

The background of the entire page is a photograph of a wastewater treatment plant. In the foreground, a long, straight channel of water flows over a series of black, rectangular weirs, creating a series of small cascades. The water is a deep blue-grey color. In the background, there is a complex of blue metal structures, including walkways, railings, and support beams, typical of industrial water treatment equipment. The sky is visible in the upper left corner, showing a soft orange and yellow glow from the setting or rising sun.

SIEMENS

Ingenuity for life

Flowmeter SITRANS F M

Siemens Selection Guide –
Your best choice

usa.siemens.com/flow

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 F M MAG 1100
SITRANS F M MAG 1100 HT
SITRANS F M MAG 1100 Food
SITRANS F M MAG 3100
SITRANS F M MAG 3100 HT
SITRANS F M MAG 3100 P
SITRANS F M MAG 5100 W
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.



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SITRANS F M SELECTION GUIDE

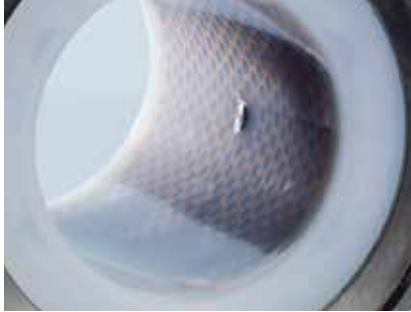
Liners and Electrodes for every industry

	PFA	PTFE	Neoprene	EPDM	NBR	Linatex	Ebonite	Ceramic	Novolak
Drinking Water*									
Wastewater									
Abrasive Liquids									
Chemicals									
Food & Beverage									
Pulp & Paper									
Overview									
Electrodes									

(*) 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 Liquids	✓
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 range	Operating pressure	Hygienic suitability
MAG 1100	DN 10...DN 100 (3/8"...4")	-30...+130 °C (-20...+270 °F)	0.02–20 bar abs (0.3–290 psia)	
MAG 1100 F	DN 10...DN 100 (3/8"...4")	-30...+130 °C (-20...+270 °F)**	0.02–20 bar abs (0.3–290 psia)	3A, EHEDG approved
MAG 3100	DN 25...DN 100 (1"...4")	-20...+100 °C (-4...+212 °F)	0.01–50 bar abs (0.15–725 psia)	
MAG 3100 HT	DN 25...DN 100 (1"...4")	-20...+150 °C (-4...+302 °F)	0.01–50 bar abs (0.15–725 psia)	
MAG 3100 P	DN 25...DN 100 (1"...4")	-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, Polytetrafluoroethylene



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 polytetrafluoroethylene, 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 range	Operating pressure	Hygienic suitability
MAG 3100	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	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	DN 15...DN 300 (½"...12")	-20...+150 °C (-4...+302 °F)	0.3–50 bar abs (4–725 psia)	
MAG 911/E	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.

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).

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

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	-

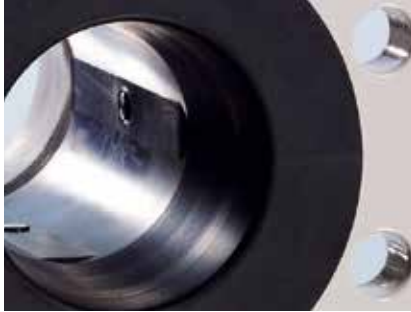
*Please also refer to the chemical resistance chart

Wear Resistance	Performance
Abrasion	✓✓

Products	Nominal size	Medium temperature range	Operating pressure	Hygienic suitability
MAG 3100	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 range	Operating pressure	Hygienic suitability
MAG 3100	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	DN 15...DN 1200 (½"...48")	-10...+70 °C (+14...+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 1200 (14"...48") 0.01–16 bar abs (0.15–232 psia)	NSF61 drinking water approved
MAG 8000	DN 25...DN 600 (1"...24")	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 600 (14"...24") 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 acrylonitrile (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 range	Operating pressure	Hygienic suitability
MAG 5100 W	DN 15...DN 1200 (1/2"...48")	-10...+70° C (+14...+158 °F)	DN 15...DN 40 (1/2"...1 1/2") 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 1200 (14"...48") 0.01–16 bar abs (0.15–232 psia)	

Internal information

NBR performs well in:

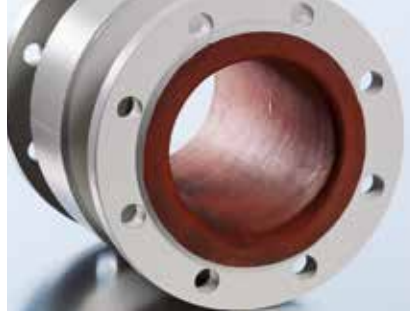
- Petroleum oils & fuels
- Silicone oils & greases
- Ethylene glycol
- Dilute acids
- Water (below 212 °F)

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 range	Operating pressure	Hygienic suitability
MAG 3100	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

Products	Nominal size	Medium temperature range	Operating pressure	Hygienic suitability
MAG 3100	DN 25...DN 2000 (1"..."78")	0...+95 °C (+32...+203 °F)	0.01–100 bar abs (0.15–1450 psia)	

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

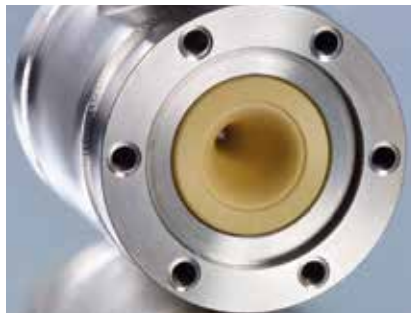
Chemical Resistance*	Capability
Acid, diluted (<10%)	+
Acid, concentrated	0
Diluted alkalis	+
Concentrated alkalis	+
Aromatic hydrocarbons (benzene)	-
Chlorinated hydrocarbons (trichloroethylene)	-
Ozone	0
High resistance	+
Moderate resistance	0
No resistance	-

*Please also refer to the chemical resistance chart

Wear Resistance	Performance
Abrasion	✓

Liner: Ceramic

Ceramic, Zirconium Oxide (ZrO₂) – 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% ZrO₂; 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 (Al₂O₃) (99.7% Al₂O₃; 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 range	Operating pressure	Hygienic suitability
MAG 1100	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	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	DN 10...DN 100 (¾"...4")	-20...+150 °C (-4...+302 °F)	DN 10...65: 40 bar abs (¾"...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 range	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	Polytetrafluoroethylene	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, grease).
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	Yes			
MAG 1100 HT				
MAG 1100 F	Yes			
MAG 3100	Yes	Yes	Yes	Yes
MAG 3100 HT	Yes	Yes		
MAG 3100 P	Yes	Yes		
MAG 5100 W				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 ₂ O 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

SITRANS FM

Electrodes



PFA

PTFE

Neoprene

EPDM

NBR

Linatex

Ebonite

Ceramic

Novolak

Overview

Electrodes

SITRANS F M SELECTION GUIDE

Liners and Electrodes for every industry

	Stainless Steel	Hastelloy®	Titanium	Tantalum	Platinum
Drinking Water	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wastewater	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Abrasive Liquids	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chemicals	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Food & Beverage	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Pulp & Paper	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overview					<input checked="" type="checkbox"/>

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 range	Liner	Hygienic suitability
MAG 3100	DN 15...DN 2000 (½"...78")	-40...+100 °C (-40...+212 °F)	Neoprene , EPDM, PTFE, Ebonite, Linatex	Drinking water approved
MAG 3100 HT	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	

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
DN 10...15 (3/8"...1/2"): C276 DN 25...100 (1"...4"): C22	DN 10...15 (3/8"...1/2"): C276 DN 25...100 (1"...4"): C22	C276	PFA liner: C22 Rest: C276	C276	C276

