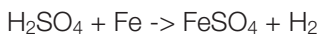


## HYDROGEN FORMATION AND HAZARDS OF WELDING ON HIGH PERFORMANCE STAINLESS STEEL

In keeping with MECS commitment to provide Total Quality plants and service to our customers, this Technical Brief is intended to serve as a reminder of the importance of adequate purging and flammable gas testing prior to the performance of maintenance on high performance stainless steel equipment items (tanks, piping and towers). Any corrosion of the high performance stainless steel may cause enough hydrogen formation to constitute an explosion hazard.

It is a well-known fact that corrosion of iron by sulfuric acid causes hydrogen formation by the following reaction:



The rate of this reaction is determined by several factors, including the acid concentration, temperature and materials involved. What may not be understood is that most high performance stainless steels used in sulfuric acid service also contain large amounts of iron.

For reference, some typical corrosion rates are listed for various conditions:

Corrosion Rate (mils/yr)	CS	Mondi	304 SS	Hi Silica SS
98.5% at 180°F	90	20	10	<1
90% at 180°F	N/A	200	1,000	10
80% at 265°F	N/A	N/A	60,000	600
<10% at 200°F	5,000	N/A	N/A	N/A

Hydrogen is lighter than air and is a very flammable material over a range of approximately 4.5 vol% to 94 vol%. Explosions have been reported in the sulfuric acid industry, either following a weak acid excursion, where a large volume of hydrogen is generated in a short period of time or in stagnant areas, where hydrogen can accumulate over time.

Adequate purging and flammable gas testing should be used whenever maintenance is performed on equipment containing acid or acid gases following a weak acid excursion or when working on equipment that has been idle or stagnant for a long period of time.

Please contact your MECS representative should you require assistance with your specific installation or have any questions. Consultation will be provided at nominal and standard industrial rates.