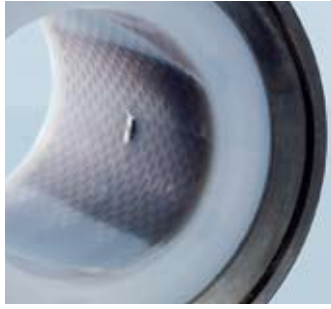


Chemical Resistance Chart

Introduction



Corrosion and degradation depend on many parameters:

- Temperature
- Pressure
- Concentration
- Impurities
- pH-value
- Materials and surfaces characteristics
- Joinings (e.g. weldings, soldering)
- Mechanical stress of materials

Due to the many parameters influencing the process the corrosion table can only be used as guidance and do not always apply to the actual process conditions at the end-user. Thus the final responsibility of material selection resides with the user who knows the specific process conditions.

The data presented in this guide is based on published data and field experience.

Disclaimer

Siemens Flow Instruments can provide assistance with the selection of sensor parts in contact with the media. However, the full responsibility for the selection rests with the customer and Siemens Flow Instruments can take no responsibility for any failure due to material incompatibility.

How to use this guide

The names of the chemicals are listed in alphabetic order.
The table is valid for pure chemicals at 20°C where nothing else is stated.

Chemical Resistance Chart for SITRANS F M

NOTE ! The table is valid for pure solutions at 20°C where nothing else is stated.

