PROCESS INSTRUMENTATION

Flow Meter
SITRANS F M

Siemens Selection Guide - Your Best Choice

usa.siemens.com/mag

SIEMENS

SITRANS F M Flowmeters

A world of possibilities

Flowmeters from Siemens are designed for individual customer demands, which means they are fully compatible for integration in future system expansions

Siemens is your partner for integrating business processes across all levels and helping you create your competitive advantage. Choosing the right flowmeter for the right application is decisive for the productivity and dramatically improves your operations. We develop, manufacture and market all flowmeters worldwide – under the brand SITRANS F. Our range extends from electronic meters based on electromagnetic, coriolis and ultrasonic technologies to more classical mechanical flowmeters. We offer a wide range of electronic flowmeters, all fulfilling the highest demands in terms of accuracy and reliability in industries such as water and wastewater, chemicals, food and beverage, pharmaceutical, mining, pulp and paper, power and utilities.

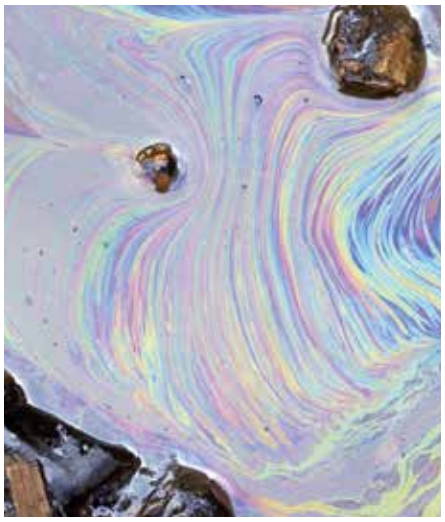
SITRANS F M – electromagnetic flowmeters from Siemens

Siemens offers a range of electromagnetic flowmeters for the measurement of all electrically conductive fluids:

SITRANS FM MAG 1100 / FM120
SITRANS FM MAG 1100 HT / FM120
SITRANS FM MAG 1100 Food / FM120
SITRANS FM MAG 3100 / FM320
SITRANS FM MAG 3100 HT / FM320
SITRANS FM MAG 3100 P / FM320
SITRANS FM MAG 5100 W/ FM520
SITRANS F M MAG 8000
SITRANS F M MAG 911/E

A wide range of transmitters and sensors completes the product range and enables the creation of exactly the flowmeter needed for your application.

A liner for every purpose



Flowmeter liners

The liners from Siemens are designed for flowmeters covering the following applications:

- Drinking Water
- Wastewater
- Abrasives Liquids
- Chemicals
- Food & Beverage / Pharmaceutical
- Pulp & Paper
- Mining

The flowmeters differ in terms of materials, size, corrosion resistance, pressure and temperature performance.

The right combination depends on the specific application area. Some of the liners are especially suitable for drinking water – such as EPDM or Ebonite – whereas others are designed for use in food and beverage industries – such as PFA or Ceramic.

Several of the liners have obtained international approvals for specific purposes. For instance in drinking water applications, different national authorities dictate a variety of strict limitations and demands.

In any situation, you can find a Siemens flowmeter to suit your requirements exactly.

Use this Selection Guide to see the exact specifications for the various liner types, and get a quick overview of the best liners to use within different application areas.

Content

SITRANS F M SELECTION GUIDE

Liners and Electrodes for every industry

Liners and **Electrodes** for every industry

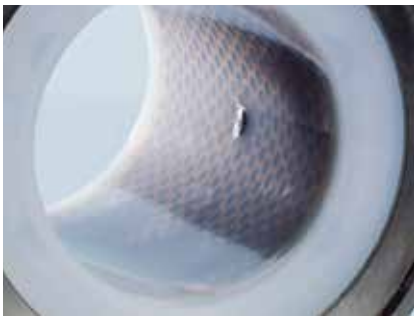
SITRANS F M SELECTION GUIDE

Liners and Electrodes for every industry

(*) NSF Drinking Water Approval

Liner: PFA

PFA, Perfluoroalkoxy



PFA has developed into a high performance liner for chemical and process applications.

The PFA liner from Siemens is the perfect choice for applications within the chemical, food and beverage and pulp and paper thanks to its excellent chemical resistance and temperature resistance.

About PFA

PFA is a perfluoroalkoxy with excellent chemical resistance and high temperature resistance. PFA is moulded directly in the flowmeter tube and is reinforced with a stainless steel tube, resulting in an extremely good mechanical performance during temperature fluctuations and under vacuum pressure conditions.

The robust PFA liner design with stainless steel tube reinforcement withstands high temperatures without deformation.

PFA facts and features

- PFA is highly resistant to chemicals
- The PFA liner tolerates media temperatures of -20 °C to +150 °C (-4 °F to +300 °F)
- Highly stable under vacuum pressure conditions
- Index price higher than PTFE

Application	Capability
Drinking Water	Contact Siemens
Wastewater	✓
Abrasive Liguids	✓
Chemicals	✓✓✓
Food & Beverage	✓✓✓
Pulp & Papier	✓✓✓

Chemical Resistance*	Capability
Acid, diluted (<10%)	+
Acid, concentrated	+
Diluted alkalis	+
Concentrated alkalis	+
Aromatic hydrocarbons (benzene)	+
Chlorinated hydrocarbons (trichloroethylene)	+
Ozone	+
High resistance	+
Moderate resistance	0
No resistance	-

***Please also refer to the chemical resistance chart**

Wear Resistance	Performance
Abrasion	✓

Products	Nominal size	Medium temperature	Operating pressure	Hygienic suitability
MAG 1100 / FM120	DN 10...DN 100 (⅜"...4")	-30...+130 °C (-20...+270 °F)	0.02–20 bar abs (0.3–290 psia)	
MAG 1100 F / FM120	DN 10...DN 100 (⅜ "...4")	-30...+130 °C (-20...+270 °F)**	0.02–20 bar abs (0.3–290 psia)	3A approved
MAG 3100 / FM320	DN 25...DN 150 (1"...6")	-20...+100 °C (-4...+212 °F)	0.01–50 bar abs (0.15–725 psia)	
MAG 3100 HT / FM320	DN 25...DN 150 (1"...6")	-20...+150 °C (-4...+302 °F)	0.01–50 bar abs (0.15–725 psia)	
MAG 3100 P / FM320	DN 25...DN 150 (1"...6")	-20...+150 °C (-4...+302 °F)	0.01–50 bar abs (0.15–725 psia)	

****Suitable for steam sterilization at +150 °C (+302 °F)**

Liner: PTFE

PTFE, Polytetraflouroethylene

PTFE is a commonly used liner for the chemical and general process industries.

PTFE is the most commonly used liner for the chemical and general process industries, where temperature-resistant materials with exceptional chemical properties are required.

About PTFE

PTFE is a polytetraflouroethylene, which is an extruded tube inserted in the flowmeter without bonding. The ends are bevelled and form the flange face.

The PTFE liner can be adversely affected by exposure to vacuum pressure.

PTFE facts and features

- Smooth surface
- Small risk of deposits in the liner
- Liner with best chemical resistance
- High and low temperature capability – tolerates media temperatures from -20 °C to +180 °C (-4 °F to +356 °F)
- Higher index-priced liner.

Application	Capability
Drinking Water	Contact Siemens
Wastewater	✓
Abrasive Liquids	✓
Chemicals	✓✓✓
Food & Beverage	✓✓✓
Pulp & Paper	✓✓✓

Chemical Resistance*	Capability
Acid, diluted (<10%)	+
Acid, concentrated	+
Diluted alkalis	+
Concentrated alkalis	+
Aromatic hydrocarbons (benzene)	+
Chlorinated hydrocarbons (trichloroethylene)	+
Ozone	+
High resistance	+
Moderate resistance	0
No resistance	-

***Please also refer to the corrosion table under notes.**

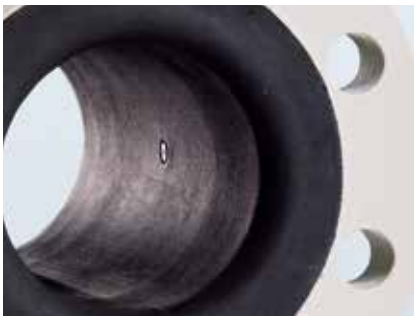
Wear Resistance	Performance
Abrasion	✓

Products	Nominal size	Medium temperature	Operating pressure	Hygienic suitability
MAG 3100 / FM320	DN 15...DN 600 (½"...24")	-20...+100 °C (-4...+212 °F)	DN ≤ 300: 0.3–50 bar abs (4–725 psia) 350 ≤ DN ≤ 600: 0.3–40 bar abs (4–580 psia)	
MAG 3100 HT / FM320	DN 15...DN 300 (½"...12")	-20...+150 °C (-4...+302 °F) -20...+180 °C (-4...+356 °F)**	0.3–50 bar abs (4–725 psia)	
MAG 3100 P / FM320	DN 15...DN 300 (½"...12")	-20...+150 °C (-4...+302 °F)	0.3–50 bar abs (4–725 psia)	
MAG 911/E / FM320	DN 15...DN 600	-20...+150 °C (-4...+302 °F)	0.3–40 bar abs (4.3–580 psia)	

****Factory mounted grounding rings type E.**

Liner: Neoprene

Neoprene, Polychloroprene



Neoprene is suitable for water and wastewater applications.

The Neoprene liner from Siemens was formerly the most commonly used liner for water and wastewater applications as well as some chemical applications. In recent years, new materials have emerged for use in these applications.

Application	Capability
Drinking Water	Contact Siemens
Wastewater	✓✓✓
Abrasive Liquids	✓✓
Chemicals	✓
Food & Beverage	
Pulp & Parier	

Chemical Resistance*	Capability
Acid, diluted (<10%)	0
Acid, concentrated	0
Diluted alkalis	+
Concentrated alkalis	+
Aromatic hydrocarbons (benzene)	-
Chlorinated hydrocarbons (trichloroethylene)	-
Ozone	0
High resistance	+
Moderate resistance	0
No resistance	-

***Please also refer to the chemical resistance chart**

Wear Resistance	Performance
Abrasion	✓✓

About Neoprene

Neoprene polychloroprene is a versatile synthetic rubber, originally developed as an oil-resistant substitute for natural rubber. Neoprene possesses a unique combination of properties, which has led to its use in thousands of applications in various water application environments.

The Siemens Neoprene liner is hand lined and bonded to the stainless steel inner tube of the sensor, which supports the liner during use.

Recently, due to new drinking water requirements and the risk of swelling in water, other rubber materials such as EPDM and Ebonite have replaced Neoprene in many water applications.

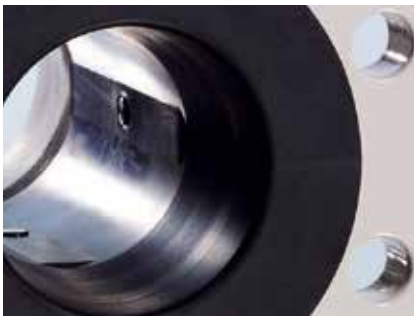
Neoprene facts and features

- Performs well in contact with oils, many chemicals and some solvents
- Well-suited to wastewater applications where oil is present
- Good abrasion resistance properties
- Due to compression set the liner tolerates a maximum temperature of +70 °C (+158 °F).

Products	Nominal size	Medium temperature	Operating pressure	Hygienic suitability
MAG 3100 / FM320	DN 25...DN 2000 (1"...78")	0...+70 °C (+32...+158 °F)	0.01–100 bar abs (0.15–1450 psia)	
MAG 911/E	DN 15...DN 600 (½"...24")	0...+70 °C (+32...+158 °F)	0.01–40 bar abs (0.15–580 psia)	

Liner: EPDM

EPDM, Ethylenepropylenediene Rubber



EPDM – a perfect choice for drinking water applications.

The EPDM liner from Siemens is the preferred liner for drinking water applications.

About EPDM

EPDM rubber (ethylenepropylenediene rubber) is an elastomer, which is characterized by a wide range of advantages, making it especially suitable for drinking water applications.

EPDM is a hand lined bonded liner with the stainless steel inner tube of the sensor as support.

In the MAG 5100 W, DN 15 to DN 300 (½" to 12") flow sensors the liner is moulded, with a stainless steel reinforcement net.

EPDM has excellent properties for drinking water applications.

EPDM facts and features

- Many country specific drinking water approvals including NSF61.
- Can be used for some chemicals, where PTFE or PFA is not required
- Can be used for some food and beverage applications with pipe sizes greater than DN 100/4"
- For wastewater applications, where hydrocarbons can be present, consider NBR as the best liner choice.
- EPDM has a much better water resistance than PU due to high hydrolysis stability.

Application	Capability
Drinking Water	✓✓✓
Wastewater	✓✓
Abrasive Liquids	✓
Chemicals	✓✓
Food & Beverage	✓✓
Pulp & Paper	

Chemical Resistance*	Capability
Acid, diluted (<10%)	+
Acid, concentrated	0
Diluted alkalis	+
Concentrated alkalis	+
Aromatic hydrocarbons (benzene)	-
Chlorinated hydrocarbons (trichloroethylene)	-
Ozone	+
High resistance	+
Moderate resistance	0
No resistance	-

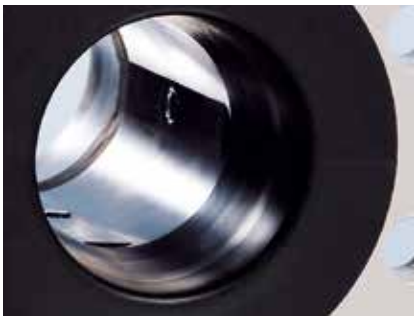
***Please also refer to the chemical resistance chart**

Wear Resistance	Performance
Abrasion	✓✓

Products	Nominal size	Medium temperature	Operating pressure	Hygienic suitability
MAG 3100 / FM320	DN 25...DN 2000 (1"...78")	-10...+70 °C (+14...+158 °F)	0.01–40 bar abs (0.15–580 psia)	NSF61 drinking water approved
MAG 5100 W / FM520	DN 15...DN 2000 (½"...80")	-40...+70 °C (-40...+158 °F)	Full bore sensor: DN 25...DN 40 (1"...1 ½") 0.01–40 bar abs (0.15–580 psia) Coned bore sensor: DN 50...DN 300 (2"...12") 0.03–20 bar abs (0.44–290 psia) Full bore sensor: DN 350...DN 2000 (14"...80") 0.01–16 bar abs (0.15–232 psia)	NSF61 drinking water approved
MAG 8000	DN 25...DN 1200 (1"...48")	0...+70 °C (+32...+158 °F)	Full bore sensor: DN 25... N 40 (1"...1 ½") 0.01–40 bar abs (0.15–580 psia) Coned bore sensor: DN 50...DN 300 (2"...12") 0.03–20 bar abs (0.44–290 psia) Full bore sensor: DN 350...DN 1200 (14"...48") 0.01–16 bar abs (0.15–232 psia)	NSF61 drinking water approved

Liner: NBR

NBR, Nitrile Butadiene Rubber



The NBR liner is excellent for water and general purpose applications.

The NBR liner from Siemens is excellent for water, wastewater and general purpose applications. And it is also suitable for process applications and certain chemical applications, where PTFE or PFA is not needed.

