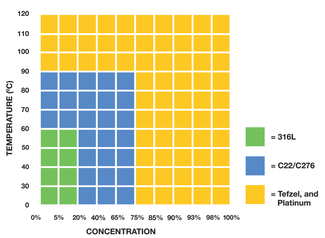
QUICK REFERENCE GUIDE

Emerson Automation Solutions offers the largest portfolio of flow products to meet the installation needs for corrosive applications. Multiple wetted materials including tantalum, alloy C22, and platinum are available across the flow portfolio to handle even the most corrosive fluids. Emerson has more than 35 years of experience and hundreds of thousands of successful installations in corrosive applications.

Product: **Sodium Hydroxide**

Other names: Caustic Soda, NaOH

Uses: Reactant in organic chemicals, pulping agent in P&P, dissolves lining, desulfurization in petrochem, saponification, pH control, aluminum production, CIP cleaner.



Tips:

- Common to buy very concentrated (typically around 50%) and dilute on site. F0100 option needed on mags with caustic concentration above 50% — use dual concentration curve.
- Dilution can have exothermic effect which can have large thermal change (Tefzel delamination issue).
- No Tantalum or titanium (ask about cleaning fluid used).
- Chloride contamination is common.
- Observe chloride limits for some wetted materials.
- 50% and higher is solid at 70°F.

Possible Materials:

- 316L - dilute
- C22/C276
- Tefzel
- Zirconium
- Platinum

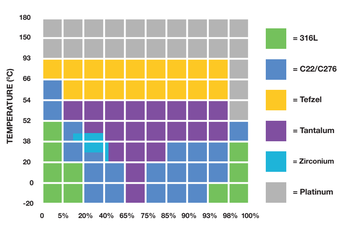
Avoid:

- Titanium
- Tantalum
- 304L

Product: **Sulfuric**

Other names: Tower or Chamber Acid

Uses: Detergents, synthetic resins, dyes, petroleum catalysts, insecticides, antifreeze, aluminum reduction, water treatment, pigments, paints, enamels, printing inks, coated fabrics, paper, explosives, cellophane, acetate, viscose textiles, lubricants, non-ferrous metals and batteries.



Tips:

- Sizing should be carefully considered due to highly erosive fluid properties to metals. Keep fluid velocity below 8 ft/s to reduce likelihood of removing oxide layer.
- Very dependent on concentration.
- Use alloys, like Tantalum, if wide concentration range expected (if crossing oxide layer).
- Concentrations above 98% are not common as the acid will quickly revert to a lower concentration.

Possible Materials:

- 316L
- C22/C276
- Tantalum – 98% max
- Tefzel – 98% max
- Zirconium – 50% max
- Platinum

Avoid:

- Titanium
- 304L

Tefzel Restrictions **for Coriolis**

- Acid dilutions can raise temperature rapidly. Do not exceed temperature changes of more than 30° F per hour.
- **No** temperatures below 32°F and over 248°F at any time, even when not in use. Includes transit, storage, outdoor installations.
- **No** steam cleaning.
- **No** vacuums in the line.

DISCLAIMER NOTE.
This is meant to be used a quick reference to direct which wetted materials and products will work for some of the most common corrosive fluids. The corrosion guide provides a more exhaustive list of options and should be referenced if there are any questions or if the application is on the transition between materials.

DOWNLOADS

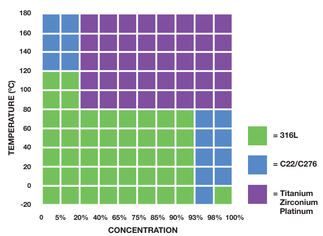
MICRO MOTION **CORROSION GUIDE**
http://www.emerson.com/micromotioncorrosionguide

ROSEMOUNT **CORROSION GUIDE**
http://www.emerson.com/rosemountcorrosionguide

Product: **Acetic Acid**

Other names: N/A

Uses: Preparation of metal acetates, used in some printing processes; vinyl acetate monomer, employed in the production of plastics; cellulose acetate, used in making photographic films and textiles; volatile organic esters (such as ethyl and butyl acetates), widely used as solvents for biochemical processes, resins, paints, and lacquers.



Tips:

- Commonly sold by the rail car or tanker truck. Focusing on loading and unloading applications will offer a good start.
- Ask about piping used for process.
- Ferric & Cupric ions good for Ti, bad for Zr. Tefzel should not be used.

