Zapp C276-SW Wirelines/Slicklines Datasheet Wire

ZAPP

ZAPP C276-SW

is a nickel-chromium-molybdenum alloy suitable for service in the most extreme oil and gas environments.

The grade is characterized by:
o Superior corrosion resistance in H_2S, CO_2 and chloride containing environments
o Excellent resistance to pitting corrosion owing to its high PRE* value of 68
o Excellent corrosion resistance in hydrochloric acid
o Good performance in high temperature wells up to 250 °C (480 °F)
o High strength – tensile strength higher than Zapp 26Mo-SW (UNS N08926)

* PRE (Pitting Resistance Equivalent) = %Cr + 3.3 x %Mo + 16 x %N

Standards
o UNS: N10276
o W.Nr. 2.4819

Chemical composition (nominal) %

C	Si	Mn	P	S	Cr	Ni	Mo	W	Fe	Co
≤ 0.010	≤ 0.08	≤ 1.0	≤0.030	≤ 0.015	16.0	Bal.	16.0	3.5	4.5	< 2.5

Forms of supply

Zapp C276-SW slicklines are supplied cold drawn and degreased in continuous lengths. All lines are 100 % EC tested.

Slicklines

Diameter		Breaking load		Weight	
mm	in.	N	lbf	kg/1,000 m	lb/1,000 ft
2,743	0.108	10,637	2,391	52.0	35.0
3,175	0.125	14,251	3,204	69.7	46.8

Mechanical properties

Zapp C276-SW is tested and certified in accordance with a minimum tensile strength. Proof strength is in the range of 85 % of the tensile strength. This means that Zapp C276-SW can resist high loads without permanent set of the wire.

Mechanical properties for slicklines, at 20 °C (68 °F)

Proof strength $R_{p0.2*}$		Tensile strength R_m	
MPa	ksi	MPa	ksi
≥ 1,530	≥ 222	≥ 1,800	≥ 261

* Corresponds to 0.2 % yield strength

Corrosion resistance

Zapp C276-SW has excellent corrosion resistance in a wide range of aggressive environments occurring in downhole environments. It resists general corrosion, localized pitting corrosion and environmental cracking in a wide range of aggressive media.

Pitting and crevice corrosion

The relative resistance of alloys to pitting corrosion can be estimated based on the chemical composition using the Pitting Resistance Equivalent number (PRE). Alloys with higher PRE values generally have better corrosion resistance compared to alloys with lower PRE values.

There are several different equations available for calculating the PRE from the chemical composition. In this document the equation specified in NACE MR0175 is used: $*PRE = \%Cr+3.3(\%Mo+0.5W)+16\%N$

Pitting resistance equivalent numbers (PRE) for some slickline alloys.

Alloy	UNS	PRE*
Zapp C276-SW	N10276	68
Zapp 26Mo	N08926	43
Zapp 28	N08028	38

Stress corrosion cracking

The high levels of nickel, molybdenum and chromium in Zapp C276-SW make the alloy highly resistant to sour environments containing high levels of H_2S, CO_2 and chlorides. The NACE standard MR 0175 is widely used for selecting material for use in H_2S-containing environments in the oil and gas industry. According to NACE MR0175 Zapp 56Mo-SW (UNS N10276) can be used in up to 1,000 psi partial pressure H_2S at 232 °C (450 °F) with no

limitation on the chloride concentration. Below 204 °C (400 °F) there is no limit on the H_2S level or chloride concentration.

Physical properties

o   Density: 8.8 g/cm³, 0.32 lb/in³
o   Resistivity: at 20 °C (68 °F), 1.16 μΩm, 45.5μΩin
o   Modulus of elasticity: at 20 °C (68 °F), 205,000 MPa (29,700 ksi)