About NBR

NBR is often used in oil and gas industries because the material is highly resistant to hydrocarbons. The performance properties of NBR depend on its acrylonitrite (ACN) and sulphur content. The oil and gasoline resistance increases with ACN rate. The Siemens NBR liner has an ACN rate of about 30 W%, a level which ensures resistance to both water and hydrocarbons.

DN > 300 (12”):

Hand lined and bonded to the stainless steel inner tube of the sensor.

DN 15 to DN 300 (1/2” to 12”):

Moulded liner with reinforcement net

NBR facts and features

- Lowest priced liner
- NBR is highly resistant to hydrocarbons
- Suitable for process applications and certain chemical applications, where PTFE or PFA is not required.
- NBR is better suited for waste water than PUR. PUR has good oil, grease, gasoline and aromatic hydrocarbons resistance, but in comparison to NBR it is not recommended for water containing these media due to its low hydrolysis resistance.

Application	Capability
Drinking Water	
Wastewater	✓✓✓
Abrasive Liquids	✓
Chemicals	✓
Food & Beverage	
Pulp & Paper	

Chemical Resistance*	Capability
Acid, diluted (<10%)	0
Acid, concentrated	-
Diluted alkalis	+
Concentrated alkalis	0
Aromatic hydrocarbons (benzene)	-
Chlorinated hydrocarbons (trichloroethylene)	-
Ozone	-
High resistance	+
Moderate resistance	0
No resistance	-

***Please also refer to the chemical resistance chart**

Wear Resistance	Performance
Abrasion	✓✓

Products	Nominal size	Medium temperature	Operating pressure	Hygienic suitability
MAG 5100 W / FM520	DN 15...DN 2000 (½"...80")	-40...+70° C (-40...+158 °F)	DN 15...DN 40 (½"...1 ½") 0.01–40 bar abs (0.15–580 psia) DN 50...DN 300 (2"...12") 0.03–20 bar abs (0.44–290 psia) DN 350...DN 2000 (14"...80") 0.01–16 bar abs (0.15–232 psia)	

Liner: NBR

Internal information

NBR performs well in:

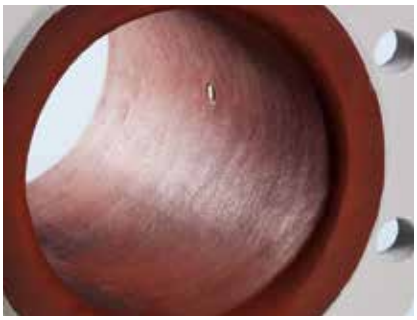
- Petroleum oils & fuels
- Silicone oils & greases
- Ethylene glycol
- Dilute acids
- Water (below 212 °F)

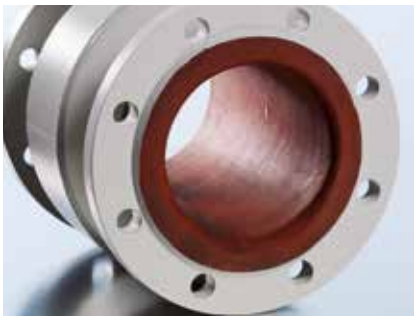
NBR does not perform well in:

- Aromatic hydrocarbons (benzene, toluene, xylene)
- Automotive brake fluid
- Halogen derivatives (carbon tetrachloride, trichloroethylene)
- Ketones (MEK, acetone)
- Phosphate ester hydraulic fluids (Skydrol®, Pydraul®)
- Strong acids

Liner: Linatex

Linatex, Natural Soft Rubber





Linatex is made of natural soft rubber and has an excellent performance in abrasive media.

Linatex has an excellent performance in abrasive media. Thanks to its high resistance to wear the Linatex liner is long lasting and economically attractive, especially in heavy slurry applications.

About Linatex

Linatex is based on 95% natural soft rubber. Raw natural rubber, when vulcanized, exhibits an inherent strength, resilience and toughness that combine to provide an excellent abrasion-resistant performance, especially in heavy slurry applications.

Its phenomenal resilience, exceptional tear resistance, all-round toughness and the unique cross-linking of its molecular structure, ensure that Linatex is well accepted worldwide within the mining industry.

The Siemens Linatex liner is a hand lined and bonded liner with a stainless steel inner tube.

Linatex facts and features

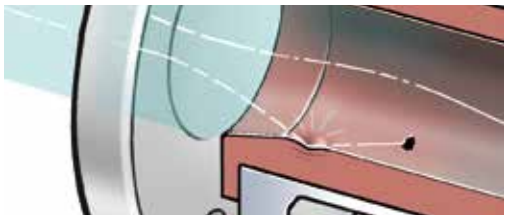
- Excellent abrasion resistance particularly to sand, slurries and particles because the particles simply bounce off the soft rubber instead of causing damage
- The only liner which tolerates low temperature applications down to -40 °C (-40 °F)
- Linatex can be adversely affected by oil and solvents.

Application	Capability
Drinking Water	
Wastewater	
Abrasive Liquids	✓✓✓
Chemicals	
Food & Beverage	
Pulp & Paper	

Chemical Resistance*	Capability
Acid, diluted (<10%)	0
Acid, concentrated	-
Diluted alkalis	+
Concentrated alkalis	+
Aromatic hydrocarbons (benzene)	-
Chlorinated hydrocarbons (trichloroethylene)	-
Ozone	-
High resistance	+
Moderate resistance	0
No resistance	-

***Please also refer to the chemical resistance chart**

Wear Resistance	Performance
Abrasion	✓✓✓



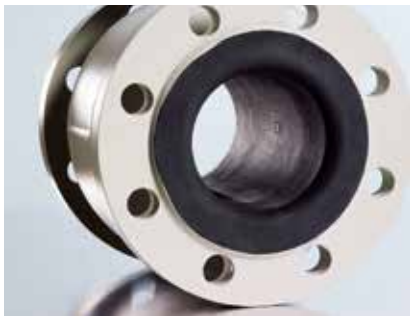
Linatex protection

Minerals or particles will bounce off the soft rubber liner instead of wearing it down.

Products	Nominal size	Medium temperature	Operating pressure	Hygienic suitability
MAG 3100 / FM320	DN 25...DN 600 (1"...24")	-40...+70 °C (-40...+158 °F)	0.01–40 bar abs (0.15–580 psia)	
MAG 911/E	DN 15...DN 1000 (½"...40")	-40...+70 °C (-40...+158 °F)	0.01–40 bar abs (0.15–580 psia)	

Liner: Ebonite

Ebonite, Hard Rubber



The Ebonite liner is very suitable for wastewater and several chemical applications.

The Ebonite liner is highly resistant to chemicals, hydrocarbons and other substances, which can be present in untreated water and sewage. The liner is therefore particularly suitable for wastewater applications and certain chemical applications.

About Ebonite

Due to its cross-connected structure the Ebonite liner exhibits an extremely low water absorption and at the same time offers a high level of stability of the measuring tube section during the entire lifetime of the sensor, regardless of pressure and temperature.

The Ebonite liner is hand lined and bonded to the stainless steel inner tube of the sensor, which supports the liner during use.

In general purpose applications Ebonite is typically used for undefined media containing low concentrations of many chemicals – especially for high pressure applications, where temperatures are above +70 °C (+158 °F) – max +95 °C (+203 °F).

Ebonite facts and features

- Good for use in wastewater applications and certain chemical applications, where PTFE and PFA are not necessary
- Relative good chemical resistance and resistance to hydrocarbons
- Tolerates high pressure and temperatures up to +95 °C (+203 °F)
- Extremely low water absorption

Application	Capability
Drinking Water	✓✓*
Wastewater	✓✓
Abrasive Liquids	✓
Chemicals	✓
Food & Beverage	✓
Pulp & Paper	

* While suitable for drinking water it is not NSF61 approved. For NSF61 approval with MAG3100, use EPDM liner

Chemical Resistance*	Capability
Acid, diluted (<10%)	+
Acid, concentrated	0
Diluted alkalis	+
Concentrated alkalis	+
Aromatic hydrocarbons (benzene)	-
Chlorinated hydrocarbons (trichloroethylene)	-
Ozone	0
High resistance	+
Moderate resistance	0
No resistance	-

***Please also refer to the chemical resistance chart**

Wear Resistance	Performance
Abrasion	✓

Products	Nominal size	Medium temperature	Operating pressure	Hygienic suitability
MAG 3100 / FM320	DN 25...DN 2200 (1"...88")	0...+95 °C (+32...+203 °F)	0.01–100 bar abs (0.15–1450 psia)	

Liner: Ceramic

Ceramic, Zirconium Oxide (ZrO_2) – Aluminium Oxide (Al2O3)

The two Ceramic liners have excellent properties for use in chemical and food applications.

The two Ceramic liners both have excellent properties for a broad range of process industry applications. They demonstrate a wide range of applicability due to their resistance to high temperatures, low pressures and corrosion. Ceramic is also usable in food and beverage applications, but needs cautions for sudden temperature shocks.

About Ceramic

Ceramic Zirconium Oxide (>96.0% ZrO_2; 3.1–3.3% MgO)

Zirconium Oxide is a versatile advanced ceramic material. It has excellent chemical resistance to acids and alkalis. It has no thermal shock limitations. Ceramic Zirconium Oxide is used for flowmeter sizes DN 2 (1/12") and DN 3 (1/8").

Ceramic Aluminium Oxide (Al_2O_3) (99.7% Al_2O_3; 0.3% MgO)

Aluminium Oxide is a high purity aluminium oxide ceramic. It resists both acids and alkalis. For flowmeters sized above DN 50 the liner can be sensitive to sudden thermal shocks. This ceramic is best suited to lining flowmeters of small diameter in high accuracy applications.

Ceramic facts and features

- The liners with the best possible long-term accuracy
- Withstands high temperatures, corrosion and wear
- Chemically inert in the presence of most substances, even at elevated temperatures
- High temperature resistance
- Totally vacuum resistant

Application	Capability
Drinking Water	
Wastewater	
Abrasive Liquids	✓
Chemicals	✓✓
Food & Beverage	✓✓✓
Pulp & Paper	

Chemical Resistance*	Capability
Acid, diluted (<10%)	+
Acid, concentrated	+
Diluted alkalis	+
Concentrated alkalis	0
Aromatic hydrocarbons (benzene)	+
Chlorinated hydrocarbons (trichloroethylene)	+
Ozone	+
High resistance	+
Moderate resistance	0
No resistance	-

***Please also refer to the chemical resistance chart**

Wear Resistance	Performance
Abrasion	✓✓

Products	Nominal size	Medium temperature	Operating pressure	Hygienic suitability
MAG 1100 / FM120	DN 2...DN 100 (1/12"...4")	-20...+150 °C (-4...+302 °F)	DN 2...65: 40 bar abs (½"...2 ½": 580 psia) DN 80: 37.5 bar abs (3": 540 psia) DN 100: 30 bar abs (4": 435 psia) Vacuum: 1 x 10–6 bar abs (1.5 x 10–5 psia)	
MAG 1100 HT / FM120	DN 15...DN 100 (½"...4")	-20...+200 °C (-4...+390 °F)	DN 15...50: 40 bar abs (½"...2": 580 psia) DN 80: 37.5 bar abs (3": 540 psia) DN 100: 30 bar abs (4": 435 psia) Vacuum: 1 x 10–6 bar abs (1.5 x 10–5 psia)	
MAG 1100 F / FM120	DN 10...DN 100 (⅜"...4")	-20...+150 °C (-4...+302 °F)	DN 10...65: 40 bar abs (⅜"...2 ½": 580 psia) DN 80: 37.5 bar abs (3": 540 psia) DN 100: 30 bar abs (4": 435 psia) Vacuum: 1 x 10–6 bar abs (1.5 x 10–5 psia)	3A, EHEDG approved

Liner: Novolak

Novolak, Epoxy Coating

The Novolak liner can be used for chemical processes, in the pulp and paper industries, and in high temperature applications in general.

The Novolak liner has its strength in high temperature applications as an economic alternative to PTFE liners. The Novolak liner is also used in chemical industries due to its excellent chemical resistance.

About Novolak

The Novolak liner is a spray coating with a smooth, hard and non-porous surface and finish – and is highly resistant to corrosion.

Apart from use in pulp and paper applications, the Novolak liner is also used in chemical industries due to its excellent chemical resistance.

Novolak facts and features

- Robust at high pressures and under vacuum conditions
- Withstands temperatures up to +130 °C (+266 °F)
- Novolak is compatible with chemicals with a pH value between 3 and 13
- Novolak is not suitable for media containing ozone

Application	Capability
Drinking Water	
Wastewater	
Abrasive Liquids	✓
Chemicals	✓✓
Food & Beverage	
Pulp & Paper	✓✓

Chemical Resistance*	Capability
Acid, diluted (<10%)	+
Acid, concentrated	0
Diluted alkalis	+
Concentrated alkalis	+
Aromatic hydrocarbons (benzene)	+
Chlorinated hydrocarbons (trichloroethylene)	
Ozone	+
High resistance	+
Moderate resistance	0
No resistance	-

***Please also refer to the chemical resistance chart**

Wear Resistance	Performance
Abrasion	✓

Products	Nominal size	Medium temperature	Operating pressure	Hygienic suitability
MAG 911/E	DN 15...DN 600	-20...+130 °C (-4...+266 °F)	0.01–40 bar abs (0.15–580 psia)	

SITRANS F M Liner Survey

The information presented in this chart has been supplied by Siemens or other reputable sources and is to be used only as reference. Please consult the Siemens catalogue FI 01 and chemical compatibility tables for further product/media compatibility and specific product temperature limitations.

Properties	PFA	PTFE	Neoprene	EPDM
Other names	Perfluoroalkoxy	Polytetraflouroethylene	Polychloroprene	Ethylenepropylenediene
General Attributes	Excellent chemical resistance, withstands high temperatures without deformation.	Excellent chemical resistance.	Performs well in contact with oils and many chemicals.	Drinking water and many other media than hydrocarbons (oil, tar, graese).
Wear Resistance	✓	✓	✓✓	✓
Applications				
Drinking Water NSF61 Approved				✓✓✓
Wastewater	✓	✓	✓✓✓	✓✓
Abrasive Liquids	✓	✓	✓✓	✓
Chemicals	✓✓✓	✓✓✓	✓	✓✓
Food & Beverage	✓✓✓	✓✓✓		✓✓
Pulp & Paper	✓✓✓	✓✓✓		
Chemical Resistance				
Acid, diluted (<10%)	+	+	0	+
Acid, concentrated	+	+	0	0
Diluted alkalis	+	+	+	+
Concentrated alkalis	+	+	+	+
Aromatic hydrocarbons (benzene)	+	+	-	-
Chlorinated hydrocarbons (trichloroethylene)	+	+	-	-
Ozone	+	+	0	+
Temperatures				
Maximum Temperature	300 °F	356 °F	158 °F	158 °F
	150 °C	180 °C	70 °C	70 °C
Availability				
MAG 1100 / FM120	Yes			
MAG 1100 HT / FM120				
MAG 1100 F / FM120	Yes			
MAG 3100 / FM320	Yes	Yes	Yes	Yes
MAG 3100 HT / FM320	Yes	Yes		
MAG 3100 P / FM320	Yes	Yes		
MAG 5100 W / FM520				Yes
MAG 8000				Yes
MAG 911/E		Yes	Yes	




NBR	Linatex	Ebonite	Ceramic	Novolak
Nitrile Butadiene Rubber	Natural Soft Rubber	Hard Rubber	Zirconium Oxide (ZRO_2) Aluminium Oxide (Al_2O_3)	Epoxy Coating
Excellent for water and general purpose applications.	Excellent abrasion performance.	Suitable for wastewater and several chemical applications. Useable for temperatures up to 95 °C and for applications with high pressure.	Chemically inert in the presence of most substances, even at elevated temperatures. Vacuum resistant.	Chemical process and pulp and paper applications. High-temperature applications.
✓✓	✓✓✓	✓	✓✓	✓
		✓✓		
✓✓✓		✓✓		
✓	✓✓✓	✓	✓	✓
✓		✓	✓✓	✓✓
		✓	✓✓✓	
				✓✓
0	0	+	+	+
-	-	0	+	0
+	+	+	+	+
0	+	+	0	+
-	-	-	+	+
-	-	-	+	
-	-	0	+	+
158 °F	158 °F	203 °F	392 °F	266 °F
70 °C	70 °C	95 °C	200 °C	130 °C
			Yes	
			Yes	
			Yes	
	Yes	Yes		
Yes				
	Yes			Yes

◂ Back to the table of content

SITRANS FM
Electrodes

SITRANS F M SELECTION GUIDE

Liners and **Electrodes** for every industry

	Stainless Steel	Hastelloy®	Titanium	Tantalum	Platinium
Drinking Water	●	◐	○	○	○
Wastewater	●	◐	○	○	○
Abrasive Liquids	●	◐	◐	○	○
Chemicals	●	◐	◐	◐	◐
Food & Beverage	●	◐	○	○	◐
Pulp & Paper	●	◐	○	◐	○
Overview				■	

Stainless Steel

The Stainless Steel AISI 316 electrode from Siemens is a general purpose electrode for non-aggressive liquids, such as drinking water, sewage and district heating.