Products	Nominal size	Medium temperature range	Liner	Hygienic suitability
MAG 1100	DN 2...100 (1/12"...4")	20...+130 °C (-4...+270 °F)	PFA	
MAG 1100 F	DN 10...100 (1/12"...4")	20...+130 °C (-4...+270 °F)	PFA	3A, EHEDG approved
MAG 3100	DN 15...DN 2000 (1/2"...78")	20...+150 °C (-4...+302 °F)	Neoprene, EPDM, PTFE, Ebonite, Linatex, PFA	Drinking water approved
MAG 3100 HT	DN 15...300 (1/2"...12")	-20...+180 °C (-4...+356 °F)	PTFE	
MAG 3100 P	DN 15...300 (1/2"...12")	-20...+150 °C (-4...+302 °F)	PTFE, PFA	
MAG 5100 W	DN 25...1200 (1"...48")	-10...+70 °C (14...+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 8000 CT	DN 50...300 (2"...12")	0.1...+30 °C (30...+70 °F)	EPDM	Drinking water approved
MAG 911/E	DN 15...600 (1/2"...24")	-20...+150 °C (-4...+302 °F)	Hard Rubber, PTFE, Novolak	

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 TiO_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 range	Liner	Hygienic suitability
MAG 3100	DN 15...600 (½" ...24")	-40...+100 °C (-40...+212 °F)	Neoprene , EPDM, PTFE, Ebonite, Linatex	
MAG 3100 HT	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	

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 fluoric acids)
Oxidizing acids	+
Organic acids	+
Alkalis	-
Diluted salts	+ (except fluor salts)
High resistance	+
Moderate resistance	0
No resistance	-

*Please also refer to the chemical resistance chart

Products	Nominal size	Medium temperature range	Liner	Hygienic suitability
MAG 3100	DN 15...600 (½"...24")	-40...+100 °C (-40...+212 °F)	Neoprene, EPDM, PTFE, Ebonite, Linatex, PFA	
MAG 3100 HT	DN 15...300 (½"...12")	-20...+180 °C (-4...+356 °F)	PTFE, PFA	
MAG 3100 P	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 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 aggressive 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	-

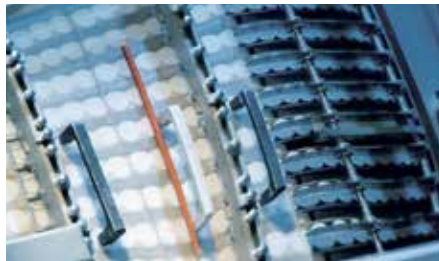
*Please also refer to the chemical resistance chart

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 range	Liner	Hygienic suitability
MAG 1100	DN 2...100 (1/12"...4")	20...+150 °C (-4...+300 °F)	Ceramic	
MAG 1100 HT	DN 15...100 (1/2"...4")	20...+200 °C (-4...+390 °F)	Ceramic	
MAG 1100 F	DN 10...100 (3/8"...4")	20...+150 °C (-4...+302 °F)	Ceramic	3A, EHEDG approved
MAG 3100	DN 15...300 (1/2"...12")	-40...+100 °C (-40...+212 °F)	Neoprene, EPDM, PTFE, Linatex, PFA	
MAG 3100 HT	DN 15...300 (1/2"...12")	-20...+180 °C (-4...+356 °F)	PTFE, PFA	
MAG 3100 P	DN 15...300 (1/2"...12")	-20...+180 °C (-4...+302 °F)	PTFE	
MAG 911/E	DN 15...600 (1/2"...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 fluoric acids)	+
Oxidizing acids	0	+	0	+	+	0
Organic acids	+	+	+	0	+	+
Alkalis	+	+	+	+	-	+
Diluted salts	0	0	0	+	+ (except fluor salts)	0
Availability						
MAG 1100		Yes	Yes			Yes
MAG 1100 HT						Yes
MAG 1100 F		Yes	Yes			Yes
MAG 3100	Yes	Yes	Yes	Yes	Yes	Yes
MAG 3100 HT	Yes		Yes	Yes	Yes	Yes
MAG 3100 P		Yes	Yes			
MAG 5100 W			Yes			
MAG 8000			Yes			
MAG 8000 CT			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			
Agent	Chemical formula	Concentration (%)	Electrical conductivity (μS/cm) @ 25 °C
Acetaldehyde	CH ₃ CHO	40	TBD
Acetaldehyde	CH ₃ CHO	100	<5
Acetamide	C ₂ H ₅ NO	100	TBD
Acetic acid	CH ₃ COOH	5	>100
Acetic acid	CH ₃ COOH	10	>100
Acetic acid	CH ₃ COOH	20	>100
Acetic acid	CH ₃ COOH	30	>100
Acetic acid	CH ₃ COOH	50	>100
Acetic acid	CH ₃ COOH	80	>100
Acetic acid	CH ₃ COOH	100	<5
Acetic anhydride	(CH ₃ CO) ₂ O	100	<5
Acetone	CH ₃ CHOCH ₃	10 ppm	TBD
Acetone	CH ₃ CHOCH ₃	100	<5
Acetonitrile	C ₂ H ₃ N	100	>5
Acetyl chloride	CH ₃ COCl	100	<5
Acrylic acid	C ₃ H ₄ O ₂	100	TBD
Acrylonitrile	C ₃ H ₃ N	100	TBD
Allyl alcohol	C ₃ H ₆ O	100	>5
Allyl chloride	C ₃ H ₅ Cl	100	TBD
Alum	K ₂ Al ₂ (SO ₄) ₂	10	>100
Alum	K ₂ Al ₂ (SO ₄) ₂	sat	>100
Aluminium chloride	AlCl ₃	10	>100
Aluminium chloride	AlCl ₃	25	>100
Aluminium chloride	AlCl ₃	40	>100
Aluminium chloride	AlCl ₃	sat	>100
Aluminium fluoride	AlF ₃	sat	TBD
Aluminium hydroxide	Al(OH) ₃	sat	TBD
Aluminium nitrate	Al(NO ₃) ₃	sat	TBD
Aluminium sulfate	Al ₂ (SO ₄) ₃	20	TBD
Aluminium sulfate	Al ₂ (SO ₄) ₃	sat	<5 (50%)
Aluminum Chlorohydrate	AlnCl(3n-m)(OH)m		TBD
Ammonia gas, wet saturated	NH ₄	sat	TBD
Ammonium Bicarbonate	NH ₄ HCO ₃	sat	TBD

Plastic and rubbers									
Butyl	EPDM	Ebonite	FKM-FPM	Linatex	NBR	Neo-prene	PFA	PTFE	PVDF
A80	A60 B80	-	B40 C60 X80	-	X	X	A150	A150	X
-	A40 B60	C	C40 X60	C23	X	C	A150	A150	X
A23	A93	-	A40	X	A40	A80	A120	A120	A25
A23 B100	A93	-	C23	B23	B23	A40	A150	A200	-
A23	A60	A30	C23 X80	B23	B23	A30	A200	A200	A105
A23	A60	-	C23 X80	B23	C23	A30	A200	A200	A60
A23	A23	B30	C	B23	B23	C23	A200	A200	A60
A23	A23	A40	C23 X40	X	C23	C23	A200	A200	A38
A23	A23	-	C23	X	X	C23	A200	A200	A40
B23	X	A23	X	X	X	X	A200	A200	A40
B23	C23	B	X	B23	X	B23	A200	A200	X
-	A60	-	A23	-	-	-	-	-	A60 B120
A60	A23 B40	A23	X	B23	X	X	A200	A200	X
B23	A70	-	X	X	X	X	A93	A200	A50 X80
X	X	X	B	X	X	X	A200	A200	A30
X	X	-	X	X	X	X	A70	A100	A40
X	X	B30	X	C23	X	A60	A200	A200	A25
A23	B150	X	A80	A23	A23 B60	A23	A200	A200	A50
X	X	-	B40	X	X	X	A200	A200	A100
A	A95	A95	-	-	-	A23	A175	A175	-
A87	A60 B93	A95	A90	A23	A60 B93	A23	A200	A200	A100
A100	A80	A100	A100	A23	-	A100	A120	A120	-
A100	A95	A70	A100	A23	-	A60	A175	A175	-
-	-	-	-	-	-	-	-	-	A140
A65	A80	A23	A100	A60	A60	A80	A120	A120	A60
A60	A80	A95	A100	A60	A80	A80	A120	A120	A135
A30	A60	A100	A80	A23	A60	A80	A120	A120	A120
A23	A80	A80	A100	A60	A60	A80	A175	A175	A120
A100	-	A70	A100	A60	-	A60	A120	A120	-
A87	A60 B123	A60	A100	A23	A60	A70	A175	A175	A135
-	X	X	-	X	-	X	A175	A175	-
-	-	A40	-	-	-	A70	-	-	X
A70	A60	A60	A60	A23	A60	B93	A200	A200	A100

