



CORROSION RESISTANCE OF COPPER AND STAINLESS STEEL IN CBEs; POINTS TO MEASURE AND CHECK IN A WATER ANALYSIS

The resistance guide below is an attempt to give a picture of the corrosion resistance of stainless steel of type AISI 316 and pure Copper (99.9%) in water, to a number of important chemical factors. The actual corrosion is however a very complex process influenced by many different factors in combination. This table is therefore a considerable simplification and should not be overvalued!

+ Good resistance under normal conditions

EXPLANATIONS 0 Corrosion problems may occur especially when more factors are valued 0

- Use is not recommended

WATER CONTAINING	CONCENTRATION (mg/l or ppm)	AISI 316	COPPER
Alcanity (HCO ₃ ⁻)	<70	+	0
	70-300	+	+
	>300	+	0/+
Sulfate (SO ₄ ²⁻)	< 70	+	+
	70-300	+	0/-
	> 300	0	-
HCO ₃ ⁻ / SO ₄ ²⁻	> 1.0	+	+
	< 1.0	+	0/-
Electrical Conductivity	< 10 μS/cm	+	0
	10 - 500 μS/cm	+	+
	> 500 μS/cm	+	0
pH	< 6.0	0	0
	6.0 - 7.5	0/+	0
	7.5 - 9.0	+	+
	> 9.0	+	0
Ammonium (NH ₃)	< 2	+	+
	2-20	+	0
	> 20	+	-
Chlorides (Cl ⁻) (Please also see table below)	< 300	+	+
	> 300	0	0/+
Free chlorine (Cl ₂)	< 1	+	+
	1-5	+	0
	> 5	0/+	0/-
Hydrogen Sulfide (H ₂ S)	< 0.05	+	+
	> 0.05	+	0/-
Free (aggressive) Carbon Dioxide (CO ₂)	< 5	+	+
	5-20	+	0
	>20	+	-
Total Hardness (°dH)	4.0 - 8.5	+	+
Nitrate (NO ₃)	< 100	+	+
	> 100	+	0
Iron (Fe)	< 0.2	+	+
	> 0.2	+	0
Aluminum (Al)	< 0.2	+	+
	> 0.2	+	0
Manganese (Mn)	< 0.1	+	+
	> 0.1	+	0

CHOICE OF PLATE MATERIAL

CHLORIDE CONTENT	MAXIMUM TEMPERATURE			
	60°C	80°C	120°C	130°C
10 ppm	SS 304	SS 304	SS 304	SS 316
= 25 ppm	SS 304	SS 304	SS 316	SS 316
= 50 ppm	SS 304	SS 316	SS 316	Ti / 254 SMO
= 80 ppm	SS 316	SS 316	SS 316	Ti / 254 SMO



= 150 ppm	SS 316	SS 316	Ti / 254 SMO	Ti / 254 SMO
= 300 ppm	SS 316	Ti / 254 SMO	Ti / 254 SMO	Ti / 254 SMO
> 300 ppm	Ti / 254 SMO	Ti / 254 SMO	Ti / 254 SMO	Ti / 254 SMO

SS = Stainless steel grade Ti = Titanium