About Stainless Steel (AISI 316)

AISI 316 is an iron-carbon alloy with chromium, nickel and molybdenum being the main alloying elements.

Chromium will form a protective oxide layer when exposed to oxygen and thus the corrosion resistance of Stainless Steel increases compared to plain carbon steel. The general corrosion resistance of AISI 316 is therefore depending on the resistance of the protective oxide layer.

Stainless steel facts and features

- General purpose electrode
- Not suitable for strong acids and alkalis
- Low cost
- Not recommended for salt water and brine

Application	Availability
Drinking Water	✓✓
Wastewater	✓✓
Abrasive Liquids	✓✓
Chemicals	✓
Food & Beverage	✓✓
Pulp & Paper	✓

Chemical Resistance*	Capability
Reducing acids	-
Oxidizing acids	0
Organic acids	+
Alkalis	+
Diluted salts	0
High resistance	+
Moderate resistance	0
No resistance	-

***Please also refer to the chemical resistance chart**

Products	Nominal size	Medium temperature	Liner	Hygienic suitability
MAG 3100 / FM320	DN 15...DN 2200 (½"...88")	-40...+100 °C (-40...+212 °F)	Neoprene , EPDM, PTFE, Ebonite, Linatex	Drinking water approved
MAG 3100 HT / FM320	DN 15...300 (½"...12")	-20...+180 °C (-4...+356 °F)	PTFE	
MAG 911/E	DN 15...600 (½"...24")	-20...+150 °C (-4...+302 °F)	Hard Rubber, PTFE, Novolak	

Hastelloy®

The Hastelloy® electrode from Siemens is the preferred choice for applications in water and wastewater, chemical, food and beverage, and pharmaceutical industries.

About Hastelloy®

Hastelloy® is a family of nickel alloys with a very wide application area. The Hastelloy® electrode is characterized by having a high-resistance towards localized corrosion which is a great advantage in chloride-containing environments at high temperatures. Furthermore, Hastelloy® has a high level of all-round corrosion resistance which can be attributed to the content of chromium and molybdenum. Chromium increases the resistance to oxidizing conditions and molybdenum increases the resistance to reducing environments. Siemens uses the grades, C22 and C276 as electrode material in its electromagnetic flowmeters, and in a few applications also C4.

Hastelloy® facts and features

- Good all-round corrosion resistance
- High resistance to localized corrosion (superior to Stainless Steel)
- The preferred material within the process and water industry due to cost benefits
- Preferred material for salt water and brine

Application	Availability	
	C22	C276
Drinking Water	✓✓✓	✓✓✓
Wastewater	✓✓✓	✓✓✓
Abrasive Liquids	✓✓✓	✓✓✓
Chemicals	✓✓✓	✓✓✓
Food & Beverage	✓✓✓	✓✓✓
Pulp & Paper	✓✓✓	✓✓

Chemical Resistance*	Capability	
	C22	C276
Reducing acids	0	0
Oxidizing acids	+	0
Organic acids	+	+
Alkalis	+	+
Diluted salts	0	0

High resistance	+
Moderate resistance	0
No resistance	-

***Please also refer to the chemical resistance chart**

MAG 1100	MAG 1100 F	MAG 5100 W	MAG 3100	MAG 8000	MAG 911/E
C22	C22	C276	C276, C22 (only PFA)	C276	C276

Products	Nominal size	Medium temperature	Liner	Hygienic suitability
MAG 1100 / FM120	DN 2...100 (1/12"...4")	20...+130 °C (-4...+270 °F)	PFA	
MAG 1100 F / FM320	DN 10...100 (1/12"...4")	20...+130 °C (-4...+270 °F)	PFA	3A, EHEDG approved
MAG 3100 / FM320	DN 15...DN 2000 (½"...80")	20...+150 °C (-4...+302 °F)	Neoprene, EPDM, PTFE, Ebonite, Linatex, PFA	Drinking water approved
MAG 3100 HT / FM320	DN 15...300 (½"...12")	-20...+180 °C (-4...+356 °F)	PTFE	
MAG 3100 P / FM320	DN 15...300 (½"...12")	-20...+150 °C (-4...+302 °F)	PTFE, PFA	
MAG 5100 W / FM520	DN 25...2000 (1"...80")	40...+70 °C (-40...+158 °F)	NBR, EPDM	Drinking water approved
MAG 8000	DN 25...1200 (1"...48")	0...+70 °C (32...+158 °F)	EPDM	Drinking water approved
MAG 911/E	DN 15...600 (½"...24")	-20...+150 °C (-4...+302 °F)	Hard Rubber, PTFE, Novolak	

Titanium

The Titanium electrode from Siemens is a good choice for applications in the process and chemical industry requiring a high corrosion resistance.

About Titanium

The Titanium electrode has an excellent corrosion resistance in many aggressive environments, particularly oxidizing and chloride-containing media. The only corrosion limitation of titanium is applications in reducing acids such as sulphuric and hydrochloric acids. The corrosion resistance of Titanium relies on the formation of a passive surface film composed of Titanium oxide (mainly $TiOx_2$). This passive film is very stable and has a self-healing effect as long as the surrounding environment contains oxygen or other oxidizing agents.

Titanium facts and features

- High corrosion resistance in oxidizing and alkaline media
- Limited resistance in reducing acids
- Good mechanical properties
- Fairly expensive electrode material

Application	Availability
Drinking Water	
Wastewater	
Abrasive Liquids	✓
Chemicals	✓✓
Food & Beverage	
Pulp & Paper	

Chemical Resistance*	Capability
Reducing acids	-
Oxidizing acids	+
Organic acids	0
Alkalis	+
Diluted salts	+
High resistance	+
Moderate resistance	0
No resistance	-

***Please also refer to the chemical resistance chart**

Products	Nominal size	Medium temperature	Liner	Hygienic suitability
MAG 3100 / FM320	DN 15...600 (½"...24")	-40...+100 °C (-40...+212 °F)	Neoprene , EPDM, PTFE, Ebonite, Linatex	
MAG 3100 HT / FM320	DN 15...300 (½"...12")	-20...+180 °C (-4...+356 °F)	PTFE	
MAG 911/E	DN 15...600 (½"...24")	-20...+150 °C (-4...+302 °F)	Hard Rubber, PTFE, Novolak	

Tantalum

The Tantalum electrode from Siemens is the perfect choice for aggressive media and almost immune to all kinds of chemical attack. This makes it a superior choice for applications in the chemical industry.

About Tantalum

Tantalum is very corrosion-resistant and has a resistance level similar to glass. Once the metal is exposed to air, a thin layer of highly resistant Tantalum oxide is formed, which makes it resistant to almost all kinds of chemicals. Corrosion can only take place in fluor-containing media and unwanted scale formation can occur in alkalis. It is a rather soft metal and thus not very abrasive-resistant.

Tantalum facts and features

- Most common electrode for chemical industry if Hastelloy® is not suitable
- Very corrosion-resistant (more or less similar to glass)
- Recommended for strong acids (except fluoric acids)
- Recommended for diluted salts (except fluor salts)
- The cost for Tantalum is high
- Not very abrasive-resistant

Application	Availability
Drinking Water	
Wastewater	
Abrasive Liquids	
Chemicals	✓✓✓
Food & Beverage	
Pulp & Paper	✓✓ (chemicals)

Chemical Resistance*	Capability
Reducing acids	+ (except flouric acids)
Oxidizing acids	+
Organic acids	+
Alkalis	-
Diluted salts	+ (except flour salts)

High resistance	+
Moderate resistance	0
No resistance	-

***Please also refer to the chemical resistance chart**

Products	Nominal size	Medium temperature	Liner	Hygienic suitability
MAG 3100 / FM320	DN 15...600 (½"...24")	-40...+100 °C (-40...+212 °F)	Neoprene, EPDM, PTFE, Ebonite, Linatex, PFA	
MAG 3100 HT / FM320	DN 15...300 (½"...12")	-20...+180 °C (-4...+356 °F)	PTFE, PFA	
MAG 3100 P / FM320	DN 15...300 (½"...12")	-20...+180 °C (-4...+302 °F)	PTFE	
MAG 911/E	DN 15...600 (½"...24")	-20...+150 °C (-4...+302 °F)	Hard Rubber, PTFE, Novolak	

Platinum

Platinum is the ultimate electrode material for difficult applications with high temperature and corrosive media. Platinum is chosen when tantalum is not sufficiently corrosion-resistant.

About Platinum

Platinum has a very noble and immune character which makes it extremely corrosion-resistant. Corrosive attack of platinum at room temperature will mainly take place in mixtures of strong oxidizing acids. Furthermore, platinum has excellent high-temperature characteristics with stable electrical properties. Different grades of platinum are available as electrode material at Siemens.

Platinum facts and features

- Very high corrosion resistance
- Used in the chemical industry for the most agressive liquids
- Very high cost
- Limited wear resistance

Application	Availability
Drinking Water	
Wastewater	
Abrasive Liquids	
Chemicals	✓✓✓
Food & Beverage	✓✓✓
Pulp & Paper	

Chemical Resistance*	Capability
Reducing acids	+
Oxidizing acids	0
Organic acids	+
Alkalis	+
Diluted salts	0
High resistance	+
Moderate resistance	0
No resistance	-

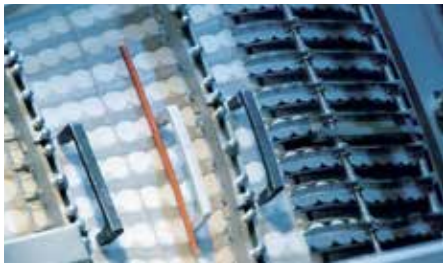
***Please also refer to the chemical resistance chart**

MAG 1100	MAG 1100 F	MAG 3100	MAG 911/E
99.9 wt% platinum electrode sintered or brazed to a ceramic liner.**	99.9 wt% platinum electrode brazed to a ceramic liner.**	90/10 wt% platinum / iridium alloy.	99.9 wt% platinum electrode

****In the brazed version, a thin layer of Titanium oxide is formed between the brazing and the ceramic liner. The general corrosion resistance of Titanium should therefore be taken into account when predicting the overall corrosion resistance.**

Products	Nominal size	Medium temperature	Liner	Hygienic suitability
MAG 1100 / FM120	DN 2...100 (1/12"...4")	20...+150 °C (-4...+300 °F)	Ceramic	
MAG 1100 HT / FM120	DN 15...100 (½"...4")	20...+200 °C (-4...+390 °F)	Ceramic	
MAG 1100 F / FM120	DN 10...100 (⅜"...4")	20...+150 °C (-4...+302 °F)	Ceramic	3A, EHEDG approved
MAG 3100 / FM320	DN 15...300 (½"...12")	-40...+100 °C (-40...+212 °F)	Neoprene, EPDM, PTFE, Linatex, PFA	
MAG 3100 HT / FM320	DN 15...300 (½"...12")	-20...+180 °C (-4...+356 °F)	PTFE, PFA	
MAG 3100 P / FM320	DN 15...300 (½"...12")	-20...+180 °C (-4...+302 °F)	PTFE	
MAG 911/E	DN 15...600 (½"...24")	-20...+150 °C (-4...+302 °F)	Hard Rubber, PTFE, Novolak	

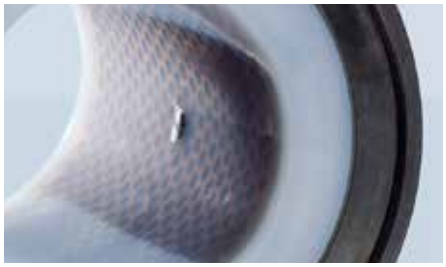
SITRANS F M Electrode Survey



	Stainless Steel	Hastelloy C22	Hastelloy C267	Titanium	Tantalum	Platinum
Applications						
Drinking Water	✓✓	✓✓✓	✓✓✓			
Wastewater	✓✓	✓✓✓	✓✓✓			
Abrasive Liquids	✓✓	✓✓✓	✓✓✓	✓		
Chemicals	✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓
Food & Beverage	✓✓	✓✓✓	✓✓✓			✓✓✓
Pulp & Paper	✓	✓✓✓	✓✓		✓✓ (chemical)	
Chemical Resistance						
Reducing acids	-	0	0	-	+ (except flouric acids)	+
Oxidizing acids	0	+	0	+	+	0
Organic acids	+	+	+	0	+	+
Alkalis	+	+	+	+	-	+
Diluted salts	0	0	0	+	+ (except fluor salts)	0
Availability						
MAG 1100 / FM120		Yes	Yes			Yes
MAG 1100 HT / FM120						Yes
MAG 1100 F / FM120		Yes	Yes			Yes
MAG 3100 / FM320	Yes	Yes	Yes	Yes	Yes	Yes
MAG 3100 HT / FM320	Yes		Yes	Yes	Yes	Yes
MAG 3100 P / FM320		Yes	Yes			
MAG 5100 W / FM520			Yes			
MAG 8000			Yes			
MAG 911/E	Yes			Yes	Yes	Yes

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 does 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 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 can take no responsibility for any failure due to material incompatibility.

How to use this guide

Chemical names are listed in alphabetical order. Each chemical may have one or more temperature and concentration combinations.

In the listing the material compatibility to the chemical and the max. temperature limit is given for each material. It can be assumed in general that the resistance will be no worse at lower temperatures.

The following codes define the compatibility to each chemical listed:

A = Excellent

B = Good, minor effect

C = Conditional, not recommended for continuous use

X = Not recommended

-- = No data available

For chemicals where the temperature limit is not given, the compatibility information refer to a temperature of 20 °C and a concentration of 100%.