Stainless Steel

Hastelloy®

Titanium

Overview

[◀ Back to the table of content](#)

Chemical Resistance Chart for SITRANS F M

Chemicals A – Z			
Agent	Chemical formula	Concentration (%)	Electrical conductivity (μS/cm) @ 25 °C
Ammonium bifluoride	F2H5N	sat	>100
Ammonium carbonate	(NH4)2CO3	sat	TBD
Ammonium chloride	NH4Cl	25	>100
Ammonium chloride	NH4Cl	sat	>100
Ammonium fluoride	NH4F	10	>100
Ammonium fluoride	NH4F	20	>100
Ammonium hydroxide	NH4OH	10	>100
Ammonium hydroxide	NH4OH	25	>100
Ammonium hydroxide	NH4OH	sat	>100
Ammonium nitrate	NH4NO3	50	>100
Ammonium nitrate	NH4NO3	sat	>100
Ammonium sulfate	(NH4)2SO4	sat	>100
Ammonium sulfide	(NH4)2S	sat	TBD
Ammonium thiocyanate	NH4SCN	sat	>100
Amyl acetate	C7H14O2	100	TBD
Amyl alcohol	C5H11OH	100	TBD
Aniline	C6H5NH2	100	<5
Aqua regia	HCl:HNO3		TBD
Arsenic acid	H3AsO3	sat	TBD
Asphalt		100	TBD
ASTM Oil No. 1			<5
ASTM Oil No. 2			<5
ASTM Oil No. 3			<5
Barium carbonate	BaCO3	sat	>5
Barium chloride	BaCl2	sat	>100
Barium hydroxide	Ba(OH)2	sat	>100
Barium sulfate	BaSO4	sat	<5
Beer		100	>100
Benzaldehyde	C7H6O	100	<5
Benzene	C6H6	100	<5
Benzene sulfonic acid	C6H5SO3H	sat	TBD
Benzoic acid	C6H5COOH	sat	<5
Benzoyl chloride	C7H5ClO	100	TBD
Benzyl alcohol	C7H8O	100	<5
Benzyl chloride	C7H7Cl	100	TBD
Black liquor		100	>100
Bleach, 12,5% active chlorine			TBD
Borax	Na2B4O7·10H2O	sat	TBD
Boric acid	H3BO3	sat	TBD
Bromine	Br2	dry	<5
Bromine solution, aqueous		sat	TBD
Butadiene	C4H6	100	TBD
Butyl acetate	C6H12O2	100	TBD

Plastic and rubbers									
Butyl	EPDM	Ebonite	FKM-FPM	Linatex	NBR	Neo-prene	PFA	PTFE	PVDF
X	A50	A60	A50	X	B30	X	A120	A120	A65
A90	A80	A90	A100	A60	X	A80	A120	A120	A135
A90	-	A100	A100	-	-	A60	A120	A120	A135
A100	A80	A100	A100	A60	A80	A80	A120	A120	A120
A80	-	A100	A60	B23	A40	A23	A120	A120	-
A80	A60	A100	A60	-	A40	A23	A120	A120	A65
A90	A100	A60	B23	X	A23	A93	A200	A200	-
A60	A75	A40	B23	X	A60	B80	A120	A120	A105
A80	A75	X	B23	X	X	A80	A180	A200	A105
A100	-	A80	A80	-	-	A60	A180	A200	-
A80	A80	A60	A80	B23	A80	A80	A180	A200	A135
A100	A80	A100	A80	A60	A80	A80	A150	A200	A135
A23	A60	-	-	A23	A60	A60	A150	A150	A50
A23	A80	-	-	A23	A60	A80	A120	A120	A135
X	B23	-	X	X	X	X	A120	A120	A50
A23	A80	A60	A40	B23	A60	A60	A150	A200	A135
A60	A23	X	B60	X	X	X	A120	A200	A40
C	X	X	B23	X	X	C	A120	A200	A25
A23	A40	A	A60	A60	A40	A60	A120	A200	A135
X	X	-	-	X	X	X	A90	A200	A120
X	X	A60	-	X	A23	X	-	-	-
X	X	A60	-	X	A23	X	-	-	-
A23	A80	A80	A100	A80	A60	A60	A200	A200	A140
A80	A80	A90	A100	A23	A60	A80	A120	A200	A140
A80	A80	A80	A100	A60	A60	A80	A180	A200	A135
A23	A80	-	A100	A80	A60	A60	A165	A200	A140
A30	A80	A23	A80	A23	A23	A23	A120	A200	A110
A30	B23	X	C	X	X	X	A150	A200	A20
X	X	X	A60	X	X	X	A100	A120	A23 B80
-	X	-	A100	X	X	B30	A100	A200	A20
A30	X	-	A80	C30	X	B30	A200	A200	A110
-	X	-	A100	X	X	X	A120	A200	A75
B60	B23	X	A60	X	X	X	A150	A200	A120
X	X	-	A90	X	X	X	A150	A150	A140
A65	A100	A80	A80	A23	A60	A30	A200	A200	A80
-	-	A65	A100	X	X	B30	A160	A200	A135
A30	A60	A80	A80	B23	B40	B90	A120	A200	A135
A90	A100	A80	A100	A23	A60	A80	A150	A200	A135
X	X	-	-	X	X	X	-	-	A60
X	X	-	A100	X	X	X	A120	A120	A100
B60	X	-	A100	X	B23	A23	A120	A120	A120
X	C23	X	X	X	X	X	A120	A120	A25

Stainless Steel

Hastelloy®

Titanium

Overview

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Chemical Resistance Chart for SITRANS F M

Chemicals A – Z			
Agent	Chemical formula	Concentration (%)	Electrical conductivity (μS/cm) @ 25 °C
Butyl alcohol / Butanol	C ₄ H ₉ OH	100	<5
Butyric acid	C ₃ H ₇ COOH	100	<5
Calcium bisulfite	Ca(HSO ₃) ₂	sat	TBD
Calcium carbonate	CaCO ₃	sat	>5
Calcium chlorate	Ca(ClO ₃) ₂	sat	TBD
Calcium chloride	CaCl ₂	sat	>100
Calcium disulfide	CaS ₂		TBD
Calcium hydroxide	Ca(OH) ₂	sat	TBD
Calcium hypochlorite	Ca(ClO) ₂	sat	TBD
Calcium nitrate	Ca(NO ₃) ₂	sat	>100
Calcium phosphate	Ca ₃ (PO ₄) ₂	sat	TBD
Calcium sulfate	CaSO ₄	sat	>100
Carbon monoxide		100	TBD
Carbon tetrachloride	CCl ₄	100	<5
Carbonic acid	H ₂ CO ₃	sat	TBD
Castor oil		100	<5
Chloride, aqueous solution	Cl ₂	0,04	>100
Chloride, aqueous solution	Cl ₂	1	>100
Chloride, aqueous solution		sat	>100
Chlorine dioxide	ClO ₂	15	TBD
Chloroacetic acid	CH ₂ ClCOOH	sat	<5
Chlorobenzene	C ₆ H ₅ Cl	100	TBD
Chloroform	CHCl ₃	100	<5
Chlorosulfonic acid	SO ₂ (OH)Cl	100	TBD
Chromic acid	H ₂ CrO ₄	10	>100
Chromic acid	H ₂ CrO ₄	50	>100
Citric acid	C ₆ H ₈ O ₇	sat	>100
Copper acetate	Cu(CH ₃ COO) ₂	sat	TBD
Copper chloride	CuCl ₂	sat	>100
Copper cyanide	CuCN	sat	TBD
Copper difluoride	CuF ₂	sat	TBD
Copper nitrate	Cu(NO ₃) ₂	sat	>100
Copper sulfate	CuSO ₄	sat	>100
Crude oil		100	<5
Cyclohexane	C ₆ H ₁₂	100	TBD
Cyclohexanol	C ₆ H ₁₂ O	100	TBD
Cyclohexanone	C ₆ H ₁₀ O	100	TBD
Detergents			TBD
Dibutyl Phthalate	C ₁₆ H ₂₂ O ₄	100	TBD
Dichlorobenzene	C ₆ H ₄ Cl ₂	100	TBD
Dichloroethane	C ₂ H ₄ Cl ₂		TBD
Dichloroethylene	C ₂ H ₂ Cl ₂	100	TBD
Diesel fuel		100	TBD
Diethyl ether	(C ₂ H ₅) ₂ O	100	TBD
Diethylamine	C ₄ H ₁₁ N	sat	<5
Dimethyl phthalate	C ₁₀ H ₁₀ O ₄	100	TBD
Diocetyl phthalate	C ₂₄ H ₃₈ O ₄	100	TBD