Possible Materials:

- 316L
- C22/C276
- Titanium
- Tantalum
- Zirconium
- Platinum
- Super Duplex

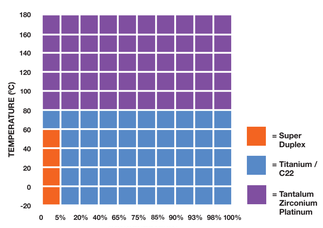
Avoid:

- Tefzel
- 304L

Product: **Brine**

Other names: salt water, sodium chloride solution

Uses: Most often used as a feed to other processes where the Chlorine ion and Hydrogen are needed for other chemical reactions.



Tips:

- Piping may be stainless steel but often this alloy is not recommended for the flow instrument.
- There are various types of brines (not all the same) with varying levels of corrosivity.
- Acid Brine – Low pH is much more corrosive.

Possible Materials:

- C22/C276
- Tantalum
- Titanium
- Zirconium
- Platinum
- Super Duplex

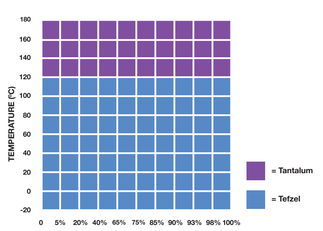
Avoid:

- 316L
- 304L

Product: **Chlorine**

Other names: Cl_2

Uses: Used to manufacture a wide range of consumer products. Includes organic chemicals such as polyvinyl chloride and the intermediates for the production of plastics.



Tips:

- If anhydrous, then may not be too corrosive although a small amount of water (even vapor) can affect the composition and become corrosive.
- Avoid platinum.
- Tantalum may be a safe alternative if the customer does not have good control on the process.
- Titanium may be flammable for dry chlorine.

Possible Materials:

- C22/C276 – must be dry
- Titanium – must be wet
- Tantalum
- Tefzel – wet Cl_2 only

Avoid:

- 316L
- 304L
- Zirconium
- Platinum
- Titanium – if no water

PRODUCTS **AVAILABLE**

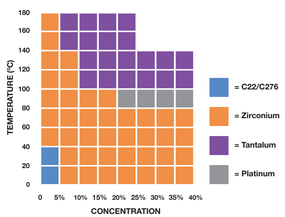
	316L	C22	Tantalum	304L	Titanium	Zirconium	Platinum	Super Duplex	Tefzel
Coriolis Flow Meters	✔	✔	✔	✔	✔			✔	✔
Fork Density Meters	✔	✔	✔	✔	✔	✔			
Magnetic Flow Meters	✔*	✔**	✔	✔****	✔		✔		
Vortex Flow Meters	✔	✔	✔***					✔	
Roxar Corrosion Instruments*****	✔							✔	

*=316 **=C-276 ***=Chemical Vapor Deposition (CVD) via special order ****=304 *****=More wetted materials may be available via special order

Product: **Hydrochloric Acid**

Other names: Muriatic Acid

Uses: Chemical reagent in the large-scale production of vinyl chloride for PVC plastic, and MDI and TDI for polyurethane. Can be used for pickling. Used in battery production.



Tips:

- Very aggressive acid.
- Ask whether process introduces ferric or cupric ions (if so, avoid Zirconium).

Possible Materials:

- C22/C276 – dilute only
- Tantalum
- Tefzel – with no organics
- Zirconium – with no oxidizing ions
- Platinum

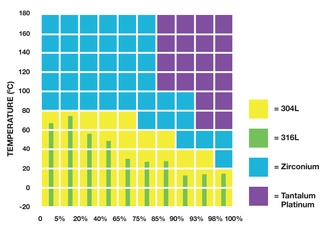
Avoid:

- 316L
- 304L
- Titanium
- Super Duplex

Product: **Nitric Acid**

Other names: N/A

Uses: Oxidant precursor to nylon, rocket propellant, analytical reagent, woodworking aging agent, etching and cleaning agent.
Often used for nitration.



Tips :

- 304L Coriolis is a lesser known but good option for this acid.
- Commercially used around 68%. Above 86% is called fuming acid.
- Often used for passivation of piping and equipment.
- C22/C276 not a good fit.

Possible Materials:

- 304L
- 316L - dilute
- Tantalum
- Tefzel
- Zirconium
- Platinum

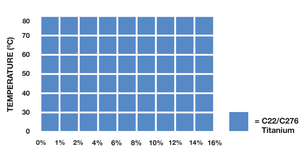
Avoid:

- C22/C276
- Titanium

Product: **Sodium Hypochlorite**

Other names: Bleach

Uses: Cleaner and disinfectant.



Tips:

- Titanium is often a good fit for this application.
- Titanium is better than Zirconium.

Possible Materials:

- C22/C276
- Titanium
- Tantalum
- Tefzel
- Platinum
- Zirconium – very dilute only

Avoid:

- 316L
- 304L