Chemical Resistance Chart for SITRANS F M

Chemicals A – Z				Plastic and rubbers									
Agent	Chemical formula	Concentration (%)	Electrical conductivity (µS/cm) @ 25 °C	Butyl	EPDM	Ebonite	FKM-FPM	Linatex	NBR	Neoprene	PFA	PTFE	PVDF
Acetaldehyde	CH3CHO	40	TBD	A80	A60 B80	-	B40 C60 X80	-	X	X	A150	A150	X
Acetaldehyde	CH3CHO	100	<5	-	A40 B60	C	C40 X60	C23	X	C	A150	A150	X
Acetamide	C2H5NO	100	TBD	A23	A93	-	A40	X	A40	A80	A120	A120	A25
Acetic acid	CH3COOH	5	>100	A23 B100	A93	-	C23	B23	B23	A40	A150	A200	-
Acetic acid	CH3COOH	10	>100	A23	A60	A30	C23 X80	B23	B23	A30	A200	A200	A105
Acetic acid	CH3COOH	20	>100	A23	A60	-	C23 X80	B23	C23	A30	A200	A200	A60
Acetic acid	CH3COOH	30	>100	A23	A23	B30	C	B23	B23	C23	A200	A200	A60
Acetic acid	CH3COOH	50	>100	A23	A23	A40	C23 X40	X	C23	C23	A200	A200	A38
Acetic acid	CH3COOH	80	>100	A23	A23	-	C23	X	X	C23	A200	A200	A40
Acetic acid	CH3COOH	100	<5	B23	X	A23	X	X	X	X	A200	A200	A40
Acetic anhydride	(CH3CO)2O	100	<5	B23	C23	B	X	B23	X	B23	A200	A200	X
Acetone	CH3CHOCH3	10 ppm	TBD	-	A60	-	A23	-	-	-	-	-	A60 B120
Acetone	CH3CHOCH3	100	<5	A60	A23 B40	A23	X	B23	X	X	A200	A200	X
Acetonitrile	C2H3N	100	>5	B23	A70	-	X	X	X	X	A93	A200	A50 X80
Acetyl chloride	CH3COCl	100	<5	X	X	X	B	X	X	X	A200	A200	A30
Acrylic acid	C3H4O2	100	TBD	X	X	-	X	X	X	X	A70	A100	A40
Acrylonitrile	C3H3N	100	TBD	X	X	B30	X	C23	X	A60	A200	A200	A25
Allyl alcohol	C3H6O	100	>5	A23	B150	X	A80	A23	A23 B60	A23	A200	A200	A50
Allyl chloride	C3H5Cl	100	TBD	X	X	-	B40	X	X	X	A200	A200	A100
Alum	K2Al2(SO4)2	10	>100	A	A95	A95	-	-	-	A23	A175	A175	-
Alum	K2Al2(SO4)2	sat	>100	A87	A60 B93	A95	A90	A23	A60 B93	A23	A200	A200	A100
Aluminium chloride	AlCl3	10	>100	A100	A80	A100	A100	A23	-	A100	A120	A120	-
Aluminium chloride	AlCl3	25	>100	A100	A95	A70	A100	A23	-	A60	A175	A175	-
Aluminium chloride	AlCl3	40	>100	-	-	-	-	-	-	-	-	-	A140
Aluminium chloride	AlCl3	sat	>100	A65	A80	A23	A100	A60	A60	A80	A120	A120	A60
Aluminium fluoride	AlF3	sat	TBD	A60	A80	A95	A100	A60	A80	A80	A120	A120	A135
Aluminium hydroxide	Al(OH)3	sat	TBD	A30	A60	A100	A80	A23	A60	A80	A120	A120	A120
Aluminium nitrate	Al(NO3)3	sat	TBD	A23	A80	A80	A100	A60	A60	A80	A175	A175	A120
Aluminium sulfate	Al2(SO4)3	20	TBD	A100	-	A70	A100	A60	-	A60	A120	A120	-
Aluminium sulfate	Al2(SO4)3	sat	<5 (50%)	A87	A60 B123	A60	A100	A23	A60	A70	A175	A175	A135
Aluminum Chlorodydrate	AlnCl(3n-m) (OH)m		TBD	-	X	X	-	X	-	X	A175	A175	-
Ammonia gas, wet saturated	NH4	sat	TBD	-	-	A40	-	-	-	A70	-	-	X
Ammonium Bicarbonate	NH4HCO3	sat	TBD	A70	A60	A60	A60	A23	A60	B93	A200	A200	A100

A = Excellent
B = Good, minor effect
C = Conditional, not recommended for continuous use
X = Not recommended
-- = No data available

Ceramics and resins				Metals								
Aluminium oxide	Zirco-nium oxide	Ceramic coated	Novolac	Graphite	AISI 316L	Hastelloy C-22	Hastelloy C-276	Platinum	Titanium	Tantalum	Gold	Tungsten carbide
A23	A23	-	-	A	A	A	A	-	A	-	-	-
-	-	-	-	A	A93	A93	A60	A200	A150	B23	-	A23
-	-	-	-	A	B171	-	B	-	-	-	-	-
A120	A120	-	A93	A	A80	A150	A150	A100	A100	A80	-	-
A120	A120	-	A93	A	A200	A150	A150	A100	A100	A120	-	-
-	-	-	A93	A	A200	A150	A150	A100	A100	A120	-	-
-	-	-	-	A	A93 B150	-	A132	A	A100	A120	-	-
A120	A120	-	-	A	A23 B100	A100	A80	A100	A127	A120	-	C23
A120	A120	-	-	A	B80 C93	A93	A90	A100	A100	A120	-	-
A120	A120	-	-	A	B80 C93	A93	A120	A118	A100	A120	A	C23
A120	A120	-	-	A23	B120	A120	A120	A100	B120	A23	-	A23
-	-	-	B93	A	A200	-	-	-	-	-	-	-
A100	A100	-	B93	A	A200	A100	A54 B93	A56	A80	A120	-	A23
-	-	-	-	A	B60	A	A100	-	A	B23	-	-
-	-	-	-	A	B60	A37	A100	A100	A100	B23	-	-
-	-	-	-	A	A50	A53	C98	-	-	-	-	-
-	-	-	-	A	A80	A100	A100	A100	A93	B93	-	A23
-	-	-	-	A	A200	A100	A100	A100	B80	A100	-	A23
-	-	-	-	A	A23 B100	A26	-	A100	A82	A80	-	-
-	-	-	-	A	A23 B100	-	B80	A80	A100	A80	-	-
-	-	-	-	A	B100	A30	B65	A80	A100	A80	-	-
A100	A100	-	A93	A	C23	A93	A80	A23	A93	A40	-	-
A100	A100	-	A93	A	X	A93	A80	A23	X	A93	-	-
-	-	-	A93	A	X	A93	A80	A23	X	A93	-	-
A100	A100	-	A93	A	X	A93	A80	A23	X	C23	-	X
-	-	-	-	A	C23	A	X	A100 (20%)	X	X	-	-
-	-	-	A93	-	A120	-	B23	A100 (10%)	B87	A23	-	-
A	A	-	A93	C	B80	A	B23	A23	A98	B23	-	-
A100	A100	-	A93	A	A100	-	A55	-	A93	-	A100 (10%)	-
A120 (57%)	A120 (57%)	-	A93	A	A23	A40	B97	A100	A93	A120	-	-
-	-	-	-	-	X	-	B	A	X	A	-	-
-	-	-	-	A	-	-	-	-	-	-	-	-
-	-	-	-	-	A80	-	B26	A100	B93	A120	-	-

◂ Back to the table of content

Chemical Resistance Chart for SITRANS F M

Chemicals A – Z				Plastic and rubbers									
Agent	Chemical formula	Concentration (%)	Electrical conductivity (µS/cm) @ 25 °C	Butyl	EPDM	Ebonite	FKM-FPM	Linatex	NBR	Neoprene	PFA	PTFE	PVDF
Ammonium bifluoride	F2H5N	sat	>100	X	A50	A60	A50	X	B30	X	A120	A120	A65
Ammonium carbonate	(NH4)2CO3	sat	TBD	A90	A80	A90	A100	A60	X	A80	A120	A120	A135
Ammonium chloride	NH4Cl	25	>100	A90	-	A100	A100	-	-	A60	A120	A120	A135
Ammonium chloride	NH4Cl	sat	>100	A100	A80	A100	A100	A60	A80	A80	A120	A120	A120
Ammonium fluoride	NH4F	10	>100	A80	-	A100	A60	B23	A40	A23	A120	A120	-
Ammonium fluoride	NH4F	20	>100	A80	A60	A100	A60	-	A40	A23	A120	A120	A65
Ammonium hydroxide	NH4OH	10	>100	A90	A100	A60	B23	X	A23	A93	A200	A200	-
Ammonium hydroxide	NH4OH	25	>100	A60	A75	A40	B23	X	A60	B80	A120	A120	A105
Ammonium hydroxide	NH4OH	sat	>100	A80	A75	X	B23	X	X	A80	A180	A200	A105
Ammonium nitrate	NH4NO3	50	>100	A100	-	A80	A80	-	-	A60	A180	A200	-
Ammonium nitrate	NH4NO3	sat	>100	A80	A80	A60	A80	B23	A80	A80	A180	A200	A135
Ammonium sulfate	(NH4)2SO4	sat	>100	A100	A80	A100	A80	A60	A80	A80	A150	A200	A135
Ammonium sulfide	(NH4)2S	sat	TBD	A23	A60	-	-	A23	A60	A60	A150	A150	A50
Ammonium thiocyanate	NH4SCN	sat	>100	A23	A80	-	-	A23	A60	A80	A120	A120	A135
Amyl acetate	C7H14O2	100	TBD	X	B23	-	X	X	X	X	A120	A120	A50
Amyl alcohol	C5H11OH	100	TBD	A23	A80	A60	A40	B23	A60	A60	A150	A200	A135
Aniline	C6H5NH2	100	<5	A60	A23	X	B60	X	X	X	A120	A200	A40
Aqua regia	HCl:HNO3		TBD	C	X	X	B23	X	X	C	A120	A200	A25
Arsenic acid	H3AsO3	sat	TBD	A23	A40	A	A60	A60	A40	A60	A120	A200	A135
Asphalt		100	TBD	X	X	-	-	X	X	X	A90	A200	A120
ASTM Oil No. 1			<5	X	X	A60	-	X	A23	X	-	-	-
ASTM Oil No. 2			<5	X	X	A60	-	X	A23	X	-	-	-
ASTM Oil No. 3			<5	X	X	A60	-	X	A23	X	-	-	-
Barium carbonate	BaCO3	sat	>5	A23	A80	A80	A100	A80	A60	A60	A200	A200	A140
Barium chloride	BaCl2	sat	>100	A80	A80	A90	A100	A23	A60	A80	A120	A200	A140
Barium hydroxide	Ba(OH)2	sat	>100	A80	A80	A80	A100	A60	A60	A80	A180	A200	A135
Barium sulfate	BaSO4	sat	<5	A23	A80	-	A100	A80	A60	A60	A165	A200	A140
Beer		100	>100	A30	A80	A23	A80	A23	A23	A23	A120	A200	A110
Benzaldehyde	C7H6O	100	<5	A30	B23	X	C	X	X	X	A150	A200	A20
Benzene	C6H6	100	<5	X	X	X	A60	X	X	X	A100	A120	A23 B80
Benzene sulfonic acid	C6H5SO3H	sat	TBD	-	X	-	A100	X	X	B30	A100	A200	A20
Benzoic acid	C6H5COOH	sat	<5	A30	X	-	A80	C30	X	B30	A200	A200	A110
Benzoyl chloride	C7H5ClO	100	TBD	-	X	-	A100	X	X	X	A120	A200	A75
Benzyl alcohol	C7H8O	100	<5	B60	B23	X	A60	X	X	X	A150	A200	A120
Benzyl chloride	C7H7Cl	100	TBD	X	X	-	A90	X	X	X	A150	A150	A140
Black liquor		100	>100	A65	A100	A80	A80	A23	A60	A30	A200	A200	A80
Bleach, 12,5% active chlorine			TBD	-	-	A65	A100	X	X	B30	A160	A200	A135
Borax	Na2B4O7·10H2O	sat	TBD	A30	A60	A80	A80	B23	B40	B90	A120	A200	A135
Boric acid	H3BO3	sat	TBD	A90	A100	A80	A100	A23	A60	A80	A150	A200	A135
Bromine	Br2	dry	<5	X	X	-	-	X	X	X	-	-	A60
Bromine solution, aqueous		sat	TBD	X	X	-	A100	X	X	X	A120	A120	A100
Butadiene	C4H6	100	TBD	B60	X	-	A100	X	B23	A23	A120	A120	A120
Butyl acetate	C6H12O2	100	TBD	X	C23	X	X	X	X	X	A120	A120	A25

A = Excellent
B = Good, minor effect
C = Conditional, not recommended for continuous use
X = Not recommended
-- = No data available

Ceramics and resins				Metals								
Aluminium oxide	Zirco-nium oxide	Ceramic coated	Novolac	Graphite	AISI 316L	Hastelloy C-22	Hastelloy C-276	Platinum	Titanium	Tantalum	Gold	Tungsten carbide
-	-	-	-	A	X	-	B60	A23	X	X	-	-
A120	A120	-	A93	A	B120	A120	B149	A23	A80	A80	-	B23
A120	A120	-	A93	A	B100	A80	A80	A100	A100	A100	-	-
A120	A120	-	A93	A	X	A23	B120	A100	A100	A120	-	B23
-	-	-	-	A	B30	-	A80	A23	B31	X	-	-
-	-	-	-	A	B23	-	A80	A23	B23	X	-	-
-	-	-	A20	A	A23 B100	A150	A23 B100	A100	A30	A30 X	-	-
A60	A60	A 23	A20	A	A25 B100	A150	A 23	A 23	A30	A30 X	-	B23
A120	A120	-	A93	A	A100	-	-	A100	-	-	-	B23
A120	A120	-	A93	C	A100	A93	-	A100	A93	A93	-	B23
-	-	-	A93	C	A100	A93	-	A120	B	A80	-	-
A120	A120	-	A93	A	A100	X	A100	A150	A100	A149	-	B23
-	-	-	-	A	B100	A70	A23 (10%)	-	-	B23	-	-
-	-	-	-	-	B23	A	B97	A100	A100	B23	-	-
-	-	-	-	A	A120	A	A200	A100	A100	B120	-	A23
-	-	-	A93	A	A100	A	B93	A100	B100	B120	-	-
A180	A180	-	-	A	A250	A120	B293	A180	A93	B93	A184	A23
A23	A23	-	-	X	X	X	X	X	A23 C60	A60	X	-
-	-	-	-	A	B100	X	B93	A93	A23	B93	A23	-
-	-	-	-	A	A23	-	-	-	A200	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	A93	-	B23	A	B293	A23	A23	B23	-	B23
A	A	-	A93	A	B80	A	A97	A100	A23	A93 (25%)	-	-
A120	A120	-	A93	A	B120	A23	B93	A93	A80	A120	-	B23
-	-	-	A93	A	B93	A93	B23	A60	A93	B93	-	B23
A	A	-	-	A	A150	A37	A32	A23	B23	A38	-	A23
-	-	-	A50	A	B200	A	A93	A100	B23	B93	-	A23
A23	A23	-	A93	A	B120	-	B93	A93	A93	A100	A93	A23
A70	A70	-	-	A	B80	-	B93	A93	X	B93	A93	-
A23	A23	-	-	A	B93	A23	A93	A93	A93	A93	A93	B23
-	-	-	-	-	A23	A	B93	A93	-	A93	A93	-
-	-	-	-	A	A93	A	B93	A93	B93	B93	A93	A23
-	-	-	-	A	B93	-	A180	A180	-	B100	A180	-
-	-	-	-	A	B93	A90	C120	A	X	X	-	-
-	-	-	-	A	X	-	A52	-	A120	A	-	-
-	-	-	A93	A	A120	-	A43 G97	A23	B23	X	-	-
A120	A120	-	A93	A	B120	A23	A120	A150	A80	A120	A150 (10%)	B23
A120	A120	-	-	X	X	A66	A50	X	X	A	X	-
-	-	-	-	X	X	-	A97	-	A32	A32	-	-
-	-	-	-	A	B100	A120	A100	A100	A100	B23	A100	A23
A23	A23	-	-	A	A120	A120	B150	A93	A93	B23	A93	A23