Plastic and rubbers									
Butyl	EPDM	Ebonite	FKM-FPM	Linatex	NBR	Neo-prene	PFA	PTFE	PVDF
A60	B100	A70	A100	A60	B60	A80	A200	A200	A110
X	B23	X	A40	X	X	X	A200	A200	A110
A30	X	A70	A100	C23	B90	A40	A200	A200	A95
A60	A60	A70	A100	A60	A40	A60	A200	A200	A140
A80	A60	-	A100	A60	A23	A40	A200	A200	A140
A80	A80	A70	A100	A60	A40	A60	A200	A200	A140
C100	-	-	A100	A23	-	-	-	-	-
A80	A100	A80	A100	A80	A60	A100	A200	A200	A135
X	B40	B80	A80	C23	C23	A23	A200	A200	A95
A80	A80	A80	A100	A60	A80	A80	A200	A200	A135
-	A	A	A	A	A	A	A200	A200	A140
A40	A100	A100	A100	A80	A60	A60	A200	A200	A140
A80	A60	A80	-	B23	A60	A60	A200	A200	A140
X	X	X	A80	X	X	X	A120	A120	A135
A80	A100	A100	A80	A80	A60	A60	A180	A200	A135
B71	B60	A60	A80	A60	A60	A60	A200	A200	A140
C	B23	A90	-	B23	X	A30	A200	A200	-
C	-	B	-	B23	X	A30	A200	A200	-
X	B23	A60	A80	X	X	X	A120	A200	A110
X	X	-	A60	X	X	X	A200	A200	A65
B65	-	-	-	X	X	X	A200	A200	X
X	X	X	A100	X	X	X	A200	A200	A75
X	X	X	A100	X	X	X	A200	A200	A50
X	X	X	-	X	X	X	A200	A200	X
A35	A23	C23	A100	X	A60	A23	A200	A200	A80
X	X	X	A100	X	A60	A23	A200	A200	A50
A90	A100	A80	A100	A50	A80	A93	A200	A200	A135
-	A60	A80	-	A23	A23	B23	A140	A200	A120
A100	A75	A90	A100	A60	A80	A60	A200	A200	A135
A	A80	A80	A100	A60	A80	A60	A200	A200	A80
-	A60	-	A100	-	A23	A60	A120	A200	A135
C23	A100	A80	A100	B40	A70	A80	A200	A200	A135
C80	A90	A100	A100	B60	A80	A60	A200	A200	A120
X	X	-	A100	X	A80	X	A120	A200	A140
X	X	-	A80	X	A80	X	A200	A200	A120
-	X	-	A80	X	X	X	A200	A200	A65
X	X	X	-	X	X	X	A200	A200	B80
A23	A100	A90	A100	B23	A80	A70	A200	A200	A120
B60	A23	-	X	X	X	X	A200	A200	X
X	X	-	A80	X	X	X	A200	A200	A60
X	X	X	A100	X	X	X	A200	A200	-
-	X	X	A100	X	X	X	A200	A200	A100
-	X	-	A100	X	A40	A23	A200	A120	A140
X	X	-	X	X	B23	X	A200	A200	A30
A100	A23	-	X	A23	X	A23	A120	A120	A25
B23	B23	-	B100	X	X	X	A200	A200	A25
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			
Aluminium oxide	Zirconium oxide	Ceramic coated	Novolac
A120	A120	-	A93
A160	A160	-	-
A23	A23	-	-
-	-	-	A93
-	-	-	-
-	-	-	A93
A120	A120	-	-
A120	A120	-	A93
A40	A40	-	-
A120	A120	-	A93
A	A	-	-
A120	A120	-	A93
-	-	-	-
A23	A23	-	A93
A23	A23	-	-
-	-	-	-
-	-	-	-
-	-	-	-
A	A	-	-
A120	A120	-	-
A23	A23	-	-
-	-	-	-
A150	A150	-	-
A120	A120	-	-
A120	A120	-	-
A120	A120	-	A93 up to 25%
-	-	-	-
A120	A120	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
A120	A120	-	A93
-	-	-	A93
-	-	-	A93
-	-	-	-
-	-	A 23	-
-	-	-	A93
-	-	-	-
-	-	-	-
A50	A50	-	-
A60	A60	-	-
-	-	-	A93
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Metals								
Graphite	AlSi 316L	Hastelloy C-22	Hastelloy C-276	Platinum	Titanium	Tantalum	Gold	Tungsten carbide
A	A100	A120	A100	A117	A120	A100	A100	-
A	B93	A23	A93	A93	A93	A23	A93	B23
A	B120	-	B23	A150	A93	A23	-	-
-	B97	A	B93	A93	A93	A100	A93	-
A60	B60	B	B93	A93	B60	B93	A93	-
A	B97	A200	A93	A100	A93	A100	A100	-
-	-	-	-	-	-	-	-	-
A	B80	A100	A100 (50%)	A93	A110	A120	A93	B23
A30 @ 30%	X	A23	A38 B93 (50%)	A93	A100	A93	A93	C23
X	B120	A23	B93	A100	B97	B23	A100	B23
A	-	A23	A23	A23	A23	A23	-	-
A	B97	A23	B120	A93	A93	B97	A93	B23
A	A250	-	A250	A250	A250	A250	A250	-
A	A93	A60	A60	A76	A93	A120	-	A23
-	B176	A120	A26	A120	A100	B149	-	-
A	B87	A	A26	-	-	-	-	A23
A30	-	-	-	-	-	-	-	-
A30	-	-	-	-	-	-	-	-
X	X	-	E93	-	A97	B149	-	-
X	X	-	B23	-	A80	A149	X	-
-	X	A	B93	A93	B93	A200	A93	X
A	X	-	B93	A93	B80	B120	A93	A23
A	A23	A21	B93	A93	A93	A93	A93	A23
A	X	A85	A93	A150	A93	B93	A150	X
X	A38	A	A23	A93	A97	B149	A93	X
X	B71	B	B97	A93	A80	A120	A93	X
A	B100	-	A93	A93	A80	A93	A100	C23
A	A23	A23	B38	A100	-	A149	A100	-
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
A	C23	A100	A93	A150	A100	A120	-	C23
A	A97	A	E32	-	A23	A23	-	B23
A	B93	X	B93	A93	A120	B23	A93	A23
A	B93	-	B26	A93	B23	B23	A93	-
A	B82	-	B82	-	B23	B23	-	A23
-	B100	-	A49	-	A60	A75	-	-
A	A93	-	B93	A200	B93	B93	A200	A23
-	B42	A	A93	A93	X	A93	A93	-
A	B200	-	B110	A100	B80	A93	-	-
-	B93	-	B93	A93	B80	B93	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	-

