







# Rosemount™ Magnetic Flow Meter Liner and Electrode Selection Guide for Oil & Gas Applications



Because the Rosemount Magnetic Flow Meters are designed without any protrusions or obstructions in the pipe, they can accommodate an array of fracking, produced water, water management and water injection applications in the oil exploration and production industry. Specialized liner materials and electrode types can be selected for chemical, corrosion and abrasion resistance. Below is a selection guide for common applications with specific model options and specifications.



## Oil & Gas Magnetic Flow Meter Liner and Electrode Selection Guide

Liner Material *	Application Consideration	Chemical Resistance	Abrasion Resistance	Process Temp Range	Maximum Working Pressure **	Line Size **	Model Option
 <p>PFA+</p>	The best liner options for chemical resistance and high temperatures. Useful on applications where vacuum may occur such as water legs of separators.	Best	Good for slurries with small particles	-20 to 350°F (-28°C to 177°C)	½ to 12" up to 740 psig 14" up to 275 psig DN15 to DN300 up to 51 barg DN350 up to 18 barg	½ to 14 DN15 to DN350	K
 <p>PTFE</p>	Very good liner material and more cost effective than PFA. Ideal for produced water, water with hydrocarbon content at pressures below 1000 psig. For pressures above 1000 psig, consider polyurethane, Adiprene®, or neoprene. Consult the product data sheet for pressure and temperature de-rating chart. For applications where vacuum may be present, consider PFA+	Excellent	Very good for slurries with small particles	-20 to 350°F (-28°C to 177°C)	1-10" up to 1000 psig 12-36" up to 740 psig 40-48" up to 275 psig DN25 to DN250 up to 68 barg DN300 to DN900 up to 51 barg DN1000 to DN1200 up to 18 barg	½ to 48 DN15 to DN1200	T – Flanged S – Wafer
 <p>ETFE</p>	Very good liner material with similar properties to PTFE. Slightly better abrasion resistance. Can be used for produced water, water with hydrocarbon content at pressures below 1000 psig. For pressures above 1000 psig, consider polyurethane, Adiprene, or neoprene. Consult the product data sheet for pressure and temperature de-rating chart.	Very Good	Better than PTFE for slurries with small particles	-20 to 250°F (-28°C to 121°C)	1-10" up to 1000 psig 12-14" up to 740 psig 16" up to 275 psig DN25 to DN250 up to 68 barg DN300 to DN350 up to 51 barg DN400 up to 18 barg	½ to 16 DN15 to DN400	F
 <p>Polyurethane</p>	Excellent liner for abrasion resistance to slurries with small particles. Limited chemical and hydrocarbon resistance. Used on clean water and high pressure applications. Recommended liner for hydraulic fracturing blending where chemicals and acids are not being used. For applications with high salinity, consider PTFE or PFA+ for low pressure applications and Adiprene or neoprene for high pressure applications.	Limited	Excellent for slurries with small and medium particles	0 to 140°F (-18°C to 60°C)	1" up to 2220 psig 1½" up to 3705 psig 2-8" up to 6170 psig 10-24" up to 1480 psig 30-36" up to 740 psig DN25 up to 153 barg DN40 up to 255 barg DN50 to DN200 up to 425 barg DN250 to DN600 up to 102 barg DN750 to DN900 up to 51 barg	1 to 36 DN25 to DN900	P
 <p>Adiprene</p>	Best liner material for abrasion resistance with excellent oil and solvent resistance for produced water with high hydrocarbon content. Preferred liner for high pressure produced water or water injection applications. For applications with high sulfide content (H2S) consider PTFE, PFA+, or neoprene	Good. Excellent for produced water with oil carry over	Excellent for slurries with small to medium particles	0 to 200°F (-18°C to 93°C)	1-1½" up to 2220 psig 2-8" up to 6170 psig 10" up to 3705 psig DN25 to DN40 up to 153 barg DN50 to DN200 up to 425 barg DN250 up to 102 barg	1 to 12 DN25 to DN300	D
 <p>Neoprene</p>	Used in water with chemicals and seawater/saltwater applications. Limited hydrocarbon resistance. Good application for produced water with low hydrocarbon content and high pressure water injection. If application contains aromatic hydrocarbons such as benzene or toluene, consider using PTFE, PFA+, or Adiprene	Good Excellent for applications with high salinity	Very good for slurries with small to medium particles	0 to 176°F (-18°C to 80°C)	1-8" up to 6170 psig 10-24" up to 1480 psig 30-36" up to 740 psig DN25 to DN200 up to 425 barg DN250 to DN600 up to 102 barg DN750 to DN 900 up to 51 barg	1 to 36 DN25 to DN900	N