◂ Back to the table of content

Chemical Resistance Chart for SITRANS F M

Chemicals A – Z				Plastic and rubbers									
Agent	Chemical formula	Concentration (%)	Electrical conductivity (µS/cm) @ 25 °C	Butyl	EPDM	Ebonite	FKM-FPM	Linatex	NBR	Neoprene	PFA	PTFE	PVDF
Butyl alcohol / Butanol	C4H9OH	100	<5	A60	B100	A70	A100	A60	B60	A80	A200	A200	A110
Butyric acid	C3H7COOH	100	<5	X	B23	X	A40	X	X	X	A200	A200	A110
Calcium bisulfite	Ca(HSO3)2	sat	TBD	A30	X	A70	A100	C23	B90	A40	A200	A200	A95
Calcium carbonate	CaCO3	sat	>5	A60	A60	A70	A100	A60	A40	A60	A200	A200	A140
Calcium chlorate	Ca(ClO3)2	sat	TBD	A80	A60	-	A100	A60	A23	A40	A200	A200	A140
Calcium chloride	CaCl2	sat	>100	A80	A80	A70	A100	A60	A40	A60	A200	A200	A140
Calcium disulfide	CaS2		TBD	C100	-	-	A100	A23	-	-	-	-	-
Calcium hydroxide	Ca(OH)2	sat	TBD	A80	A100	A80	A100	A80	A60	A100	A200	A200	A135
Calcium hypochlorite	Ca(ClO)2	sat	TBD	X	B40	B80	A80	C23	C23	A23	A200	A200	A95
Calcium nitrate	Ca(NO3)2	sat	>100	A80	A80	A80	A100	A60	A80	A80	A200	A200	A135
Calcium phosphate	Ca3(PO4)2	sat	TBD	-	A	A	A	A	A	A	A200	A200	A140
Calcium sulfate	CaSO4	sat	>100	A40	A100	A100	A100	A80	A60	A60	A200	A200	A140
Carbon monoxide		100	TBD	A80	A60	A80	-	B23	A60	A60	A200	A200	A140
Carbon tetrachloride	CCl4	100	<5	X	X	X	A80	X	X	X	A120	A120	A135
Carbonic acid	H2CO3	sat	TBD	A80	A100	A100	A80	A80	A60	A60	A180	A200	A135
Castor oil		100	<5	B71	B60	A60	A80	A60	A60	A60	A200	A200	A140
Chloride, aqueous solution	Cl2	0,04	>100	C	B23	A90	-	B23	X	A30	A200	A200	-
Chloride, aqueous solution	Cl2	1	>100	C	-	B	-	B23	X	A30	A200	A200	-
Chloride, aqueous solution		sat	>100	X	B23	A60	A80	X	X	X	A120	A200	A110
Chlorine dioxide	ClO2	15	TBD	X	X	-	A60	X	X	X	A200	A200	A65
Chloroacetic acid	CH2ClCOOH	sat	<5	B65	-	-	-	X	X	X	A200	A200	X
Chlorobenzene	C6H5Cl	100	TBD	X	X	X	A100	X	X	X	A200	A200	A75
Chloroform	CHCl3	100	<5	X	X	X	A100	X	X	X	A200	A200	A50
Chlorosulfonic acid	SO2(OH)Cl	100	TBD	X	X	X	-	X	X	X	A200	A200	X
Chromic acid	H2CrO4	10	>100	A35	A23	C23	A100	X	A60	A23	A200	A200	A80
Chromic acid	H2CrO4	50	>100	X	X	X	A100	X	A60	A23	A200	A200	A50
Citric acid	C6H8O7	sat	>100	A90	A100	A80	A100	A50	A80	A93	A200	A200	A135
Copper acetate	Cu(CH3COO)2	sat	TBD	-	A60	A80	-	A23	A23	B23	A140	A200	A120
Copper chloride	CuCl2	sat	>100	A100	A75	A90	A100	A60	A80	A60	A200	A200	A135
Copper cyanide	CuCN	sat	TBD	A	A80	A80	A100	A60	A80	A60	A200	A200	A80
Copper difluoride	CuF2	sat	TBD	-	A60	-	A100	-	A23	A60	A120	A200	A135
Copper nitrate	Cu(NO3)2	sat	>100	C23	A100	A80	A100	B40	A70	A80	A200	A200	A135
Copper sulfate	CuSO4	sat	>100	C80	A90	A100	A100	B60	A80	A60	A200	A200	A120
Crude oil		100	<5	X	X	-	A100	X	A80	X	A120	A200	A140
Cyclohexane	C6H12	100	TBD	X	X	-	A80	X	A80	X	A200	A200	A120
Cyclohexanol	C6H12O	100	TBD	-	X	-	A80	X	X	X	A200	A200	A65
Cyclohexanone	C6H10O	100	TBD	X	X	X	-	X	X	X	A200	A200	B80
Detergents			TBD	A23	A100	A90	A100	B23	A80	A70	A200	A200	A120
Dibutyl Phtalate	C16H22O4	100	TBD	B60	A23	-	X	X	X	X	A200	A200	X
Dichlorobenzene	C6H4Cl2	100	TBD	X	X	-	A80	X	X	X	A200	A200	A60
Dichloroethane	C2H4Cl2		TBD	X	X	X	A100	X	X	X	A200	A200	-
Dichloroethylene	C2H2Cl2	100	TBD	-	X	X	A100	X	X	X	A200	A200	A100
Diesel fuel		100	TBD	-	X	-	A100	X	A40	A23	A200	A120	A140
Diethyl ether	(C2H5)2O	100	TBD	X	X	-	X	X	B23	X	A200	A200	A30
Diethylamine	C4H11N	sat	<5	A100	A23	-	X	A23	X	A23	A120	A120	A25
Dimethyl phtalate	C10H10O4	100	TBD	B23	B23	-	B100	X	X	X	A200	A200	A25
Dioctyl phtalate	C24H38O4	100	TBD	A30	A23	-	A30	X	X	X	A200	A200	A25

A = Excellent
B = Good, minor effect
C = Conditional, not recommended for continuous use
X = Not recommended
-- = No data available

Ceramics and resins				Metals								
Aluminium oxide	Zirco-nium oxide	Ceramic coated	Novolac	Graphite	AISI 316L	Hastelloy C-22	Hastelloy C-276	Platinum	Titanium	Tantalum	Gold	Tungsten carbide
A120	A120	-	A93	A	A100	A120	A100	A117	A120	A100	A100	-
A160	A160	-	-	A	B93	A23	A93	A93	A93	A23	A93	B23
A23	A23	-	-	A	B120	-	B23	A150	A93	A23	-	-
-	-	-	A93	-	B97	A	B93	A93	A93	A100	A93	-
-	-	-	-	A60	B60	B	B93	A93	B60	B93	A93	-
-	-	-	A93	A	B97	A200	A93	A100	A93	A100	A100	-
A120	A120	-	-	-	-	-	-	-	-	-	-	-
A120	A120	-	A93	A	B80	A100	A100 (50%)	A93	A110	A120	A93	B23
A40	A40	-	-	A30 @ 30%	X	A23	A38 B93 (50%)	A93	A100	A93	A93	C23
A120	A120	-	A93	X	B120	A23	B93	A100	B97	B23	A100	B23
A	A	-	-	A	-	A23	A23	A23	A23	A23	-	-
A120	A120	-	A93	A	B97	A23	B120	A93	A93	B97	A93	B23
-	-	-	-	A	A250	-	A250	A250	A250	A250	A250	-
A23	A23	-	A93	A	A93	A60	A60	A76	A93	A120	-	A23
A23	A23	-	-	-	B176	A120	A26	A120	A100	B149	-	-
-	-	-	-	A	B87	A	A26	-	-	-	-	A23
-	-	-	-	A30	-	-	-	-	-	-	-	-
-	-	-	-	A30	-	-	-	-	-	-	-	-
-	-	-	-	X	X	-	E93	-	A97	B149	-	-
A	A	-	-	X	X	-	B23	-	A80	A149	X	-
A120	A120	-	-	-	X	A	B93	A93	B93	A200	A93	X
A23	A23	-	-	A	X	-	B93	A93	B80	B120	A93	A23
-	-	-	-	A	A23	A21	B93	A93	A93	A93	A93	A23
A150	A150	-	-	A	X	A85	A93	A150	A93	B93	A150	X
A120	A120	-	-	X	A38	A	A23	A93	A97	B149	A93	X
A120	A120	-	-	X	B71	B	B97	A93	A80	A120	A93	X
A120	A120	-	A93 up to 25%	A	B100	-	A93	A93	A80	A93	A100	C23
-	-	-	-	A	A23	A23	B38	A100	-	A149	A100	-
A120	A120	-	-	A	X	B23	C23	X	A80	A149	A100	-
-	-	-	-	A	B97	A100	A65	A23	A23	B149	-	-
-	-	-	-	A	X	-	X	A23	X	X	-	-
-	-	-	-	A	B93	-	B26	A23	A23	A149	-	X
A120	A120	-	A93	A	C23	A100	A93	A150	A100	A120	-	C23
-	-	-	A93	A	A97	A	E32	-	A23	A23	-	B23
-	-	-	A93	A	B93	X	B93	A93	A120	B23	A93	A23
-	-	-	-	A	B93	-	B26	A93	B23	B23	A93	-
-	-	A 23	-	A	B82	-	B82	-	B23	B23	-	A23
-	-	-	A93	-	B100	-	A49	-	A60	A75	-	-
-	-	-	-	A	A93	-	B93	A200	B93	B93	A200	A23
-	-	-	-	-	B42	A	A93	A93	X	A93	A93	-
A50	A50	-	-	A	B200	-	B110	A100	B80	A93	-	-
A60	A60	-	-	-	B93	-	B93	A93	B80	B93	A93	-
-	-	-	A93	A	A23	A120	B93	-	B80	A120	-	-
-	-	-	-	A	B97	-	B93	A93	A93	A93	A93	-
-	-	-	-	A	A93	-	A40	A93	A93	A93	A93	-
-	-	-	-	A	A38	-	-	-	-	-	-	-
-	-	-	-	A	B38	-	-	A93	A93	A93	A93	-

◂ Back to the table of content

Chemical Resistance Chart for SITRANS F M

Chemicals A – Z				Plastic and rubbers									
Agent	Chemical formula	Concentration (%)	Electrical conductivity (µS/cm) @ 25 °C	Butyl	EPDM	Ebonite	FKM-FPM	Linatex	NBR	Neoprene	PFA	PTFE	PVDF
Dioxane	O2(CH2)4	100	TBD	B23	B70	-	X	X	X	X	A200	A200	X
Epichlorhydrin	C3H5ClO	100	<5	X	X	-	X	X	X	X	A200	A200	A40
Ether	(C6H5)2O		TBD	X	X	-	X	X	X	X	A180	A200	-
Ethyl acrylate	C5H8O2	100	TBD	X	A30	-	X	X	X	X	A180	A200	A25
Ethylacetate	CH3COOC2H5	100	<5	A38	A23	A23	X	X	X	X	A180	A200	X
Ethylalcohol, Ethanol	C2H5OH	100	<5	A90	A100	A70	A80	A23	A80	A70	A200	A200	A140
Ethylchloride	C2H5Cl	100	<5	X	A60	X	A60	X	A93	X	A200	A200	A140
Ethylene glycol	C2H6O2	100	TBD	A85	A120	A70	A100	A60	A93	A60	A200	A200	A140
Ethylene oxide	C2H4O	100	TBD	X	X	-	X	X	X	X	A200	A200	A95
Ethylenediamine	C2H8N2	100	TBD	A23	B120	-	A65	A26	A26	B30	A120	A120	A105
Fatty acids		100	TBD	C23	X	A30	A80	X	A80	23	A200	A200	A140
Ferric chloride	FeCl3	sat	>100	A90	A90	A100	A80	A60	A60	A40	A200	A200	A140
Ferric nitrate	Fe(NO3)3	sat	TBD	A90	A80	A70	A100	A60	A60	A60	A200	A200	A135
Ferric sulfate	Fe2(SO4)3	sat	TBD	A65	A80	A70	A80	A60	A60	A80	A200	A200	A140
Ferrous chloride	FeCl2	sat	TBD	A100	A80	A90	A90	A60	A80	A30	A200	A200	A140
Ferrous nitrate	Fe(NO3)2	sat	TBD	A90	A80	A90	A100	A60	A60	A80	A200	A200	A135
Ferrous Sulfate	FeSO4,7h2O	sat	>100	A90	A80	A70	A80	A60	A60	A70	A200	A200	A140
Formaldehyde	HCHO	37	>100 @38°C	A60	A80	A40	-	B23	X	A60	A120	A200	A50
Formic acid	HCOOH	conc	>100	A100	A100	B23	B100	X	X	A23	A120	A120	A120
Fruit juice		100	>100	-	A80	-	A100	-	A80	A90	A200	A200	A120
Fuel oil		100	<5	X	X	-	A23	X	A100	A60	A200	A200	A140
Furfuryl alcohol	C5H4O2	100	TBD	A170	C23	-	X	X	X	X	A120	A120	A40
Gasoline – Leaded		100	<5	X	X	X	A80	X	A80	A23	A120	A120	A140
Gasoline – Unleaded		100	<5	X	X	X	A80	X	A90	A23	A120	A120	A140
Glucose		sat	TBD	A80	A120	-	A150	A23	A100	A70	A200	A200	A140
Glycerine	C3H8O3	100	<5	A150	A80	A80	A120	A60	A100	A80	A200	A200	A140
Glycols			<5	A90	A90	A80	A100	A23	A80	A60	A120	A200	-
Heptane	C7H16	100	<5	-	X	-	A150	X	A80	A80	A120	A200	A140
Hexafluorosilicic acid	H2SiF6	30	TBD	A80	A60	A60	-	A23	A70	A60	A170	A200	-
Hexafluorosilicic acid	H2SiF6	50	TBD	A80	A60	-	A100	A23	A70	A60	A170	A200	A135
Hexane	C6H14	100	<5	X	X	-	A100	X	A80	A23	A200	A200	A140
Hydrazine	N2H4	100	>100	A23	A23	A50 @15%	X	X	A23	X	A120	A120	A95
Hydrobromic acid	HBr	20	>100	A71	A60	-	A90	-	X	X	A120	A120	
Hydrobromic acid	HBr	up to 50%	>100	A42	A40	A40	A90	A23	X	X	A120	A120	A135
Hydrochloric acid	HCl	10	>100	B50	A60	A70	A50	A60	A23	A50	A120	A120	
Hydrochloric acid	HCl	37	>100	X	B40	B40	A40	B23	X	X	A93	A120	A140
Hydrochloric acid + Nitric acid	HCl:HNO3	3:1	>100	C23	-	-	B23	C23	-	C23	A120	A120	-
Hydrochloric acid + Sulfuric acid	HCl:H2SO4	1:1	>100	-	X	-	X	-	C23	-	A120	A120	A23
Hydrocyanic acid	HCN	10	>100	A60	A90	A90	A90	B23	A90	X	A200	A200	A135
Hydrofluoric acid	HF	40	>100	B23	A40	B23	A90	A23	X	A80	A120	A120	A120
Hydrofluoric acid	HF	70	>100		X	C23	A90	X	X	A50	A120	A120	A95
Hydrogen bromide	HBr	50	<5	A100	-	-	-	B23	X	X	A120	A120	-
Hydrogen peroxide	H2O2	30	TBD	X	B70	X	A70	X	X	X	A120	A120	A70
Hydroiodic acid	HI	50	>100	-	A40	B23	A100	-	-	X	A120	A120	-