Chemical Resistance Chart for SITRANS F M

Chemicals A – Z			
Agent	Chemical formula	Concentration (%)	Electrical conductivity (μS/cm) @ 25 °C
Dioxane	O2(CH2)4	100	TBD
Epichlorhydrin	C3H5ClO	100	<5
Ether	(C6H5)2O		TBD
Ethyl acrylate	C5H8O2	100	TBD
Ethylacetate	CH3COOC2H5	100	<5
Ethylalcohol, Ethanol	C2H5OH	100	<5
Ethylchloride	C2H5Cl	100	<5
Ethylene glycol	C2H6O2	100	TBD
Ethylene oxide	C2H4O	100	TBD
Ethylenediamine	C2H8N2	100	TBD
Fatty acids		100	TBD
Ferric chloride	FeCl3	sat	>100
Ferric nitrate	Fe(NO3)3	sat	TBD
Ferric sulfate	Fe2(SO4)3	sat	TBD
Ferrous chloride	FeCl2	sat	TBD
Ferrous nitrate	Fe(NO3)2	sat	TBD
Ferrous Sulfate	FeSO4,7h2O	sat	>100
Formaldehyde	HCHO	37	>100 @38°C
Formic acid	HCOOH	conc	>100
Fruit juice		100	>100
Fuel oil		100	<5
Furfuryl alcohol	C5H4O2	100	TBD
Gasoline – Leaded		100	<5
Gasoline – Unleaded		100	<5
Glucose		sat	TBD
Glycerine	C3H8O3	100	<5
Glycols			<5
Heptane	C7H16	100	<5
Hexafluorosilicic acid	H2SiF6	30	TBD
Hexafluorosilicic acid	H2SiF6	50	TBD
Hexane	C6H14	100	<5
Hydrazine	N2H4	100	>100
Hydrobromic acid	HBr	20	>100
Hydrobromic acid	HBr	up to 50%	>100
Hydrochloric acid	HCl	10	>100
Hydrochloric acid	HCl	37	>100
Hydrochloric acid + Nitric acid	HCl:HNO3	3:1	>100
Hydrochloric acid + Sulfuric acid	HCl:H2SO4	1:1	>100
Hydrocyanic acid	HCN	10	>100
Hydrofluoric acid	HF	40	>100
Hydrofluoric acid	HF	70	>100
Hydrogen bromide	HBr	50	<5
Hydrogen peroxide	H2O2	30	TBD
Hydroiodic acid	HI	50	>100

Plastic and rubbers									
Butyl	EPDM	Ebonite	FKM-FPM	Linatex	NBR	Neo-prene	PFA	PTFE	PVDF
B23	B70	-	X	X	X	X	A200	A200	X
X	X	-	X	X	X	X	A200	A200	A40
X	X	-	X	X	X	X	A180	A200	-
X	A30	-	X	X	X	X	A180	A200	A25
A38	A23	A23	X	X	X	X	A180	A200	X
A90	A100	A70	A80	A23	A80	A70	A200	A200	A140
X	A60	X	A60	X	A93	X	A200	A200	A140
A85	A120	A70	A100	A60	A93	A60	A200	A200	A140
X	X	-	X	X	X	X	A200	A200	A95
A23	B120	-	A65	A26	A26	B30	A120	A120	A105
C23	X	A30	A80	X	A80	23	A200	A200	A140
A90	A90	A100	A80	A60	A60	A40	A200	A200	A140
A90	A80	A70	A100	A60	A60	A60	A200	A200	A135
A65	A80	A70	A80	A60	A60	A80	A200	A200	A140
A100	A80	A90	A90	A60	A80	A30	A200	A200	A140
A90	A80	A90	A100	A60	A60	A80	A200	A200	A135
A90	A80	A70	A80	A60	A60	A70	A200	A200	A140
A60	A80	A40	-	B23	X	A60	A120	A200	A50
A100	A100	B23	B100	X	X	A23	A120	A120	A120
-	A80	-	A100	-	A80	A90	A200	A200	A120
X	X	-	A23	X	A100	A60	A200	A200	A140
A170	C23	-	X	X	X	X	A120	A120	A40
X	X	X	A80	X	A80	A23	A120	A120	A140
X	X	X	A80	X	A90	A23	A120	A120	A140
A80	A120	-	A150	A23	A100	A70	A200	A200	A140
A150	A80	A80	A120	A60	A100	A80	A200	A200	A140
A90	A90	A80	A100	A23	A80	A60	A120	A200	-
-	X	-	A150	X	A80	A80	A120	A200	A140
A80	A60	A60	-	A23	A70	A60	A170	A200	-
A80	A60	-	A100	A23	A70	A60	A170	A200	A135
X	X	-	A100	X	A80	A23	A200	A200	A140
A23	A23	A50 @15%	X	X	A23	X	A120	A120	A95
A71	A60	-	A90	-	X	X	A120	A120	
A42	A40	A40	A90	A23	X	X	A120	A120	A135
B50	A60	A70	A50	A60	A23	A50	A120	A120	
X	B40	B40	A40	B23	X	X	A93	A120	A140
C23	-	-	B23	C23	-	C23	A120	A120	-
-	X	-	X	-	C23	-	A120	A120	A23
A60	A90	A90	A90	B23	A90	X	A200	A200	A135
B23	A40	B23	A90	A23	X	A80	A120	A120	A120
	X	C23	A90	X	X	A50	A120	A120	A95
A100	-	-	-	B23	X	X	A120	A120	-
X	B70	X	A70	X	X	X	A120	A120	A70
-	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			
Aluminium oxide	Zirconium oxide	Ceramic coated	Novolac
A	A	-	-
-	-	-	-
A23	A23	-	-
-	-	-	-
A23	A23	-	-
A120	A120	-	A93
A23	A23	-	-
-	-	-	A93
-	-	-	-
-	-	-	-
-	-	-	-
A120	A120	-	A93 up to 50%
A120	A120	-	A93
A65	A65	-	A93
A100	A100	-	-
-	-	-	A93
A120	A120	-	A93
A100	A100	-	A93 up to 100%
A100	A100	-	A93 up to 10%
-	-	-	-
-	-	-	-
A170	A170	-	-
-	-	-	A93
-	-	-	A93
-	-	-	-
A200	A200	-	A93
-	-	-	-
-	-	-	A93
A30	A30	-	-
A30	A30	-	-
-	-	-	A93
-	-	-	-
-	-	-	-
-	-	-	-
A120	A120	-	-
A120	A120	X	A93 up to 25%
A23	A23	-	-
-	-	-	-
A23	A23	-	-
A50	A50	-	A93
-	-	-	-
A120	A120	-	-
-	-	-	-
A23	A23	-	-

Metals								
Graphite	AISI 316L	Hastelloy C-22	Hastelloy C-276	Platinum	Titanium	Tantalum	Gold	Tungsten carbide
A	B97	A	B93	A93	B93	B93	A93	A23
A	B93	A60	A23	A93	A60	B23	A93	-
A	A93	X	B80	A35	B23	B93	A35	A23
A	B82	-	A82	A93	B23	B23	A93	-
A	A149	A65	B149	A200	A93	B93	A200	A23
A	A93	B97	A93	A93	A93	A93	A93	-
A	A93	-	B97	A120	A93	A93	-	C23
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
A	X	X	B38	B23	A93	A93	-	-
C	B93 (10%)	A23	B65	A23	A120	A93	-	-
A	A93 (10%)	-	B23	A23	A100	A80	-	X
A	X	X	B138	A100	A100	A93	-	X
A	B23	-	B23	A23	A23	A23	-	-
A	B23	A120	B93 (50%)	A23	A32	A71	-	X
A	A93	B100	B93	A250	A93	A93	-	C23
A	B93	A23	A93	A93	X	A93	A93	C23
A	B150	A23	A82	A	A23	A38	-	A23
-	B71	A80	B93	-	A32	B82	-	-
-	-	-	-	A93	A93	A93	A93	B23 (25%)
A	B32	A120	A38	-	A23	A38	-	A23
A	B23	A120	A160	-	B23	A38	-	A23
A	B176	-	B165	-	A23	A23	-	A23
A	A97	A100	A250	A250	A80	B23	A250	A23
A	B160	-	A290	-	A97	A32	-	A23
A	A93	A98	A93	A93	B93	B93	A93	A23
-	B23	-	B23	A93	X	X	A93	-
-	B42	-	B23	A93	X	X	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
A	X	A45	A45	A93	B23	A70	A120	-
A	X	X	A38	A93	X	A93	A120	-
-	X	-	-	X	-	-	X	-
-	X	-	-	-	-	-	-	-
A	A23	A23	B23	A93	-	A93	A93	X
A	X	X	B60	A93	X	X	A93	X
A	X	X	B60	A93	X	X	A93	X
A	X	X	-	-	-	A23	-	-
A	B93	A90	A23	A93	A80	B120	A93	X
-	X	-	B93	-	C32	A60	A23	-