High resistance + Moderate resistance 0 No resistance -

Chemicals A - I		Plastics and rubbers									Ceramics		Metals								
		PTFE	PFA	EPDM	NBR	Neoprene	Ebonite	Linatex	FKM/FPM	PVDF	Zirconium oxide (ZrO ₂)	Aluminium oxide (AL ₂ O ₃)*	AISI 316	Titanium	Tantalum	Hastelloy C4	Hastelloy C22	Hastelloy C276	Platinum*	Monel	Graphite
Acetic acid 30%	CH ₃ COOH	+	+	+	0	+	+	0	-	+	+	+	+	+	+	+	+	+	+	0	-
Acetic acid Glacial	CH ₃ COOH 100%	+	+	+	-	-	+	0	-	+	+	+	+	+	+	+	+	+	+	0	-
Aluminium chloride	AlCl ₃	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	-
Aluminium nitrate	Al(NO ₃) ₃	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Aluminium sulphate	Al ₂ (SO ₄) ₃	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Ammonium bromide	NH ₄ Br	+	+				+					+	+	+	+	+	+	+	+	+	-
Ammonium chloride	NH ₄ Cl	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Ammonium fluoride	NH ₄ F	+	+	+	+	0	+	+	+	+	+	0	-	-	+	+	+	+	+	+	-
Ammonium hydroxide	NH ₄ OH	+		+	-	+	+	0	0	+	+	+	+	0	+	+	+	+	+	-	-
Ammonium nitrate	NH ₄ NO ₃	+	+	+	+	0	+	+	+	+	+	+	0	+	+	+	+	+	+	-	-
Ammonium sulphate	(NH ₄) ₂ SO ₄	+	+	+	+	0	+	+	0	+	+	+	+	+	+	+	+	+	+	+	-
Aniline	C ₆ H ₅ NH ₂	+	+	+	-	-	+	0	+	+	+	+	+	+	+	+	+	+	+	+	+
Aqua Regia	HCl / HNO ₃ (3:1)	+	+	-	-	-	0	-	-	+	+	-	0	+	-	-	-	-	-	-	-
Arsenic acid	AsH ₃ O ₄	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	-
Barium chloride	BaCl ₂	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Barium hydroxide	Ba(OH) ₂	+	+	+	+	+	+	+	+	+	+	+	+	0	+	+	+	+	+	+	-
Beer		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Benzoic acid	C ₆ H ₅ COOH	+	+	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	0	+
Boric acid	B(OH) ₃	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0
Bromine	Br ₂	+	+	-	-	-	0	-	+	+	+	+	0	+	0	0	0	+	0	0	-
Butyl alcohol	C ₄ H ₉ OH	+	+	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Butyric acid	CH ₃ CH ₂ CH ₂ COOH	+	+	0	-	-	0		0	+	+	+	+	+	+	+	+	+	+	+	0
Calcium chloride	CaCl ₂	+	+	+	+	+	+	+	+	+	+	0	+	+	+	+	+	+	+	+	-
Calcium fluoride	CaF ₂	+	+	+	+	+	+	+	+	+	+	0	-	-	+	+	+	+	+	+	-
Calcium hydroxide	Ca(OH) ₂	+	+	+	+	+	+	+	+	+	+	+	+	0	+	+	+	+	+	+	-
Calcium hypochlorite	Ca(ClO) ₂	+	+	+	0	0	0	0	+	+	+	-	+	+	+	+	+	+	+	0	-
Calcium nitrate	Ca(NO ₃) ₂	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Calcium phosphate	Ca ₃ (PO ₄) ₂	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Calcium sulphate (gypsum)	CaSO ₄	+	+	+		+	+			+	+	+	+	+	+	+	+	+	+	+	-
Camphoric acid	C ₁₀ H ₁₆ O ₄	+	+				0			+	+	+	+	+	+	+	+	+	+	+	-
Carbonic acid	H ₂ CO ₃	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0
Chlorine	Cl ₂	+	+	0	-	-	0	-	+	+	+	+	0	+	+	+	+	+	+	0	-
Chlorine dioxide	ClO ₂	+	+	-	-	-	0	-	+	+	+	+	+	+	+	+	+	+	+	-	-
Chromic acid	CrO ₃	+	+	0	-	-	+	-	+	+	+	0	+	+	0	0	0	+	+	0	-
Citric acid	C ₃ H ₄ (OH)(COOH) ₃	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Copper (II) chloride	CuCl ₂	+	+	+	+	0	+	+	+	+	+	+	+	+	0	0	0	+	+	0	-
Copper sulphate	CuSO ₄	+	+	+	+	0	+	+	+	+	+	+	+	+	+	+	+	+	+	0	-
Diesel oil		+	+	-	+	-	0	-	+	+	+	+	+	+	+	+	+	+	+	+	+
Ethanol / Ethyl alcohol	CH ₃ CH ₂ OH	+	+	+	+	+	+	+	0	+	+	+	+	+	+	+	+	+	+	+	+
Ferric chloride	FeCl ₃	+	+	+	+	0	+	+	+	+	+	+	+	+	0	0	0	+	-	-	-
Ferric nitrate	Fe(NO ₃) ₃	+	+	+	+	0	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-
Formaldehyde	HCHO	+	+	0	0	0	+	0	-	+	+	+	+	+	+	+	+	+	+	+	+
Formic acid	HCOOH	+	+	+	-	0	+	0	-	+	+	+	0	+	+	+	+	+	+	+	-
Fruit juice		+	+	+	0	0	0	-	+	+	+	+	+	+	+	+	+	+	+	+ 1)	-
Hydrobromic acid	HBr	+	+	+	-	0	+	+	+	+	+	-	+	+	0	0	0	+	+	0	-
Hydrochloric acid	HCl	+	+	+	0	0	0	0	+	+	+	0	-	+	0	0	0	+	0 1)	-	-
0.1% Hydrochloric acid	0,1% HCl	+	+	+	+	0	+	+	+	+	+	0	+ 2)	+	+ 2)	+ 2)	+ 2)	+	0 1)	-	-
1% Hydrochloric acid	1% HCl	+	+	+	+	0	+	+	+	+	+	-	+ 11)	+	+ 2)	+ 2)	+ 2)	+	0 1)	-	-
10% Hydrochloric acid	10% HCl	+	+	+			+		+	+	+	-	-	+	+ 4)	+ 5)	+ 5)	+	0 1)	-	-
20% Hydrochloric acid	20% HCl	+	+	+		+	+	+	+	+	+	-	-	+	-	-	-	+	0 1)	-	-
37% Hydrochloric acid (concentrated)	37% HCl	+	+	+	-	-	0	0	+	+	+	-	-	+	+ 6)	+ 7)	+ 7)	+	0 1)	-	-
Hydrocyanic acid	HCN	+	+	+	0	0	+	0	+	+	+	+	-	+	+	+	+	+	+	+	+
Hydrofluoric acid	HF	+	+	0	-	0	-	-	0	+	+	-	-	-	0	0	0	+	+	+	-
Hydrogen peroxide	H ₂ O ₂	+	+	-	-	-	0	-	+	+	+	+	0	+	0	0	0	0	0	-	-
Hydroiodine acid	HI	+	+			-	0			+	+	0	+	+	+	+	+	+	-	0	-
Iodine	I ₂	+	+	0	0	-	0	-	+	+	+	0	0	+	0	0	0	+	0	0	-

* For chemical resistance for MAG 1100/MAG 1100 F (DN10-100) platinum with gold/titanium brazing alloy electrode please also refer to titanium.