A = Excellent
B = Good, minor effect
C = Conditional, not recommended for continuous use
X = Not recommended
-- = No data available

Ceramics and resins				Metals								
Aluminium oxide	Zirco-nium oxide	Ceramic coated	Novolac	Graphite	AISI 316L	Hastelloy C-22	Hastelloy C-276	Platinum	Titanium	Tantalum	Gold	Tungsten carbide
A	A	-	-	A	B97	A	B93	A93	B93	B93	A93	A23
-	-	-	-	A	B93	A60	A23	A93	A60	B23	A93	-
A23	A23	-	-	A	A93	X	B80	A35	B23	B93	A35	A23
-	-	-	-	A	B82	-	A82	A93	B23	B23	A93	-
A23	A23	-	-	A	A149	A65	B149	A200	A93	B93	A200	A23
A120	A120	-	A93	A	A93	B97	A93	A93	A93	A93	A93	-
A23	A23	-	-	A	A93	-	B97	A120	A93	A93	-	C23
-	-	-	A93	A	A93	A200	A200	A93	A93	A32	A93	A23
-	-	-	-	A	A40 B150	A31	A23	A93	A31	A32	A93	-
-	-	-	-	A	A93	X	X	A93	A40	B23	A93	-
-	-	-	-	A	A200	A200	A200	A120	A80	A200	A200	B23
A120	A120	-	A93 up to 50%	A	X	X	B38	B23	A93	A93	-	-
A120	A120	-	A93	C	B93 (10%)	A23	B65	A23	A120	A93	-	-
A65	A65	-	A93	A	A93 (10%)	-	B23	A23	A100	A80	-	X
A100	A100	-	-	A	X	X	B138	A100	A100	A93	-	X
-	-	-	A93	A	B23	-	B23	A23	A23	A23	-	-
A120	A120	-	A93	A	B23	A120	B93 (50%)	A23	A32	A71	-	X
A100	A100	-	A93 up to 100%	A	A93	B100	B93	A250	A93	A93	-	C23
A100	A100	-	A93 up to 10%	A	B93	A23	A93	A93	X	A93	A93	C23
-	-	-	-	A	B150	A23	A82	A	A23	A38	-	A23
-	-	-	-	-	B71	A80	B93	-	A32	B82	-	-
A170	A170	-	-	-	-	-	-	A93	A93	A93	A93	B23 (25%)
-	-	-	A93	A	B32	A120	A38	-	A23	A38	-	A23
-	-	-	A93	A	B23	A120	A160	-	B23	A38	-	A23
-	-	-	-	A	B176	-	B165	-	A23	A23	-	A23
A200	A200	-	A93	A	A97	A100	A250	A250	A80	B23	A250	A23
-	-	-	-	A	B160	-	A290	-	A97	A32	-	A23
-	-	-	A93	A	A93	A98	A93	A93	B93	B93	A93	A23
A30	A30	-	-	-	B23	-	B23	A93	X	X	A93	-
A30	A30	-	-	-	B42	-	B23	A93	X	X	A93	-
-	-	-	A93	A	A93	A	A93	A93	A65	B32	A93	A23
-	-	-	-	A	B65	A	A23	A23	A40	A40	A23	-
-	-	-		A	X	-	A32	A93	A93	A120	A93	-
-	-	-	-	A	X	X	-	A93	A80	A120	A93	X
A120	A120	-		A	X	A45	A45	A93	B23	A70	A120	-
A120	A120	X	A93 up to 25%	A	X	X	A38	A93	X	A93	A120	-
A23	A23	-	-	-	X	-	-	X	-	-	X	-
-	-	-	-	-	X	-	-	-	-	-	-	-
A23	A23	-	-	A	A23	A23	B23	A93	-	A93	A93	X
A50	A50	-	A93	A	X	X	B60	A93	X	X	A93	X
-	-	-	-	A	X	X	B60	A93	X	X	A93	X
A120	A120	-	-	A	X	X	-	-	-	A23	-	-
-	-	-	-	A	B93	A90	A23	A93	A80	B120	A93	X
A23	A23	-	-	-	X	-	B93	-	C32	A60	A23	-

◂Back to the table of content

Chemical Resistance Chart for SITRANS F M

Chemicals A – Z				Plastic and rubbers									
Agent	Chemical formula	Concentration (%)	Electrical conductivity (µS/cm) @ 25 °C	Butyl	EPDM	Ebonite	FKM-FPM	Linatex	NBR	Neoprene	PFA	PTFE	PVDF
Hydroquinone	C6H6O2	sat	TBD	B23	X	-	A90	B23	A23	X	A120	A200	A120
Hypochlorous acid	HOCl	100	TBD	X	A40	A65	A50	B23	X	X	A200	A200	A20
Iodine	I2		<5	-	B23	A20	A23	X	B23	A23	A200	A200	-
Isopropanol (propan-2-ol)	(CH3)2CHOH	100	<5	A80	A60	A60	A90	A23	A23	A23	A200	A200	A60
Jet Fuels – JP4		100	<5	X	X	-	A150	X	A100	X	A200	A200	A95
Jet Fuels – JP5		100	<5	X	X	-	A150	X	A100	X	A200	A200	A95
Kerosene		100	<5	X	X	X	A150	X	A100	X	A200	A200	A120
Lactic acid	H6C3O3	80	>5	A65	A65	A60	A80	B23	A23	A23	A200	A200	A65
Lead acetate	Pb(CH3COO)2	sat	TBD	A50	A80	A80	X	A23	A60	A80	A200	A200	A135
Lead nitrate	Pb(NO3)2	sat	>100	A23	A80	-	A100	B23	A80	A80	A200	A200	-
Linseed oil		100	<5	B65	X	A80	A100	X	A90	A80	A200	A200	A140
Magnesium carbonate	MgCO3	sat	>100	-	A80	A80	A100	A80	A60	A80	A200	A200	A140
Magnesium chloride	MgCl2	sat	>100	A90	A100	A100	A80	A60	A80	A80	A200	A200	A140
Magnesium hydroxide	Mg(OH)2	sat	TBD	A90	A80	A80	A100	A80	A80	A80	A200	A200	A135
Magnesium nitrate	Mg(NO3)2	sat	>100	A90	A80	A80	A100	A60	A60	A80	A200	A200	A135
Magnesium sulfate	MgSO4	sat	>100	A90	A90	A100	A100	A60	A80	A80	A200	A200	A135
Maleic acid	C4H4O4	sat	TBD	X	A23	A80	A40	A23	X	X	A120	A200	A135
Malic acid	C4H6O5	sat	TBD	A23	X	A65	A100	A23	A40	A23	A200	A200	A120
Manganese chloride	MnCl2	sat	>100	-	A60	A100	A100	-	A60	A100	A120	A200	A120
Manganese sulfate	MnSO4	sat	>100	A23	A80	A60	A100	B23	A60	A70	A200	A150	A120
Mercuric chloride	HgCl2	sat	>100 @ 5%	A65	A60	A90	A80	A60	A60	X	A120	A120	A120
Mercuric cyanide	Hg(CN)2	sat	TBD	A65	A23	A90	A23	A60	A60	X	A120	A120	A120
Mercury	Hg	100	>100	A50	A80	-	A90	A60	A40	A80	A120	A120	A140
Methanol	CH3OH	100	<5	A65	A40	A60	X	A60	B40	A80	A120	A120	A140
Methyl ethyl ketone	C4H8O	100	<5	B40	B90	-	X	X	X	X	A120	A120	X
Methyl isobutyl ketone	C6H12O	100	TBD	X	B23	-	X	X	X	X	A120	A120	X
Methyl methacrylate	C5H8O2	100	TBD	X	X	-	X	X	X	X	A120	A120	A50
Methylene chloride	CH2Cl2	100	TBD	X	X	-	X	X	X	X	A120	A120	A50
Milk		100	>100	A40	A120	A	A90	B23	A60	A80	A200	A200	A120
Molasses		100	>100	A90	A40	A90	A90	A60	A90	A90	A200	A200	A120
Monochloro acetic acid	CH2ClCO2H	100	TBD	A190	C23	-	X	B23	X	X	A190	A190	A80
Naphta		100	TBD	X	X	X	A60	X	A60	X	A200	A200	A135
Naphtalene	C10H8	100	<5	X	X	X	A80	X	X	X	A200	A200	A95
Nickel chloride	NiCl2,6H2O	sat	TBD	A95 @80%	A80	A95	A100	A60	A80	A80	A200	A200	A120
Nickel nitrate	Ni(NO3)2	sat	TBD	A65	A100	A90	A120	A60	A80	A80	A200	A200	A140
Nickel sulfate	NiSO4	sat	>100	A90	A80	A90	A80	B23	A80	A80	A200	A200	A140
Nitric acid	HNO3	10	>100	A23	A23	A20	A80	X	X	X	A200	A200	A80
Nitric acid	HNO3	30	>100	X	X	X	A40	X	X	X	A200	A200	A50
Nitric acid	HNO3	50	>100	X	X	X	X	X	X	X	A200	A200	A50
Nitric acid	HNO3	98	>100	X	X	X	X	X	X	X	A120	A120	A50
Nitric acid + Hydrofluoric acid	HNO3 / HF (1:1)		>100	X	A23	X	A40	X	X	X	A120	A120	-
Nitrobenzene	C6H5NO2	100	<5	A23	X	-	A23	X	X	X	A200	A200	A25

A = Excellent
B = Good, minor effect
C = Conditional, not recommended for continuous use
X = Not recommended
-- = No data available

Ceramics and resins				Metals								
Aluminium oxide	Zirco-nium oxide	Ceramic coated	Novolac	Graphite	AISI 316L	Hastelloy C-22	Hastelloy C-276	Platinum	Titanium	Tantalum	Gold	Tungsten carbide
-	-	-	-	-	B93	A	A93	A250	B93	B97	A250	-
-	-	-	-	-	X	A	B23	A93	B23	A93	A93	-
A23	A23	-	-	B23	X	C23	A250	A250	C23	B120	A250	-
-	-	-	A93	A	A93	A	A93	A93	A93	B100	-	A23
-	-	-	-	-	B204	-	A38	-	A30	-	-	A23
-	-	-	-	-	B204	-	A38	-	A30	-	-	A23
A120	A120	-	A93	A	B120	A30	B97	A23	A23	B23	-	-
A120	A120	-	-	A	B93	X	B93	A93	A93	A120	A93	C23
A23	A23	-	-	A	B93	A100	B93	A93	A80	B93	A93	-
-	-	-	-	A	B23	-	B93	A93	-	A93	A93	-
-	-	-	A93	-	B97	A23	B32	A93	A23	B93	A93	A23
-	-	-	A93	A	B97	A	-	A23	A23	B93	-	-
A120	A120	-	A93	A	B97	A120	A120	A	A120	A120	A150	-
A120	A120	-	A93	A	A100	A100	A93	A	A32	A32	-	B23
A120	A120	-	A93	-	B149	A93	E23	A	A23	A93	-	B23
A120	A120	-	A93	A	B120	A93	A93	A100	B80	A60	-	B23
A100	A100	-	-	A	B204	A80	B93	-	A93	A80	-	C23
A120	A120	-	-	A	A120	A120	B97	-	A80	B80	-	-
A100	A100	-	-	-	B93	-	A93 (40%)	B93	A93	A93	B93	-
A23	A23	-	-	A	A93 (50%)	A63	B65	A93	A63	A93	A93	-
-	-	-	A93	A	X	-	-	A100	B80	A100	X	X
-	-	-	-	A	B23	-	B23	-	A23	A100	-	-
A150	A150	-	-	A	A200	A	A200	X	X	A23	X	-
A65	A65	-	A93	A	B100	A100	A121	A65	B80	B120	A65	-
-	-	-	A93	A	B100	A93	B97	-	B80	B93	-	-
-	-	-	A93	A	B100	-	B100	-	B93	B93	-	-
-	-	-	-	A	B23	A	-	-	-	B23	-	A23
-	-	-	-	-	B204	X	A93	A40	A100	X	A300	B23
A	A	-	-	A	A120	A80	A38	A100	A32	A149	A100	A23
-	-	-	A93	A	A176	-	A38	A	A23	A38	-	-
A190	A190	-	-	A	X	-	B149	A150	A42	A42	-	-
A23	A23	-	A93	A	B97	A	B93	A100	B32	B38	A100	A23
-		-	-	A	A200	A120	B93	A200	A100	A120	A200	-
A95	A95	-	A93	A	B23	A90	A100	A100	A80	A100	A100	X
A	A	-	A93	A	A200	-	B23	A100	A32	B80	A100	-
A80	A80	-	A93	A	A100	-	B93	A100	X	X	A100	X
A120	A120	-	-	A	A100	A52	A80	A	A120	A120	A120	X
A120	A120	-	A93	X	A50	-	A50 B70 C90	-	A120	A187	A120	X
A120	A120	-	X	X	A38	-	A50 80 C120	A100	A85	A187	A120	X
A100 @70%	A100 @70%	-	A93 up to 30%	X	B23	A23	B23	A100	B97	A150	-	X
B23	X	-	-	X	X	B23	C23	A100	X	A100	X	X
A120	A120	-	-	A	B176	A	-	A100	A80	B97	A100	A23

