

WIRELINES

DATA SHEET ZAPP 2205-SW



ZAPP IS CERTIFIED ACCORDING TO ISO 9001

ZAPP 2205-SW FOR WIRELINES

is a duplex (austenitic/ferritic) stainless steel suitable for service in corrosive oil and gas wells.

STANDARDS

- _ UNS: S31803, S32205
- _ EN Number: 1.4462

THE GRADE IS CHARACTERIZED BY

- _ High resistance to stress corrosion cracking (SCC) in chloride and CO₂ containing environments
- _ High resistance to pitting owing to its high PRE* value of 35 minimum
- _ High resistance to general corrosion
- _ High tensile strength

Zapp 2205-SW is suitable for service in wells with a H₂S partial pressure of max. 3 psi.

Service temperature: -50 to 280 °C (-60 to 540 °F)

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

CHEMICAL COMPOSITION (NOMINAL) %

C	Si	Mn	P	S	Cr	Ni	Mo	N
≤ 0.030	≤ 1.0	≤ 2.0	≤ 0.030	≤ 0.015	22.0	5.5	3.2	0.18

FORMS OF SUPPLY

Zapp 2205-SW for corrosive oil and gas environments is supplied in the form of cold-drawn and degreased wire in continuous lengths, without welds, on metallic spools.

PRODUCT PROGRAM

Zapp 2205-SW in corrosive oil and gas environments

Dimension		Breaking load		Weight	
mm	in.	N	lb	kg/1,000 m	lb/1,000 ft
2,083	0.082	5,790	1,302	26.6	17.81
2,337	0.092	7,288	1,639	33.5	22.42
2,667	0.105	9,494	2,134	43.7	29.21
2,743	0.108	10,044	2,258	46.2	30.90
3,175	0.125	13,455	3,025	61.9	41.39
3,556	0.140	16,886	3,795	77.6	52.0
3,810	0.150	19,384	4,356	89.1	59.7
4,064	0.160	20,757	4,665	101.12	67.82

MECHANICAL PROPERTIES

ZAPP 2205-SW IN CORROSIVE OIL AND GAS ENVIRONMENTS

The material is tested and certified in accordance with minimum tensile strength. The proof strength is in the range of 90 % of the tensile strength. Zapp 2205-SW is thus able to resist high loads without permanent set of the wire.

MODULUS OF ELASTICITY at 20 °C (68 °F): 200,000 MPa (29,000 ksi)

AT 20 °C (68 °F)

Proof strength, R _{p0.2}		Tensile strength, R _m	
MPa	ksi	MPa	ksi
≥ 1,530	≥ 222	≥ 1,700	≥ 246

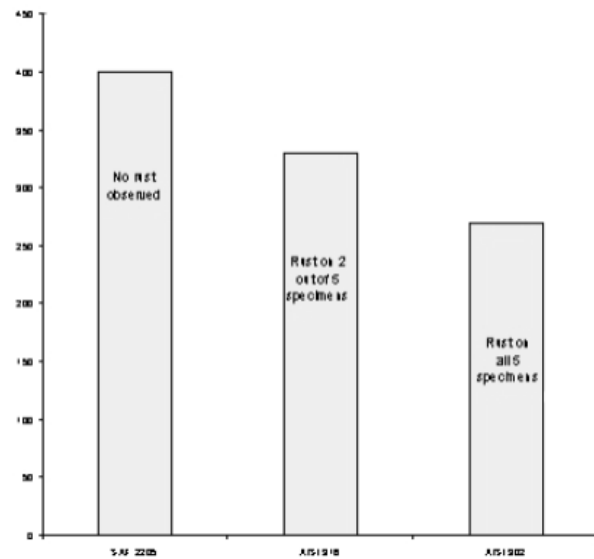
CORROSION RESISTANCE

CHLORIDE INDUCED CORROSION

In seawater and other high chloride content environments, Zapp 2205-SW has better corrosion resistance than stainless steel of type AISI 316 owing to the high PRE-value. This can be demonstrated by e.g. salt spray testing where samples are sprayed with water containing 5 % NaCl at 35 °C and checked every 24 hours. See the diagram below.