1) no air 2) max boiling point 3) no stagnation 4) max 40 °C 5) max 45 °C 6) max 50 °C 7) max 55 °C 8) max 60 °C 9) max 65 °C 10) max 75 °C 11) max 80 °C 12) max 85 °C 13) max 95 °C 14) max 110 °C

Chemical Resistance Chart for SITRANS F M

NOTE ! The table is valid for pure solutions at 20°C where nothing else is stated.

High resistance + Moderate resistance 0 No resistance -

Chemicals K - Z		Plastics and rubbers									Ceramics		Metals								
		PTFE	PFA	EPDM	NBR	Neoprene	Ebonite	Linatex	FKM/FPM	PVDF	Zirconium oxide (ZrO ₂)	Aluminium oxide (AL ₂ O ₃)*	AISI 316	Titanium	Tantalum	Hastelloy C4	Hastelloy C22	Hastelloy C276	Platinum*	Monel	Graphite
Kerosene		+	+	-	+	-	0	-	+	+	+	+	+	+	+	+	+	+	+	+	+
Lactic acid	CH ₃ CH(OH)COOH	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	-
Magnesium chloride	MgCl ₂	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Magnesium hydroxide	Mg(OH) ₂	+	+	+	+	+	+	0	+	+	+	+	+	+	+	+	+	+	+	+	-
Magnesium nitrate	Mg(NO ₃) ₂	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Magnesium sulphate	MgSO ₄	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Manganese chloride	MnCl ₂	+	+							+								0	0		
Methanol / Methyl alcohol	CH ₃ OH	+	+	+	+	+	+	+	-	+	+	+	0	+	+	+	+	+	+	+	+
Methylene chloride	CH ₂ Cl ₂	+	+	0	-	-	0	-	+	+	+	+	+	+	+	+	+	+	+	+	+
Milk		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0		
Nitric acid	HNO ₃	+	+	0	0	0	0	-	0	+	+	+	+	+	+	+	+	+	+	-	-
1% Nitric acid	1% HNO ₃	+	+	+	-	+	+	-	0	+	+	+	+2)	+2)	+	+2)	+2)	+2)	+	-	-
10% Nitric acid	10% HNO ₃	+	+	+	0	0	+	-	0	+	+	+	+2)	+2)	+	+2)	+2)	+2)	+	-	-
50% Nitric acid	50% HNO ₃	+	+	-	-	-	0	-	0	+	+	+	+2)	+12)	+	+2)	+2)	+2)	+	-	-
70% Nitric acid	70% HNO ₃	+	+	0	-	-	-	-	-	+	+	+	+11)	+2)	+	+8)	+12)	+5)	+	-	-
Nitric acid + Hydrofluoric acid	HNO ₃ / HF (1:1)	+	+							-	0	-	-	-	0	0	0	0	-	-	
Oxalic acid	(COOH) ₂	+	+	+	0	0	+	0	+	+	+	+	+	+	+	+	+	+	+	+	-
Petrol / Gasoline		+	+	-	+	0	0	-	+	+	+	+	+	+	+	+	+	+	+	+	+
Phosphoric acid	H ₃ PO ₄	+	+	0	0	0	0	0	+	+	0	0	+	0	+	+	+	+	+	+1)	-
1% Phosphoric acid	1% H ₃ PO ₄	+	+	+	0	0	+	0	+	+	+	+	+2)	+2)	+	+2)	+2)	+2)	+	+1)	-
10% Phosphoric acid	10% H ₃ PO ₄	+	+	+	0	0	+	0	+	+	+	+	+2)	+7)	+	+2)	+2)	+2)	+	+1)	-
50% Phosphoric acid	50% H ₃ PO ₄	+	+				0				+	+	+13)	-	+	+2)	+2)	+2)	+	+1)	-
80% Phosphoric acid	80% H ₃ PO ₄	+	+	0	-	-	0	-	+	+	0	0	+11)	-	+	+14)	+14)	+14)	+	+1)	-
Phosphoric acid + Hydrofluoric acid + Nitric acid	H ₃ PO ₄ / HF / HNO ₃ (1:1:1)	+	+							-	-	-	-	-	0	0	0	0	-	-	