◂ Back to the table of content

Chemical Resistance Chart for SITRANS F M

Chemicals A – Z				Plastic and rubbers									
Agent	Chemical formula	Concentration (%)	Electrical conductivity (µS/cm) @ 25 °C	Butyl	EPDM	Ebonite	FKM-FPM	Linatex	NBR	Neoprene	PFA	PTFE	PVDF
Oil, vegetable			<5	X	X	A23	A90	X	A90	A20	A200	A200	-
Oleic acid		100	<5 @15°C	X	X	A65	A80	X	A23	X	A120	A200	A120
Oxalic acid	H2C2O4	25	>100	A100	A140	A80	A100	-	X	X	A200	A200	A60
Oxalic acid	H2C2O4	sat	>100	A100	A140	-	-	B23	X	X	A200	A200	A50
Ozone solution, aqueous	O3	10 ppm	TBD	-	A40	-	A40	-	-	-	A150	A150	A120
Ozone solution, aqueous	O3	0,5 mg/L	TBD	-	A40	-	A40	-	-	-	A150	A150	
Palmitic acid		sat	TBD	B23	A23	X	A200	X	A100	X	A200	A200	A120
Paraffin		100	<5	-	X	A80	A200	X	A60	A60	A200	A200	A135
Perchloric acid	HClO4	10	TBD	A65	A60	-	A200	A60	X	A23	A200	A200	A95
Perchloric acid	HClO4	70	TBD	-	A60	-	A200	-	X	X	A200	A200	A50
Perchloroethylene	C2Cl4	100	TBD	X	X	-	A200	X	X	X	A120	A200	A135
Petroleum oil (crude oil)		100	<5	X	X	-	A80	X	A80	A40	A120	A120	A135
Petroleum oil, refined			<5	X	X	-	A100	X	A80	A40	A120	A120	
Petroleum oil, Sour			<5	X	X	X	A100	X	A80	X	A120	A120	
Phenol	C6H5OH	5	TBD	-	-	A20	-	-	-	-	-	-	A80
Phenol	C6H5OH	100	<5	X	X	X	A100	X	X	X	A200	A200	A50
Phosphoric acid	H3PO4	10	>100	A65	A80	A90	A90	B23	A23	-	A200	A200	A135
Phosphoric acid	H3PO4	50	>100	A65	A80	B90	A90	C23	A23	X	A120	A120	-
Phosphoric acid	H3PO4	85	>100	A65	A80	B80	A90	C23	X	X	A120	A120	A105
Phosphoric acid + Hydrofluoric acid	H3PO4 / HF (1:1)		>100	-	-	X	-	-	-	-	A	A	A
Phosphoric acid + Hydrofluoric acid + Nitric acid	H3PO4 / HF / HNO3 (1:1:1)		>100	-	-	X	-	-	-	-	A	A	A
Phosphoric acid + Sulphuric acid	H3PO4 / H2SO4 (1:1)		>100	-	-	X	-	-	-	-	A	A	A
Phosphoric acid + Sulphuric acid + Nitric acid	H3PO4 / H2SO4 / HNO3 (1:1:1)		>100	-	-	X	-	-	-	-	A	A	A
Phosphorus trichloride	PCl3	100	TBD	A	A23	-	A90	X	X	X	A120	A200	A95
Plating solutions, brass	3% Cu, 1% Zn, 5.6% Rh; 3% cyanide, sodium carbonate	100	TBD	A90	A23	A90	A60	B23	A80	A60	A200	A200	A100
Plating solutions, cadmium	3% Cadmium oxyde, 10% sodium cyanide, 1.2% sodium hydroxide	100	TBD	A70	A150	A90	A80	A23	A80	A90	A200	A200	A100
Plating solutions, Chrome	25% Cr_2O_3, 12% H_2SO_4, H_2O	100	TBD	X	A100	X	A90	X	X	X	A200	A200	A65
Plating solutions, Copper (Cyanide)	10.5% Cu, 14% sodium cyanide, 6% rochelle salts	100	TBD	A80	B150	A90	A90	B23	A80	A70	A200	A200	A105

A = Excellent
B = Good, minor effect
C = Conditional, not recommended for continuous use
X = Not recommended
-- = No data available

Ceramics and resins				Metals								
Aluminium oxide	Zirco-nium oxide	Ceramic coated	Novolac	Graphite	AISI 316L	Hastelloy C-22	Hastelloy C-276	Platinum	Titanium	Tantalum	Gold	Tungsten carbide
-	-	-	-	A	B97	A43	A32	-	A40	A93	-	-
-	-	-	-	A	A149	-	B80	A120	A23	B97	-	C23 (40%)
A120	A120	-	-	A	X	-	-	-	X	-	-	C23
A120	A120	-	A93	A	X	-	B80	A150	B23	A93	A100	-
-	-	-	-	A	B176	-	-	-	A	-	-	-
-	-	-	-	A	B176	-	-	-	A	-	-	-
-	-	-	-	A	B200	-	B40	-	-	-	-	C23
-	-	-	-	A	A60	A60	B40	-	A	A93	-	A23
-	-	-	-	A	X	-	B100	-	X	A150	-	-
-	-	-	-	X	X	-	B100	A23	X	A150	-	-
A120	A120	-	A93	A	A23 B200	-	B97	-	A 100	B93	-	A23
-	-	-	-	A	-	A	-	A23	A	-	-	-
-	-	-	-	A	B26	-	-	-	-	A150	-	-
-	-	-	-	A	B26	-	-	-	-	-	-	-
-	-	-	-	A	B93	-	-	-	-	-	-	A23
A180	A180	-	-	A	A200	A95	A200	A180	A23	A120	A180	-
A120	A120	-	A93 up to 50%	A	A60	A	A40	A100	A23	A175	A100	X
A120	A120	-	-	A	A100	A	A40 C93	A100	X	A100	A100	-
A60	A60	X	-	A	B23	A110	A93	A100	X	A200	-	X
X	X	-	-	-	X	C23	C23	A23	X	X	-	-
X	X	-	-	-	X	C23	C23	C23	X	X	-	-
B23	B23	-	-	-	X	A23	A23	A23	X	A	-	-
B23	B23	-	-	-	X	A23	A23	A23	X	A	-	-
-	-	-	A93	A	A32	X	B38	X	A23	A60	-	-
-	-	-	-	-	B149	-	A38	-	A38	-	-	-
-	-	-	-	-	B176	-	A38	-	A32	-	-	-
-	-	-	-	X	B176	-	A54	-	X	A150	-	-
-	-	-	-	-	A50	-	A49 B97	-	A32	A23	-	-

◂ Back to the table of content

Chemical Resistance Chart for SITRANS F M

Chemicals A – Z				Plastic and rubbers									
Agent	Chemical formula	Concentration (%)	Electrical conductivity (µS/cm) @ 25 °C	Butyl	EPDM	Ebonite	FKM-FPM	Linatex	NBR	Neoprene	PFA	PTFE	PVDF
Plating solutions, Gold	22.8% potassium ferrocyanide, 0.2% potassium gold cyanide, 0.8% sodium cyanide, water	100	TBD	A80	B150	A90	A90	B23	A80	A50	A200	A200	A93
Plating solutions, Lead	8% Pb, 0.8% fluoboric acid, 0.4% boric acid, water	100	TBD	A70	B150	A90	A90	A23	A80	A80	A200	A200	A93
Plating solutions, Nickel	11% nickel sulfate, 2% nickel chloride, 1% boric acid, H_2O	100	TBD	-	B150	A90	A90	B23	A80	A90	A200	A200	A93
Plating solutions, Silver	4% silver, 7% potasium cyanide, 5% sodium cyanide, 2% potassium carbonate	100	TBD	A65	B150	A90	A90	B23	A80	A90	A200	A200	A93
Plating solutions, Tin	7% Sn, 18% Stannous fluoborate, 9% fluoboric acid, 2% boric acid	100	TBD	A65	A90	A70	A90	-	A80	A90	A200	A200	A93
Plating solutions, Zinc	9% Zinc cyanide, 9% sodium hydroxide, 4% sodium cyanide	100	TBD	A65	B150	A90	A90	B23	A80	A90	A200	A200	A93
Potassium aluminium sulfate	$KAl(SO_4)_2$ $12H_2O$	sat	TBD	A	A80	A100	A100	A23	A80	A60	A200	A200	A120
Potassium bicarbonate	$KHCO_3$	sat	>100	A	A90	A100	A100	A23	A80	A70	A200	A200	A95
Potassium bromide	KBr	sat	>100	A	A100	A90	A100	A60	A80	A60	A200	A200	A140
Potassium carbonate	K_2CO_3	sat	>100	A80	A80	A70	A90	A60 @50%	A80	A60	A120	A200	A140
Potassium chlorate	$KClO_3$	sat	TBD	A	A40	A90	A60	A23	A23	A23	A200	A200	A95
Potassium chloride	KCl	sat	>100	A100	A80	A90	A100	A60	A80	A60	A200	A200	A140
Potassium chromate	K_2CrO_4	sat	>100	-	A80	-	A100	-	A60	A23	A120	A200	A140
Potassium cyanide	KCN	All	>100	A65	A80	A90	A90	A60	A80	A80	A120	A120	A140
Potassium dichromate	$K_2Cr_2O_7$	sat	>100	A65	A90	X	A90	X	A70	X	A120	A200	A140
Potassium hydroxide	KOH	20	>100	A120	A120	A90	X	A23	B23	A90	A120	A120	X
Potassium hydroxide	KOH	50	>100	A80	A120	A90	X	A23	B23	A80	A120	A120	X
Potassium hypochlorite	KOCl	sat	TBD	-	A23	-	A40	X	X	B23	A200	A200	A95

A = Excellent
B = Good, minor effect
C = Conditional, not recommended for continuous use
X = Not recommended
-- = No data available

Ceramics and resins				Metals								
Aluminium oxide	Zirco-nium oxide	Ceramic coated	Novolac	Graphite	AISI 316L	Hastelloy C-22	Hastelloy C-276	Platinum	Titanium	Tantalum	Gold	Tungsten carbide
-	-	-	-	-	A38	-	A23	-	A23	A23	-	-
-	-	-	-	-	A32	-	-	-	X	-	-	-
-	-	-	-	A	A38 B60	-	A60	-	A60	-	-	-
-	-	-	-	-	A38	-	A38	-	A38	-	-	-
-	-	-	-	-	C38	-	A42	-	X	-	-	-
-	-	-	-	-	-	-	A71-B97	-	A60	-	-	-
-	-	-	A93	A	B55	-	A23	A23	A100	A80	-	C23
-	-	-	A93	-	B97	-	B23	-	A100 (30%)	B97 (30%)	-	-
-	-	-	-	A	B100 (30%)	X	-	A100	A23	A100 (<50%)	A100	-
-	-	-	A93	A	B100	A	B100	A100	A100	-	A100	-
-	-	-	-	X	A100	-	A23 B100 (30%)	A100 (30%)	A100	B23 (30%)	A120	-
A100	A100	-	A93	A	A100 (30%)	A110	A170	A23	A80	A160	-	C23
-	-	-	-	X	B100 (<40%)	-	B93 (30%)	-	A 100 (<40%)	B23 (30%)	-	-
A	A	-	-	A	B93	C23	B93 (30%)	B23	X	A32 (30%)	X	X
-	-	-	A93 up to 10%	X	A93 (<50%)	-	B93 (<50%)	A93 (<50%)	A32	A120	A120	-
A120	A120	-	A93	A	B93	A93	B150	A200	B100	X	-	B23
B120	A120	-	A93	A	B60	A93	B150	A200	A23	X	A300	-
A150	A150	-	-	A	B23	A	-	-	A93 (<40%)	B97	-	-

◂ Back to the table of content

Chemical Resistance Chart for SITRANS F M

Chemicals A – Z				Plastic and rubbers									
Agent	Chemical formula	Concentration (%)	Electrical conductivity (µS/cm) @ 25 °C	Butyl	EPDM	Ebonite	FKM-FPM	Linatex	NBR	Neoprene	PFA	PTFE	PVDF
Potassium nitrate	KNO_3	sat	>100	A120	A80	A80	A100	A60	A60	A60	A200	A200	A140
Potassium perchlorate	$KClO_4$	sat	TBD	-	A60	-	A80	-	X	A23	A120	A120	A95
Potassium permanganate	$KMnO_4$	25	>100	A50	A100	X	A70	A23	X	A40	A100	A200	A120
Potassium sulfate	K_2SO_4	sat	>100	-	A60	A80	A100	A23	A60	A60	A100	A200	A140
Propan-1-ol	C_3H_8O	100	<5	A50	A80	A90	A100	A60	A40	A80	A120	A200	A65
Propylene glycol	$C_3H_8O_2$	100	<5	A23	A100	-	A120	A23	A80	A23	A200	A200	A65
Propylene oxide	C_3H_6O	100	TBD	-	B23	-	X	X	X	X	A200	A200	X
Pyridine	C_5H_5N	100	<5 @18°C	B23	X	-	X	X	X	X	A120	A200	X
Salicylic acid	$C_7H_6O_3$	sat	TBD	A23	A150	-	A150	A23	A23	A23	A200	A200	A95
Salt water (brine)		sat	>100	A90	A120	A90	A100	A60	A70	A80	A200	A200	A120
Seawater		100	>100	A	A120	A100	A80	A23	A70	A80	A200	A200	A120
Silicone oil		100	<5	A23	A60	A80	A100	C23	A60	A20	A200	A200	A120
Soap solution			>100	A65	A150	A80	A100	A60	A110	A80	A200	A200	-
Sodium acetate	$C_2H_3NaO_2$	sat	>100	A	A100	A80	X	C23	X	C23	A120	A200	A140
Sodium bicarbonate	$NaHCO_3$	sat	>100	A80	A100	A100	A100	A40	A60	A70	A120	A200	A140
Sodium bisulfate	$NaHSO_4$	sat	TBD	A80	A90	A90	A100	A60	A80	A90	A200	A200	A140
Sodium bisulfite	$NaHSO_3$	sat	TBD	A80	A80	A90	A100	A60	A60	A80	A200	A200	A140
Sodium borate	$Na_2B_4O_7{\cdot}10H_2O$	sat	TBD	A80	A80	A90	A100	A23	B100	B100	A200	A200	A100
Sodium carbonate	Na_2CO_3	sat	>100	A100	A80	A70	A100	A80	A90	A60	A200	A200	A140
Sodium chlorate	$NaClO_3$	sat	TBD	A90	A80	A80	A60	A60	A80	A23	A200	A200	A120
Sodium chloride	NaCl	sat	>100	A80	A60	A90	A100	A23	A80	A70	A200	A200	A120
Sodium chlorite	$NaClO_2$	sat	TBD	-	X	A30	B60	X	X	X	A200	A200	A120
Sodium chromate	Na_2CrO_4	sat	TBD	-	A23	A60	A23	-	A23	A23	A120	A120	A95
Sodium cyanide	NaCN	sat	TBD	A65	A80	A80	A80	A80	A60	A60	A120	A200	A135
Sodium dichromate	$Na_2Cr_2O_7$	sat	>100	A60	A60	A80	B100	X	A60	X	A120	A200	A100
Sodium hydrogen sulfite	$NaHSO_3$	sat	TBD	-	-	A80	-	-	-	-	-	-	-
Sodium hydroxide	NaOH	30	>100	A90	A80	A70	A23	A60	A80	A60	A200	A200	-
Sodium hydroxide	NaOH	50	>100	A90	A80	A70	X	A60	A65	A60	A200	A200	X
Sodium hydroxide	NaOH	70	TBD	A80	A40	A70	X	A23	X	A60	A200	A200	
Sodium hypochlorite	NaOCl	5	TBD	B23	B23	A23	A80	C23	X	X	A200	A200	A135
Sodium hypochlorite	NaOCl	12,5%, 150 g/L Cl2	TBD	X	B23	B30	A80	X	X	X	A200	A200	A95
Sodium metabisulphite	$Na_2S_2O_5$		TBD		A		A				A	A	
Sodium nitrate	$NaNO_3$	sat	>100	A100	A100	A70 @25%	A100	B23	A60	A70 @25%	A200	A200	A135
Sodium nitrite	$NaNO_2$	sat	TBD	A100	A80	-	A100	-	A60	A60	A120	A200	A135
Sodium perborate	$NaBO_3{\cdot}nH_2O$	sat	TBD	A23	A60	-	A80	B23	A23	C23	A120	A120	A120
Sodium peroxide	Na_2O_2	10	TBD	A80	A150	A90	A80	A60	A90	A80	A120	A200	A95
Sodium phosphate	Na_3PO_4	sat	>100	A90	A80	A90	A100	A60	A80	A60	A120	A200	A140