NEUTRAL SALT SPRAY TEST ACCORDING TO ASTM B 117

Testing time, hours



OIL AND GAS APPLICATIONS

Zapp 2205-SW is, thanks to its duplex structure, significantly more corrosion resistant than ASTM 316.

PHYSICAL PROPERTIES

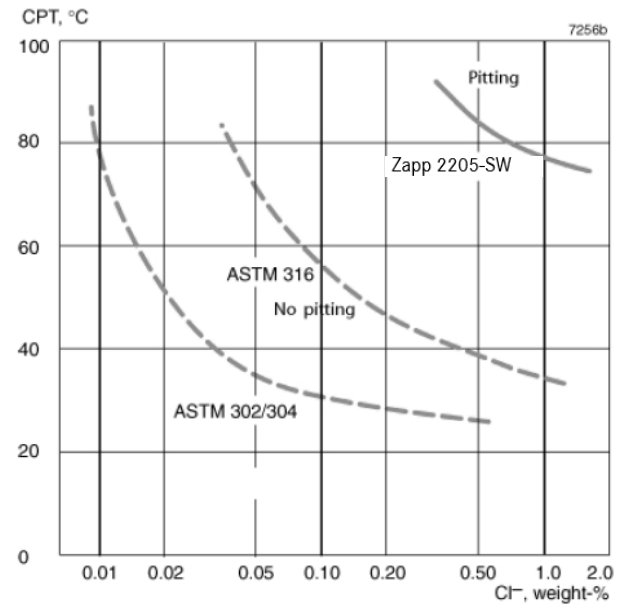
RESISTIVITY

Temperature, °C	μΩm	Temperature, °F	μΩin.
20	0.74	68	29.1
100	0.85	200	33.1
200	0.96	400	39.8
300	1.00	600	43.3
400	1.10	800	43.3

Modulus of elasticity at 20°C (68°F): 200 000 MPa (29 000 ksi)

CRITICAL PITTING TEMPERATURE

In high saline content environments such as salt water, the aggressiveness of the environment increases as the temperature rises. All stainless steels have a critical pitting temperature above which there is a risk of pitting. The critical pitting temperature for Zapp 2205-SW and AISI 316 in seawater is shown in the diagram.

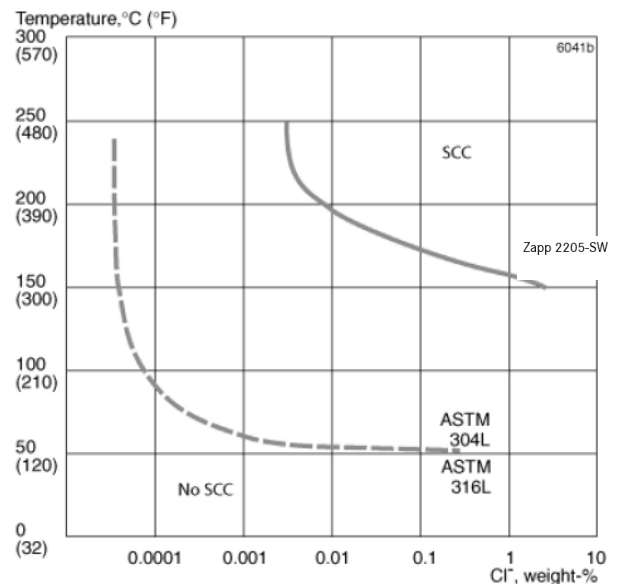


CREVICE CORROSION

Crevice corrosion is in principle the same as pitting corrosion, but occurs in crevices and cracks, e.g. between flange joints, under deposits on the metal surface or in welds with incomplete penetration. Crevice corrosion often occurs at lower temperatures and at lower chloride contents than those necessary for pitting to occur. Resistance is influenced by the content of Cr, Mo and N in the same way as pitting resistance.

STRESS CORROSION CRACKING

Stress corrosion cracking leading to catastrophic failures can occur with standard austenitic steels. The application of duplex stainless steels like Zapp 2205-SW will reduce this risk.



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