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	Neo-prene	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			
Aluminium oxide	Zirconium oxide	Ceramic coated	Novolac
-	-	-	-
-	-	-	-
A23	A23	-	-
-	-	-	A93
-	-	-	-
-	-	-	-
A120	A120	-	A93
A120	A120	-	-
A23	A23	-	-
-	-	-	-
-	-	-	A93
-	-	-	A93
A120	A120	-	A93
A120	A120	-	A93
A120	A120	-	A93
A120	A120	-	A93
A100	A100	-	-
A120	A120	-	-
A100	A100	-	-
A23	A23	-	-
-	-	-	A93
-	-	-	-
A150	A150	-	-
A65	A65	-	A93
-	-	-	A93
-	-	-	A93
-	-	-	-
-	-	-	-
A	A	-	-
-	-	-	A93
A190	A190	-	-
A23	A23	-	A93
-	-	-	-
A95	A95	-	A93
A	A	-	A93
A80	A80	-	A93
A120	A120	-	-
A120	A120	-	A93
A120	A120	-	-
A120	A120	-	X
A100 @70%	A100 @70%	-	A93 up to 30%
B23	X	-	-
A120	A120	-	-

Metals								
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	-
B23	X	C23	A250	A250	C23	B120	A250	-
A	A93	A	A93	A93	A93	B100	-	A23
-	B204	-	A38	-	A30	-	-	A23
-	B204	-	A38	-	A30	-	-	A23
A	B120	A30	B97	A23	A23	B23	-	-
A	B93	X	B93	A93	A93	A120	A93	C23
A	B93	A100	B93	A93	A80	B93	A93	-
A	B23	-	B93	A93	-	A93	A93	-
-	B97	A23	B32	A93	A23	B93	A93	A23
A	B97	A	-	A23	A23	B93	-	-
A	B97	A120	A120	A	A120	A120	A150	-
A	A100	A100	A93	A	A32	A32	-	B23
-	B149	A93	E23	A	A23	A93	-	B23
A	B120	A93	A93	A100	B80	A60	-	B23
A	B204	A80	B93	-	A93	A80	-	C23
A	A120	A120	B97	-	A80	B80	-	-
-	B93	-	A93 (40%)	B93	A93	A93	B93	-
A	A93 (50%)	A63	B65	A93	A63	A93	A93	-
A	X	-	-	A100	B80	A100	X	X
A	B23	-	B23	-	A23	A100	-	-
A	A200	A	A200	X	X	A23	X	-
A	B100	A100	A121	A65	B80	B120	A65	-
A	B100	A93	B97	-	B80	B93	-	-
A	B100	-	B100	-	B93	B93	-	-
A	B23	A	-	-	-	B23	-	A23
-	B204	X	A93	A40	A100	X	A300	B23
A	A120	A80	A38	A100	A32	A149	A100	A23
A	A176	-	A38	A	A23	A38	-	-
A	X	-	B149	A150	A42	A42	-	-
A	B97	A	B93	A100	B32	B38	A100	A23
A	A200	A120	B93	A200	A100	A120	A200	-
A	B23	A90	A100	A100	A80	A100	A100	X
A	A200	-	B23	A100	A32	B80	A100	-
A	A100	-	B93	A100	X	X	A100	X
A	A100	A52	A80	A	A120	A120	A120	X
X	A50	-	A50 B70 C90	-	A120	A187	A120	X
X	A38	-	A50 80 C120	A100	A85	A187	A120	X
X	B23	A23	B23	A100	B97	A150	-	X
X	X	B23	C23	A100	X	A100	X	X
A	B176	A	-	A100	A80	B97	A100	A23

Chemical Resistance Chart for SITRANS F M

Chemicals A – Z			
Agent	Chemical formula	Concentration (%)	Electrical conductivity (μS/cm) @ 25 °C
Oil, vegetable			<5
Oleic acid		100	<5 @15°C
Oxalic acid	H ₂ C ₂ O ₄	25	>100
Oxalic acid	H ₂ C ₂ O ₄	sat	>100
Ozone solution, aqueous	O ₃	10 ppm	TBD
Ozone solution, aqueous	O ₃	0,5 mg/L	TBD
Palmitic acid		sat	TBD
Paraffin		100	<5
Perchloric acid	HClO ₄	10	TBD
Perchloric acid	HClO ₄	70	TBD
Perchloroethylene	C ₂ Cl ₄	100	TBD
Petroleum oil (crude oil)		100	<5
Petroleum oil, refined			<5
Petroleum oil, Sour			<5
Phenol	C ₆ H ₅ OH	5	TBD
Phenol	C ₆ H ₅ OH	100	<5
Phosphoric acid	H ₃ PO ₄	10	>100
Phosphoric acid	H ₃ PO ₄	50	>100
Phosphoric acid	H ₃ PO ₄	85	>100
Phosphoric acid + Hydrofluoric acid	H ₃ PO ₄ / HF (1:1)		>100
Phosphoric acid + Hydrofluoric acid + Nitric acid	H ₃ PO ₄ / HF / HNO ₃ (1:1:1)		>100
Phosphoric acid + Sulphuric acid	H ₃ PO ₄ / H ₂ SO ₄ (1:1)		>100
Phosphoric acid + Sulphuric acid + Nitric acid	H ₃ PO ₄ / H ₂ SO ₄ / HNO ₃ (1:1:1)		>100
Phosphorus trichloride	PCl ₃	100	TBD
Plating solutions, brass	3% Cu, 1% Zn, 5.6% Rh; 3% cyanide, sodium carbonate	100	TBD
Plating solutions, cadmium	3% Cadmium oxyde, 10% sodium cyanide, 1.2% sodium hydroxide	100	TBD
Plating solutions, Chrome	25% Cr ₂ O ₃ , 12% H ₂ SO ₄ , H ₂ O	100	TBD
Plating solutions, Copper (Cyanide)	10.5% Cu, 14% sodium cyanide, 6% rochelle salts	100	TBD