A = Excellent
B = Good, minor effect
C = Conditional, not recommended for continuous use
X = Not recommended
-- = No data available

Ceramics and resins				Metals								
Aluminium oxide	Zirco-nium oxide	Ceramic coated	Novolac	Graphite	AISI 316L	Hastelloy C-22	Hastelloy C-276	Platinum	Titanium	Tantalum	Gold	Tungsten carbide
A120	A120	-	A93	X	B93 (<80%)	A23	B93 (<80%)	A23	A93 (<80%)	B100	A120	-
A25	A25	-	-	-	B93 (20%)	-	A23	-	A93 (20%)	-	-	-
A120	A120	-	-	A23	B93	A100	A32	A100	B23	-	-	-
A50	A50	-	A93	A	A93 (10%)	A23	B26	A93 (10%)	A32	A23	A120	B23
-	-	-	-	A	A93	A104	A93	-	A23	B40	-	-
-	-	-	A93	A	B97	A	B32	-	A23	A32	-	A23
-	-	-	-	A	A60	-	-	-	-	B32	-	A23
A60	A60	-	-	A	A93	X	A60	A93	B93	B100	A115	B23
-	-	-	-	A	A60	A120	A120	A93	A23	B93	A120	C23
A	A	-	-	A	B121	A	A120	-	A23	A38	-	-
-	-	-	A93	A	A23	A	A120	-	A93	A38	-	B23
-	-	-	-	A	B38	A	-	-	A	A	-	-
-	-	-	A93	A	B23	A	A23	A93	A32	A23	-	A23
-	-	-	-	A	A60 B120	A	A93	A200	A93	A23	A120	-
A120	A120	-	A93	-	A65	A65	A65	-	A93 (20%)	A65	-	B23 (50%)
A120	A120	-	A93	-	X	A	B93	A93 (<50%)	A70 (20%)	A23	A300	-
A120	A120	-	-	-	B23	A	B93	A93 (<40%)	B97 (10-40%)	B23	A100	-
-	-	-	-	A	A200	A	A38	-	B87	A23	-	-
A120	A120	-	A93	A	B150	A100	B93	A100	A93	A93 (<25%)	A100	B23 (<20%)
A120	A120	-	A93	A23	X	A150	A93	-	A93	X	-	-
A120	A120	-	A93	A	X	A60	A120	A93	A93	A120	A100	B23 (30%)
A	A	-	-	X	B23 (25%)	-	B23 (10%)	-	-	-	A100	-
-	-	-	-	X	A93	-	A93 (80%)	A93 (80%)	A93 (80%)	A93 (80%)	-	B23
-	-	-	-	A100	A23	-	B38	X	A32	A93	X	X
-	-	-	-	X	B23	-	A32	-	A32	A23	-	-
-	-	-	-	A	-	-	-	-	-	-	-	-
A120	A120	-	-	A	A60 X93	A86	B97	A93	A93	X	-	A23
B100	A100	A 23	A93	A	A40-B60-X93	A86	A87-B97	A93	A 23	X	-	C23
X	B100	-		A	A40	-	A104	-	B93	X	A100	C23
A120	A120	-	-	A	B23	A60	A23	A93	B	A120	-	C23
A120	A120	X	-	A	X	A60	A23	A93	A 23	B120	-	-
		-		-	-	A	-	-	-	-	-	-
A100	A100	-	A93	A	A93	A	X	A93	A23	B93	A100	C23
A100	A100	-	-	A	B23	A	X	-	A97	B93	-	-
-	-	-	-	A	A40	-	B93 (10%)	A50	-	-	A50	B23 (10%)
A120	A120	-	-	X	B93	A100	B93	A93	-	C23	-	B23
-	-	-	-	A	B97	A100	B93	A100	B80	A23	A100	-

◂ Back to the table of content

Chemical Resistance Chart for SITRANS F M

Chemicals A – Z				Plastic and rubbers									
Agent	Chemical formula	Concentration (%)	Electrical conductivity (µS/cm) @ 25 °C	Butyl	EPDM	Ebonite	FKM-FPM	Linatex	NBR	Neoprene	PFA	PTFE	PVDF
Sodium sulfate	Na_2SO_4	sat	>100	A65	A80	A70	A100	A60	A60	A60 @ 25%	A200	A200	A140
Sodium sulfide	Na_2S	50	>100	A65	A60	A80	A80	A60	A60	A80	A200	A200	A120
Sodium sulfite	Na_2SO_3	sat	TBD	A100	A60	A70	A60	A23	A60	X	A120	A120	A140
Sodium thiosulfate	Na_4S2O_3	sat	>100	A90	A60	A80	A90	A60	A60	A80	A200	A200	A135
Soybean oil		100	<5	A	X	-	A90	X	A60	A70	A200	A200	A135
Spirit			TBD	-	-	A60	-	-	-	-	-	-	-
Starch solution		100	>100	-	A60	A80	A90	B23	A50	A70	A150	A150	A110
Steam, high pressure			TBD	X	X	X	X	X	X	X		X	-
Steam, low pressure			TBD	X	X	X	X	X	X	X	A90	A200	-
Steam, medium pressure			TBD	X	X	X	X	X	X	X	A90	A200	-
Stearic acid	$C_{17}H_{35}COOH$	100	<5	X	X	A80	A40	X	A40	A80	A120	A200	A140
Sugar solution		sat	>100	-	A60	A60	A80	A23	A60	B60	A120	A120	A140
Sulfur chloride	S_2Cl_2	sat	TBD	X	X	-	A60	X	X	X	A120	A200	A25
Sulfur trioxide	SO_3	100	TBD	A	X	A90	B60	X	X	X	A120	A200	X
Sulfuric acid	H_2SO_4	10	>100	B23	B80	A80	A120	A60	A60	A50	A200	A200	A120
Sulfuric acid	H_2SO_4	50	>100	B23	B23	A60	A100	B23	B23	X	A200	A200	A95
Sulfuric acid	H_2SO_4	70	>100	B23	X	B40	A80	X	X	X	A200	A200	-
Sulfuric acid	H_2SO_4	98	>100	X	X	X	A40	X	X	X	A200	A200	A50
Sulfuric acid + nitric acid	H_2SO_4:HNO_3	50:50	TBD	X	-	B	B35	-	-	X	A200	A200	-
Sulfuric acid fuming	H_2SO_4 + SO_3	25	TBD	X	X	-	A100	X	X	X	A200	A200	X
Sulfuric dioxide, gaseous, dry and wet	SO_2		<5	-	-	A30	-	-	-	-	-	-	-
Sulfurous acid, aqueous solution	H_2SO_3	5	TBD	A65	X	A20	A60	B23	X	X	A200	A200	A120
Tall oil		100	<5	X	X	-	A100	X	A100	X	A200	A200	A140
Tannic acid	$C_{76}H_{52}O_{44}$	100	>5 (50%)	A23	A23	A60	A100	A23	A100	A80	A200	A200	A110
Tartaric acid	$C_4H_6O_6$	sat	>100	A90	X	A80	A80	A80	A60	A100	A200	A200	A120
Tin (II) chloride	$SnCl_2$	25	TBD	A	B100	A100	A80	A60	A60	A60	A120	A120	-
Tin (IV) chloride	$SnCl_4$	sat	TBD	A150	A	-	-	A60	A23	A80	A120	A120	-
Titanium dioxide		sat	>100	-	-	A80	-	-	-	-	-	-	-
Titanium tetrachloride	$TiCl_4$	sat	TBD	-	X	-	A70	X	X	X	A200	A200	A65
Toluene	$C_6H_5CH_3$	100	<5	X	X	X	A23	X	X	X	A120	A120	A80
Tomato juice		100	TBD	-	A90	-	A60	-	A60	A60	A200	A200	A120
Transformer oil			<5	X	X	-	A180	X	B	X	A200	A200	-
Tributyl phospahte	$C_{12}H_{27}O_4P$	100	TBD	X	A23	-	X	X	X	X	A200	A200	A25
Trichloroacetic acid		50	<5	X	X	-	A80	X	B23	X	A200	A200	A50
Trichloroethylene	$CHCl=CCl_2$	100	TBD	X	X	X	A100	X	X	X	A120	A120	A140
Triethanolamine	$C_6H_{15}NO_3$	100	TBD	A65	A23	X	X	B23	A23	A60	A200	A200	A50
Trisodium phosphate	Na_3PO_4	sat	TBD	A90	A23	A90	A80	A23	A90	A90	A200	A200	A120
Urea		50	>100	A65	A60	A90	A80	A23	A60	A65	A100	A120	A95
Vinegar		100	>100	A65	A60	A65	A100	B23	X	A80	A200	A200	A120
Vinyl acetate	$C_4H_6O_2$	100	TBD	-	X	-	X	X	X	X	A100	A200	A120
Waste water		100	>100	-	X	A	A60	A	A60	B	A120	A120	-
Water, demineralized		100	<5	A70	A80	A80	A100	A23	A80	-	A200	A200	-
Water, potable		100	>5	A100	A80	A80	A80	A23	A80	B23	A200	A200	A150
Wine		100	>100	A65	A80	A	A80	A23	A80	A	A200	A200	A120
Xylene	$(CH_3)_2C_6H_4$	100	<5	X	X	X	B80	X	X	X	A100	A200	A95
Zinc chloride	$ZnCl_2$	sat	>100	A90	A80	A70	A100	A60	A100	A60	A200	A200	A120
Zinc sulfate	$ZnSO_4$	sat	>100	A60	A60	A70	A100	A60	A60	A60	A200	A200	A140

A = Excellent
B = Good, minor effect
C = Conditional, not recommended for continuous use

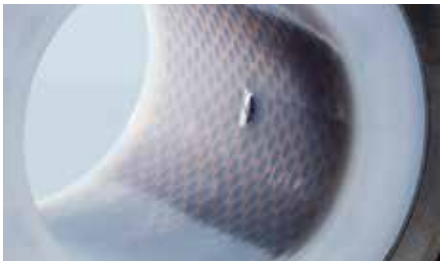
X = Not recommended
-- = No data available

Ceramics and resins				Metals								
Aluminium oxide	Zirco-nium oxide	Ceramic coated	Novolac	Graphite	AISI 316L	Hastelloy C-22	Hastelloy C-276	Platinum	Titanium	Tantalum	Gold	Tungsten carbide
A120	A120	-	A93	A	A93	A	A60	-	A93 (10-20%)	A23	A100	B23 (<50%)
A120	A120	-	-	A	B80	-	B93	A93	B93	B100 (10%)	A100	B23
A120	A120	-	-	A	A93 (50%)	-	X	A93 (25%)	A	A120	A100	-
-	-	-	A93 up to 50%	A	A93	-	B32	A93	A93 (25%)	A93	-	B23 (25%)
-	-	-	-	A	B65	A	A	-	A23	A23	-	A23
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	A	A23	-	-	-	-	A23	-	A23
-	-	-	-	-	B293	-	B149	-	A293	-	-	-
-	-	-	-	-	B293	-	B97	-	B97	B149	-	-
-	-	-	-	-	B293	-	B121	-	A187	-	-	-
A120	A120	-	-	A	A200	A	A93	A200	A180	B200	A300	C23
A120	A120	-	-	A	A43	A32	A149	-	-	A32	-	A23
A120	A120	-	-	A	X	A	B97	A150	X	A150	-	-
-	-	-	-	X	B200	A25	B120	X	X	X	-	-
A120	A120	-	A93	A	A 23	A52	A75	A120	X	A93	A250	C23
A120	A120	X	-	A	X	A24	A23	A120	X	A54	A250	X
A120	B120	-	-	A100	X	A24	B80	A120	X	A54	A250	X
B120	X	-	-	X	A38	A50	A50	A120	X	A54	A250	X
B35	X	-	-	-	-	A23	A23	A23	X	B23	X50	-
A120	A120	-	-	X	-	-	-	A120	X	X	-	-
-	-	-	-	A	-	-	-	-	-	-	-	-
-	-	-	-	A	B93	-	B93	A93	A60	A150	A100	-
-	-	-	-	A	B93	A	A150	-	-	B149	-	A23
A120	A120	-	-	A	B93	-	X	A93	A93	B80	-	-
A120	A120	-	-	-	A93	-	B93	A93	B93	A93	A120	-
A150	A150	-	-	A	A93 (10%)	-	B80	A100	A23	B80	-	-
A150	A150	-	-	A	X	C23	-	-	-	B120	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	A	B23	A	B23	-	A120	A32	-	-
A	A	-	A93	A	A176	A	A93	A93	A93	A93	A111	A23
-	-	-	-	A	B120	-	B43	-	-	A32	-	-
-	-	-	-	A	B32	-	B32	-	-	-	-	-
-	-	-	-	A	B23	-	B38	-	-	-	-	-
-	-	-	-	A	X	A120	A93	-	X	B149	-	X
A23	A23	-	-	A	B120	A	A93	-	A93	B97	-	A23
-	-	-	-	A	B23	A95	A23	A200	A40	B97	-	A23
-	-	-	A93	A	E71 (10%)	A200	E49 (10%)	-	-	B26	-	-
-	-	-	A93	A	B97	A90	B23	-	A90	A90	-	A23
-	-	-	A93	A	B82	A	-	-	A23	A23	-	C23
-	-	-	-	-	A40	A	A40	-	-	-	-	-
A	A	-	-	A	B23	A	A23	A	A23	A23	-	-
A100	A100	-	A93	A	B100	A	A200	A	-	A23	-	-
A100	A100	A 23	A93	A	B100	A	A 23	A	A23	A 23	-	-
A100	A100	-	-	A	A23	A	A38	-	A23	A23	-	-
-	-	-	-	A	B93	A120	A150	A100	A93	A93	-	A23
A120	A120	-	A93	A	X	C23	B120	A93	A93 (<70%)	A80	-	X
-	-	-	A93	A	A97	A100	A100	A100	A93 (<40%)	A32	A100	-

SITRANS F M Selection Guide

Dictionary

The following is an explanation of some of the terms used in the Selection Guide.



Alkalis:	Bases with pH greater than 7 common examples within this category are sodium hydroxide and potassium hydroxide.
Concentrated:	The most concentrated solution possible at a given temperature.
Diluted:	A liquid that has been reduced in concentration or purity.
Mineral acids:	Organic acids are in general weak and will not dissociate completely in water (unlike most mineral acids). Common acids within this category include acetic acid, formic acid, citric acid, oxalic acid, and lactic acid.
Organic acids:	A mineral or organic acid with a high redox potential. ommon acids within this category include nitric acid, chromic acid, and hypochlorous acids.
Oxidizing acids:	A mineral or organic acid with a high redox potential. Common acids within this category include nitric acid, chromic acid, and hypochlorous acids.
Reducing acids:	A mineral or organic acid with a low redox potential. Common acids within this category include hydrochloric acid, sulfuric acid, phosphoric acid, and hydrofluoric acid.
Salt solutions:	Salts are ionic compounds composed of positive and negative solvated ions. Salt solutions can be alkaline, acidic or neutral depending on the type of salt.

Measuring everything that matters:

usa.siemens.com/pi

Siemens Process Instrumentation offers best-in-class measurement and seamless integration into your automation system. We are the total solution provider for flow, level, pressure, temperature, weighing, positioners and more.

Legal Manufacturer

Siemens Industry, Inc.
100 Technology Drive
Alpharetta, GA 30005
United States of America

Telephone: +1 (800) 365-8766
usa.siemens.com/pi

Order No. PIBR-BI10164-0325