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## Oil & Gas Magnetic Flow Meter Liner and Electrode Selection Guide

Electrode Material *	Application Consideration	Abrasion Resistance	Corrosion Resistance	Model Option	
316L SST	The most common electrode material used. It has reasonable corrosion resistance and adequate abrasion resistance for most applications. Stainless is a no charge adder. Not recommended for sulfuric or hydrochloric acids or produced water with high salt content.	Good	Good	S	
Nickel Alloy 276	Offers improved corrosion resistance compared to stainless steel, especially in lower concentration acid applications and salt water. It also offers better abrasion resistance, particularly in applications where there is a high concentration of solids particles. Nickel Alloy is the same price as SST and is an excellent choice in most O&G applications.	Better	Better	H	
80% Platinum – 20% Iridium	Most expensive electrode material offered and the most versatile. Typically, not needed in most O&G applications.	Good	Best	P	
Titanium	Suited for high caustic concentration fluids and offers poor chemical resistance to acid applications. Because it is a very hard material, it offers superior abrasion resistance to slurries and fluids with particles present in the flow stream.	Excellent	Good	N	
Tungsten Carbide Coated 316L SST	Special electrode material, available with a flat electrode head (T), suited for the most abrasive applications. Recommended electrode for hydraulic fracturing blending applications due to high sand / proppant content.	Best	Good	W	
Tungsten Carbide coated Nickel Alloy 276	Special electrode material, available with a flat electrode head (T), suited for the most abrasive applications. The Nickel Alloy base material is recommended for hydraulic fracturing blending applications where higher concentrations of acids or chemicals are being injected with the fracturing fluid.	Best	Better	Y	
Electrode Type	Application Consideration	Abrasion Resistance	Corrosion Resistance	Model Option	Model Option with Grounding Electrode
Standard	Lowest cost electrode that is good for most applications. In applications where coating is an issue, the flow meter should be sized to keep the velocity above 3 ft/s to minimize electrode coating potential.	Good	Good	A	E
Bulletnose	Slightly more expensive, but best option for coating applications. Electrode extends further into the flow stream providing a natural cleaning effect in processes susceptible to coating such as produced water with oil content. For applications where abrasion may occur, or applications with solid content such as sand, consider using a standard or flat head electrode.	Poor	Best	B	F
Flat head	This electrode option is intended for highly abrasive applications. The flat head and flush mount design provides added protection for the electrode from impingement of the abrasive media. For applications where coating is a concern, consider using bullet nose electrodes.	Best	Better	T	U
Other Options	Application Consideration	Model Option			
Grounding Rings	Recommended for installations in lined or non-metallic pipe. Used to provide a process reference for the meter in order to measure accurately. Recommended if the meter is going to be installed and left in service for some time without being removed.	G1 / G5 – Dual / Single 316L SST Rings G2 / G6 – Dual / Single Nickel Alloy 276 Rings			
Lining Protectors	Provides leading edge protection for the liner in abrasive slurries. Recommended for use on meters that will be frequently removed for cleaning. Recommended for meters where flexitallic gaskets may be used for sealing, especially in high pressure installations. Also provides a process reference similar to grounding rings.	L1 / L5 – Dual / Single 316L SST Lining Protector L2 / L6 – Dual / Single Nickel Alloy 276 LP			

\* Rosemount Inc. neither represents nor warrants the accuracy or sufficiency of the information set forth in this guide for specific end-user applications. Ultimate responsibility for materials selection remains with the end-user. Nothing in this guide constitutes a change to the terms and conditions under which the Rosemount product was sold.

\*\* Liner, flange rating and line size availability is subject to change. Consult your Emerson representative for confirmation of liner, flange rating and line size combination availability.

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