

## ENGINEERING BULLETIN #119

### Corrosion of Common Alloys in Dry Chlorine

In a couple of previous issues of our Engineering Bulletins we have already shown how [Chloride / Chlorine levels](#) in aqueous environments would affect alloy selection, and how the [calculation of PREN](#) (Pitting Resistance Equivalent Number) would help in selection of an appropriate alloy for pitting corrosion resistance.

This short Bulletin considers corrosion of common alloys by dry chlorine. Well, dry chlorine ( $Cl_2$ ) is not corrosive to steels at ambient temperatures and is commonly shipped and handled in carbon steel equipment with higher-alloy materials such as Monel 400 and Hastelloy C-276 used for critical parts. The main factor that influences corrosion rates of steels by dry chlorine is temperature. Stainless Steel alloys can be usable up to about 300°C (570°F).

Corrosion rates of different alloys in dry chlorine and temperature (°C) at which given rates are exceeded are presented in the table below. Keep in mind that moisture will greatly accelerate attack of any of these materials with the additional danger of SCC (Stress Corrosion Cracking) of stainless steel.

### CORROSION OF SOME COMMON ALLOYS IN DRY CHLORINE

Penetration Rates, [inches/year] and °C at Which Given Rate is Exceeded					
Alloy	0.005"	0.01"	0.05"	0.10"	0.50"
Inconel 600	489	504	540	556	596
Inconel 625	484	500	534	545	589
Hastelloy C-276	473	488	522	538	579
Inconel 825	388	407	451	472	527
SS Alloy 310	362	383	434	465	536
SS Alloy 316	339	358	407	431	492
SS Alloy 309		354	390	406	448
SS Alloy 304		341	375	393	434
SS Alloy 321		341	375	393	434

If you have any questions or comments, please [contact us](#).