Plastic and rubbers									
Butyl	EPDM	Ebonite	FKM-FPM	Linatex	NBR	Neo-prene	PFA	PTFE	PVDF
X	X	A23	A90	X	A90	A20	A200	A200	-
X	X	A65	A80	X	A23	X	A120	A200	A120
A100	A140	A80	A100	-	X	X	A200	A200	A60
A100	A140	-	-	B23	X	X	A200	A200	A50
-	A40	-	A40	-	-	-	A150	A150	A120
-	A40	-	A40	-	-	-	A150	A150	
B23	A23	X	A200	X	A100	X	A200	A200	A120
-	X	A80	A200	X	A60	A60	A200	A200	A135
A65	A60	-	A200	A60	X	A23	A200	A200	A95
-	A60	-	A200	-	X	X	A200	A200	A50
X	X	-	A200	X	X	X	A120	A200	A135
X	X	-	A80	X	A80	A40	A120	A120	A135
X	X	-	A100	X	A80	A40	A120	A120	
X	X	X	A100	X	A80	X	A120	A120	
-	-	A20	-	-	-	-	-	-	A80
X	X	X	A100	X	X	X	A200	A200	A50
A65	A80	A90	A90	B23	A23	-	A200	A200	A135
A65	A80	B90	A90	C23	A23	X	A120	A120	-
A65	A80	B80	A90	C23	X	X	A120	A120	A105
-	-	X	-	-	-	-	A	A	A
-	-	X	-	-	-	-	A	A	A
-	-	X	-	-	-	-	A	A	A
-	-	X	-	-	-	-	A	A	A
A	A23	-	A90	X	X	X	A120	A200	A95
A90	A23	A90	A60	B23	A80	A60	A200	A200	A100
A70	A150	A90	A80	A23	A80	A90	A200	A200	A100
X	A100	X	A90	X	X	X	A200	A200	A65
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			
Aluminium oxide	Zirconium oxide	Ceramic coated	Novolac
-	-	-	-
-	-	-	-
A120	A120	-	-
A120	A120	-	A93
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
A120	A120	-	A93
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
A180	A180	-	-
A120	A120	-	A93 up to 50%
A120	A120	-	-
A60	A60	X	-
X	X	-	-
X	X	-	-
B23	B23	-	-
B23	B23	-	-
-	-	-	A93
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Metals								
Graphite	AlSi 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%)
A	X	-	-	-	X	-	-	C23
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	-	-
A	A23 B200	-	B97	-	A 100	B93	-	A23
A	-	A	-	A23	A	-	-	-
A	B26	-	-	-	-	A150	-	-
A	B26	-	-	-	-	-	-	-
A	B93	-	-	-	-	-	-	A23
A	A200	A95	A200	A180	A23	A120	A180	-
A	A60	A	A40	A100	A23	A175	A100	X
A	A100	A	A40 C93	A100	X	A100	A100	-
A	B23	A110	A93	A100	X	A200	-	X
-	X	C23	C23	A23	X	X	-	-
-	X	C23	C23	C23	X	X	-	-
-	X	A23	A23	A23	X	A	-	-
-	X	A23	A23	A23	X	A	-	-
A	A32	X	B38	X	A23	A60	-	-
-	B149	-	A38	-	A38	-	-	-
-	B176	-	A38	-	A32	-	-	-
X	B176	-	A54	-	X	A150	-	-
-	A50	-	A49 B97	-	A32	A23	-	-

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	Neo-prene	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 ₂ O	100	TBD	-	B150	A90	A90	B23	A80	A90	A200	A200	A93
Plating solutions, Silver	4% silver, 7% potassium 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 ₂ O	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 ₂ CO 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 ₂ CrO 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 ₂ Cr ₂ O 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			
Aluminium oxide	Zirconium oxide	Ceramic coated	Novolac
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	A93
-	-	-	A93
-	-	-	-
-	-	-	A93
-	-	-	-
A100	A100	-	A93
-	-	-	-
A	A	-	-
-	-	-	A93 up to 10%
A120	A120	-	A93
B120	A120	-	A93
A150	A150	-	-

Metals								
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	-	-	-
A	B55	-	A23	A23	A100	A80	-	C23
-	B97	-	B23	-	A100 (30%)	B97 (30%)	-	-
A	B100 (30%)	X	-	A100	A23	A100 (<50%)	A100	-
A	B100	A	B100	A100	A100	-	A100	-
X	A100	-	A23 B100 (30%)	A100 (30%)	A100	B23 (30%)	A120	-
A	A100 (30%)	A110	A170	A23	A80	A160	-	C23
X	B100 (<40%)	-	B93 (30%)	-	A 100 (<40%)	B23 (30%)	-	-
A	B93	C23	B93 (30%)	B23	X	A32 (30%)	X	X
X	A93 (<50%)	-	B93 (<50%)	A93 (<50%)	A32	A120	A120	-
A	B93	A93	B150	A200	B100	X	-	B23
A	B60	A93	B150	A200	A23	X	A300	-
A	B23	A	-	-	A93 (<40%)	B97	-	-

Chemical Resistance Chart for SITRANS F M

Chemicals A – Z			
Agent	Chemical formula	Concentration (%)	Electrical conductivity (μS/cm) @ 25 °C
Potassium nitrate	KNO ₃	sat	>100
Potassium perchlorate	KClO ₄	sat	TBD
Potassium permanganate	KMnO ₄	25	>100
Potassium sulfate	K ₂ SO ₄	sat	>100
Propan-1-ol	C ₃ H ₈ O	100	<5
Propylene glycol	C ₃ H ₈ O ₂	100	<5
Propylene oxide	C ₃ H ₆ O	100	TBD
Pyridine	C ₅ H ₅ N	100	<5 @18°C
Salicylic acid	C ₇ H ₆ O ₃	sat	TBD
Salt water (brine)		sat	>100
Seawater		100	>100
Silicone oil		100	<5
Soap solution			>100
Sodium acetate	C ₂ H ₃ NaO ₂	sat	>100
Sodium bicarbonate	NaHCO ₃	sat	>100
Sodium bisulfate	NaHSO ₄	sat	TBD
Sodium bisulfite	NaHSO ₃	sat	TBD
Sodium borate	Na ₂ B ₄ O ₇ ·10H ₂ O	sat	TBD
Sodium carbonate	Na ₂ CO ₃	sat	>100
Sodium chlorate	NaClO ₃	sat	TBD
Sodium chloride	NaCl	sat	>100
Sodium chlorite	NaClO ₂	sat	TBD
Sodium chromate	Na ₂ CrO ₄	sat	TBD
Sodium cyanide	NaCN	sat	TBD
Sodium dichromate	Na ₂ Cr ₂ O ₇	sat	>100
Sodium hydrogen sulfite	NaHSO ₃	sat	TBD
Sodium hydroxide	NaOH	30	>100
Sodium hydroxide	NaOH	50	>100
Sodium hydroxide	NaOH	70	TBD
Sodium hypochlorite	NaOCl	5	TBD
Sodium hypochlorite	NaOCl	12,5%, 150 g/L Cl ₂	TBD
Sodium metabisulphite	Na ₂ S ₂ O ₅		TBD
Sodium nitrate	NaNO ₃	sat	>100
Sodium nitrite	NaNO ₂	sat	TBD
Sodium perborate	NaBO ₃ ·nH ₂ O	sat	TBD
Sodium peroxide	Na ₂ O ₂	10	TBD
Sodium phosphate	Na ₃ PO ₄	sat	>100

