mm diameter	706.4	Kg/1000m
Magnetic permeability		33	

TECHNICAL SALES ASSISTANCE
Our resident team of highly qualified metallurgists and engineers will be pleased assist further on any technical topic