Phosphoric acid + Sulphuric acid + Nitric acid	H ₃ PO ₄ / H ₂ SO ₄ / HNO ₃ (1:1:1)	+	+							-	0	0	-	-	+	+	+	+	+	-	
Phosphoric acid + Sulphuric acid	H ₃ PO ₄ / H ₂ SO ₄ (1:1)	+	+							-	0	0	-	-	+	+	+	+	+	0 1)	
Phosphoric acid + Hydrofluoric acid	H ₃ PO ₄ / HF (1:1)	+	+							-	-	-	-	-	0	0	0	+	0 1)		
Potassium chloride	KCl	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+	+	+	+	+	+
Potassium cyanide	KCN	+	+	+	+	0	+	+	+	+	+	+	+	+	0	0	0	0	0	+	+
Potassium hydroxide	KOH	+	+	+	0	0	+	0	-	+	+	+	0	+	0	+	+	+	+	+	-
Potassium nitrate	KNO ₃	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	-
Potassium sulphate	K ₂ SO ₄	+	+	+	+	+	+	0	+	+	+	+	+	+	+	+	+	+	+	+	-
Sea water/ Salt water		+	+	+	+	0	+	+	+	+	+	+	0	+	+	+	+	+	+	+3)	
Sodium chloride	NaCl	+	+	+	+	+	+	+	+	+	+	+	0	+	+	+	+	+	+	+	-
Sodium hydroxide	NaOH	+	+	+	0	+	+	+	-	+	+	+	+	0	+	+	+	+	+	+	-
Sodium hypochlorite	NaOCl	+	+	0	-	0	0	-	+	+	+	+	-	+	+	+	+	+	+	0	-
Sodium nitrate	NaNO ₃	+	+	+	0	0	+	0	+	+	+	+	+	+	+	+	+	+	+	+	-
Sodium sulphate	Na ₂ SO ₄	+	+	+	+	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Sugar water		+	+	+	+	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sulphuric acid	H ₂ SO ₄	+	+	0	-	-	0	0	0	+	0	0	0	0	+	+	+	+	+	0 1)	-
1% Sulphuric acid	1% H ₂ SO ₄	+	+	0	-	-	+	0	+	+	+	+	+13)	+9)	+	+10)	+13)	+10)	+	0 1)	-
10% Sulphuric acid	10% H ₂ SO ₄	+	+	0	-	-	+	0	+	+	+	+	+6)	-	+	+10)	+13)	+10)	+	0 1)	-
20% Sulphuric acid (oleum)	20% H ₂ SO ₄	+	+	-	-	-	0	-	+	+	+	+	0	-	+	+	+	+	+	0	-
50% Sulphuric acid	50% H ₂ SO ₄	+	+	-	-	-	0	-	0	+	0	0	-	-	+	+4)	+8)	+5)	+	0 1)	-
100% Sulphuric acid	100% H ₂ SO ₄	+	+	-	-	-	-	-	0	+	0	0	+6)	-	+	+4)	+7)	+6)	+	-	-
Sulphuric acid + Nitric acid	H ₂ SO ₄ / HNO ₃ (1:1)	+	+				0			+	0	0	-	-	+	+	+	+	+	-	-
Tin chloride	SnCl ₂	+	+	+	+	+	+	+	+	+	+	+	-	+	+	0	0	0	+	0	-
Toluene	C ₆ H ₅ CH ₃	+	+	-	-	-	0	-	+	+	+	+	+	+	+	+	+	+	+	+	-
Water, dionized		+	+	+	0	0	+	+	+	+	+	+	0	0	+	0	+	+	+	0	-
Water, potable		+	+	+	+	0	+	0	0	+	+	+	0	+	+	+	+	+	+	+	-
Wine		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+1)	-
Zinc chloride	ZnCl ₂	+	+	+	+	+	+	+	+	+	+	+	0	0	+	0	0	0	+	+	-

* For chemical resistance for MAG 1100/MAG 1100 F (DN10-100) platinum with gold/titanium brazing alloy electrode please also refer to titanium.

1) no air 2) max boiling point 3) no stagnation 4) max 40 °C 5) max 45 °C 6) max 50 °C 7) max 55 °C 8) max 60 °C 9) max 65 °C 10) max 75 °C 11) max 80 °C 12) max 85 °C 13) max 95 °C 14) max 110 °C