Plastic and rubbers									
Butyl	EPDM	Ebonite	FKM-FPM	Linatex	NBR	Neo-prene	PFA	PTFE	PVDF
A120	A80	A80	A100	A60	A60	A60	A200	A200	A140
-	A60	-	A80	-	X	A23	A120	A120	A95
A50	A100	X	A70	A23	X	A40	A100	A200	A120
-	A60	A80	A100	A23	A60	A60	A100	A200	A140
A50	A80	A90	A100	A60	A40	A80	A120	A200	A65
A23	A100	-	A120	A23	A80	A23	A200	A200	A65
-	B23	-	X	X	X	X	A200	A200	X
B23	X	-	X	X	X	X	A120	A200	X
A23	A150	-	A150	A23	A23	A23	A200	A200	A95
A90	A120	A90	A100	A60	A70	A80	A200	A200	A120
A	A120	A100	A80	A23	A70	A80	A200	A200	A120
A23	A60	A80	A100	C23	A60	A20	A200	A200	A120
A65	A150	A80	A100	A60	A110	A80	A200	A200	-
A	A100	A80	X	C23	X	C23	A120	A200	A140
A80	A100	A100	A100	A40	A60	A70	A120	A200	A140
A80	A90	A90	A100	A60	A80	A90	A200	A200	A140
A80	A80	A90	A100	A60	A60	A80	A200	A200	A140
A80	A80	A90	A100	A23	B100	B100	A200	A200	A100
A100	A80	A70	A100	A80	A90	A60	A200	A200	A140
A90	A80	A80	A60	A60	A80	A23	A200	A200	A120
A80	A60	A90	A100	A23	A80	A70	A200	A200	A120
-	X	A30	B60	X	X	X	A200	A200	A120
-	A23	A60	A23	-	A23	A23	A120	A120	A95
A65	A80	A80	A80	A80	A60	A60	A120	A200	A135
A60	A60	A80	B100	X	A60	X	A120	A200	A100
-	-	A80	-	-	-	-	-	-	-
A90	A80	A70	A23	A60	A80	A60	A200	A200	-
A90	A80	A70	X	A60	A65	A60	A200	A200	X
A80	A40	A70	X	A23	X	A60	A200	A200	
B23	B23	A23	A80	C23	X	X	A200	A200	A135
X	B23	B30	A80	X	X	X	A200	A200	A95
	A		A				A	A	
A100	A100	A70 @25%	A100	B23	A60	A70 @25%	A200	A200	A135
A100	A80	-	A100	-	A60	A60	A120	A200	A135
A23	A60	-	A80	B23	A23	C23	A120	A120	A120
A80	A150	A90	A80	A60	A90	A80	A120	A200	A95
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			
Aluminium oxide	Zirconium oxide	Ceramic coated	Novolac
A120	A120	-	A93
A25	A25	-	-
A120	A120	-	-
A50	A50	-	A93
-	-	-	-
-	-	-	A93
-	-	-	-
A60	A60	-	-
-	-	-	-
A	A	-	-
-	-	-	A93
-	-	-	-
-	-	-	A93
-	-	-	-
A120	A120	-	A93
A120	A120	-	A93
A120	A120	-	-
-	-	-	-
A120	A120	-	A93
A120	A120	-	A93
A120	A120	-	A93
A120	A120	-	A93
A	A	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
A120	A120	-	-
B100	A100	A 23	A93
X	B100	-	-
A120	A120	-	-
A120	A120	X	-
-	-	-	-
A100	A100	-	A93
A100	A100	-	-
-	-	-	-
A120	A120	-	-
-	-	-	-

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

Chemical Resistance Chart for SITRANS F M

Chemicals A – Z				Plastic and rubbers									
Agent	Chemical formula	Concentra- tion (%)	Electrical conductivity (µS/cm) @ 25 °C	Butyl	EPDM	Ebonite	FKM- FPM	Linatex	NBR	Neo- prene	PFA	PTFE	PVDF
Sodium sulfate	Na ₂ SO ₄	sat	>100	A65	A80	A70	A100	A60	A60	A60 @ 25%	A200	A200	A140
Sodium sulfide	Na ₂ S	50	>100	A65	A60	A80	A80	A60	A60	A80	A200	A200	A120
Sodium sulfite	Na ₂ SO ₃	sat	TBD	A100	A60	A70	A60	A23	A60	X	A120	A120	A140
Sodium thiosulfate	Na ₄ S ₂ O 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 ₂ Cl 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 ₂ SO ₄	10	>100	B23	B80	A80	A120	A60	A60	A50	A200	A200	A120
Sulfuric acid	H ₂ SO ₄	50	>100	B23	B23	A60	A100	B23	B23	X	A200	A200	A95
Sulfuric acid	H ₂ SO ₄	70	>100	B23	X	B40	A80	X	X	X	A200	A200	-
Sulfuric acid	H ₂ SO ₄	98	>100	X	X	X	A40	X	X	X	A200	A200	A50
Sulfuric acid + nitric acid	H ₂ SO ₄ :HNO ₃	50:50	TBD	X	-	B	B35	-	-	X	A200	A200	-
Sulfuric acid fuming	H ₂ SO 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 ₂ SO 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 ₄ H ₆ O 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 ₆ H ₅ CH 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 ₄ P	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 ₆ H ₁₅ NO ₃	100	TBD	A65	A23	X	X	B23	A23	A60	A200	A200	A50
Trisodium phosphate	Na ₃ PO 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 ₄ H ₆ O 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) ₂ C ₆ H 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
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X = Not recommended
 -- = No data available

Ceramics and resins			
Aluminium oxide	Zirconium oxide	Ceramic coated	Novolac
A120	A120	-	A93
A120	A120	-	-
A120	A120	-	-
-	-	-	A93 up to 50%
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
A120	A120	-	-
A120	A120	-	-
A120	A120	-	-
-	-	-	-
A120	A120	-	A93
A120	A120	X	-
A120	B120	-	-
B120	X	-	-
B35	X	-	-
A120	A120	-	-
-	-	-	-
-	-	-	-
-	-	-	-
A120	A120	-	-
A120	A120	-	-
A150	A150	-	-
A150	A150	-	-
-	-	-	-
-	-	-	-
A	A	-	A93
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
A23	A23	-	-
-	-	-	-
-	-	-	A93
-	-	-	A93
-	-	-	A93
A	A	-	-
A100	A100	-	A93
A100	A100	A 23	A93
A100	A100	-	-
-	-	-	-
A120	A120	-	A93
-	-	-	A93

Metals									
Graphite	AISI 316L	Hastelloy C-22	Hastelloy C-276	Platinum	Titanium	Tantalum	Gold	Tungsten carbide	
A	A93	A	A60	-	A93 (10-20%)	A23	A100	B23 (<50%)	
A	B80	-	B93	A93	B93	B100 (10%)	A100	B23	
A	A93 (50%)	-	X	A93 (25%)	A	A120	A100	-	
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	-	-	-	
A	A200	A	A93	A200	A180	B200	A300	C23	
A	A43	A32	A149	-	-	A32	-	A23	
A	X	A	B97	A150	X	A150	-	-	
X	B200	A25	B120	X	X	X	-	-	
A	A 23	A52	A75	A120	X	A93	A250	C23	
A	X	A24	A23	A120	X	A54	A250	X	
A100	X	A24	B80	A120	X	A54	A250	X	
X	A38	A50	A50	A120	X	A54	A250	X	
-	-	A23	A23	A23	X	B23	X50	-	
X	-	-	-	A120	X	X	-	-	
A	-	-	-	-	-	-	-	-	
A	B93	-	B93	A93	A60	A150	A100	-	
A	B93	A	A150	-	-	B149	-	A23	
A	B93	-	X	A93	A93	B80	-	-	
-	A93	-	B93	A93	B93	A93	A120	-	
A	A93 (10%)	-	B80	A100	A23	B80	-	-	
A	X	C23	-	-	-	B120	-	-	
-	-	-	-	-	-	-	-	-	
A	B23	A	B23	-	A120	A32	-	-	
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	
A	B120	A	A93	-	A93	B97	-	A23	
A	B23	A95	A23	A200	A40	B97	-	A23	
A	E71 (10%)	A200	E49 (10%)	-	-	B26	-	-	
A	B97	A90	B23	-	A90	A90	-	A23	
A	B82	A	-	-	A23	A23	-	C23	
-	A40	A	A40	-	-	-	-	-	
A	B23	A	A23	A	A23	A23	-	-	
A	B100	A	A200	A	-	A23	-	-	
A	B100	A	A 23	A	A23	A 23	-	-	
A	A23	A	A38	-	A23	A23	-	-	
A	B93	A120	A150	A100	A93	A93	-	A23	
A	X	C23	B120	A93	A93 (<70%)	A80	-	X	
A	A97	A100	A100	A100	A93 (<40%)	A32	A100	-	

Stainless Steel

Hastelloy®

Titanium

Tantalum

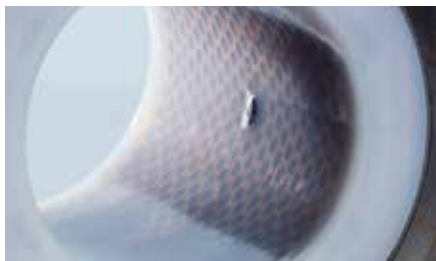
Platinum

Overview

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. Common 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.

Siemens Industry Inc.
Process Instrumentation
100 Technology Drive
Alpharetta, GA 30005
1-800-365-8766
info.us@siemens.com

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