

ZERON[®]100 (UNS S32760) SLICKLINE DATA SHEET

High Quality Wire and Strand for the Oil and Gas Industry

ZERON[®]100 VHX is a super duplex stainless steel available in all wire diameters that has high mechanical properties whilst retaining good ductility. The alloy has excellent resistance to chloride and sulfide stress corrosion cracking, acid corrosion and crevice corrosion, making it suitable for use in many environments. Due to its high strength, ZERON[®]100 also exhibits excellent resistance to abrasion and high resistance to fatigue and corrosion fatigue. ZERON[®]100 has a low coefficient of thermal expansion that is similar to ferritic steels.

Further information on any of these properties, or advice on the use of ZERON[®]100 is available on request.

CHEMICAL ANALYSIS

	C	Si	Mn	S	P	Cr	Ni	Mo	Cu	N	W	Fe
Min						24	6.0	3.0	0.5	0.2	0.5	Bal
Max	0.03	1.0	1.0	0.03	0.03	26	8.0	4.0	1.0	0.3	1.0	

$$\text{PREN} = \text{Cr}\% + 3.3 \text{ Mo}\% + 16 \text{ N}\% = 40\text{min}$$

$$\text{PRENW} = \text{Cr}\% + 3.3 (\text{Mo}\% + \text{W}\%) + 16 \text{ N}\% = 42.15\text{min}$$

MECHANICAL PROPERTIES

There are two grades of ZERON 100 wire available with different strength levels:

ZERON[®] 100 SDSS

Wire Diameter	0.092"	0.108"	0.125"
Minimum Breaking load (lbf)	1650	2050	2750
Minimum Tensile Strength ksi (MPa)	246 (1700)	231 (1595)	225 (1550)
0,2 % Proof Strength (% of TS)	75-90	75-90	75-90
Elastic limit (% of TS)	35-50	35-50	35-50
Elongation on 100mm GL (Typical %)	4	4	4
Torsion on 8" GL (Typical %)	4	4	4
Minimum Bend Diameter	120xd	120xd	120xd

ZERON[®] 100HS SDSS

Wire Diameter	0.092"	0.108"	0.125"	0.140"	0.160"
Minimum Breaking Load (lbf)	1,920	2,500	3,300	4,050	5,150
Minimum Tensile Strength ksi (MPa)	261 (1,800)	261 (1,800)	276 (1,900)	254 (1,750)	254 (1,750)
0.2% Proof Strength (% of TS)	75-90	75-90	75-90	75-90	75-90
Elastic Limit (% of TS)	35-50	35-50	35-50	35-50	30-45
Elongation on 100mm GL (Typical)	4	4	3	3	3
Torsion on 8" GL (Typical)	4	4	3	3	3
Minimum Bend Diameter	120xd	120xd	120xd	120xd	120xd

PHYSICAL PROPERTIES

Mean Coeff. of Thermal Expansion	10 ⁻⁶ in/in°F	10 ⁻⁶ K ⁻¹	Thermal conductivity	Wm ⁻¹ K ⁻¹	Btu/hr/ft/°F
70 - 200°F, 20 – 100°C	7.0	12.8	68°F, 20° C	7.5	12.9
70 - 400°F, 20 – 200°C	7.4	13.3	100°F, 100° C	7.7	14.4
70 - 600°F, 20 – 300°C	7.7	13.8	200°F, 150° C	8.3	15.4
			300°F, 200° C	8.9	16.3
			400°F, 250° C	9.5	17.3
			500°F, 300° C	10.1	18.2
Resistivity	10 ⁻⁶ ohm.m		Specific heat	Btu/lb°F	J kg ⁻¹ K ⁻¹
68°F, 20°C	0.851		68°F, 20°C	0.115	482
212°F, 100°C	0.897		100°F, 100°C	0.116	500
302°F, 150°C	0.927		200°F, 150°C	0.119	513
392°F, 200°C	0.956		300°F, 200°C	0.122	523
482°F, 250°C	0.985		400°F, 250°C	0.125	535
572°F, 300°C	1.014		500°F, 300°C	0.128	547
Modulus of Elasticity (GPa) (+/-10%) @ 20°C	190		Poisson's ratio	0.32	
Magnetic permeability	29		Density (g/cm ³)	7.84	

CORROSION

In addition to excellent mechanical properties ZERON[®]100 Very High Strength (VHX) wirelines have exceptional corrosion resistance.

In sweet wells, ZERON[®]100 VHX wirelines are very resistant to corrosion by CO₂, irrespective of chloride levels, up to high temperature (> 200°C).

In sour wells, the main concern is failure by sulfide stress corrosion cracking (SSCC). ZERON[®]100VHX wireline has been demonstrated to resist cracking in sour, condensed waters with 0.4 bar partial pressure of H₂S. Produced waters have a higher pH, but also higher chloride content; and ZERON[®]100VHX wireline resisted cracking in 0.4 bar partial pressure of H₂S. It therefore has applications in many sour wells.

The performance of ZERON[®]100 VHX is similar to that of 6% Mo austenitic alloys at around 100°C, but it is superior at elevated temperatures, where the 6% Mo austenitic alloys are restricted to low chloride concentrations with high H₂S levels by NACE MR0175/ ISO 15156.

Another important consideration for wireline users in marine atmospheres is atmospheric corrosion during storage as some of the failures of wireline in service are due to corrosion that has occurred during storage between uses. This corrosion acts as a local stress raiser that can lead to wire fracture in use. ZERON[®]100 VHX has exceptional resistance to corrosion in storage, even when tight crevices occur, so preventing premature failure.

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