

# Increasing Gas Mixture Shelf Life Study Using Corrosive Gas Mixtures

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## Stability of Corrosive Mixtures in Luxfer SGS Alu Cylinders

### Summary:

This study evaluated the capability of Luxfer SGS Alu cylinders to contain low concentration mixtures of corrosive gases. SGS Alu cylinders were subjected to a bake out/purge/evacuation preparation cycle and then filled with one of six low concentration corrosive mixtures. The prepared mixtures were then analyzed multiple times over a 90 day period to determine their degree of stability.

### Methodology:

SGS Alu cylinders (30 liter nominal internal volume) containing a variety of low concentration corrosive mixtures were tested for stability over a 90 day period. Cylinder preparation consisted of industry-standard cylinder bake out / evacuation with cycle purge of the target balance gas at elevated temperature (140°F). No additional cylinder passivation treatment such as silanization, fluorination, or conditioning with the target component was performed. The SGS Cylinder has an almost mirror-like surface which minimizes reaction of corrosive mixture components with the cylinder wall.

The following mixtures were prepared by weight on highly accurate scales calibrated using NIST-traceable weights:

Cylinder: SGS Alu 30 Liter      Fill pressure: 2000 psia

Nominal :

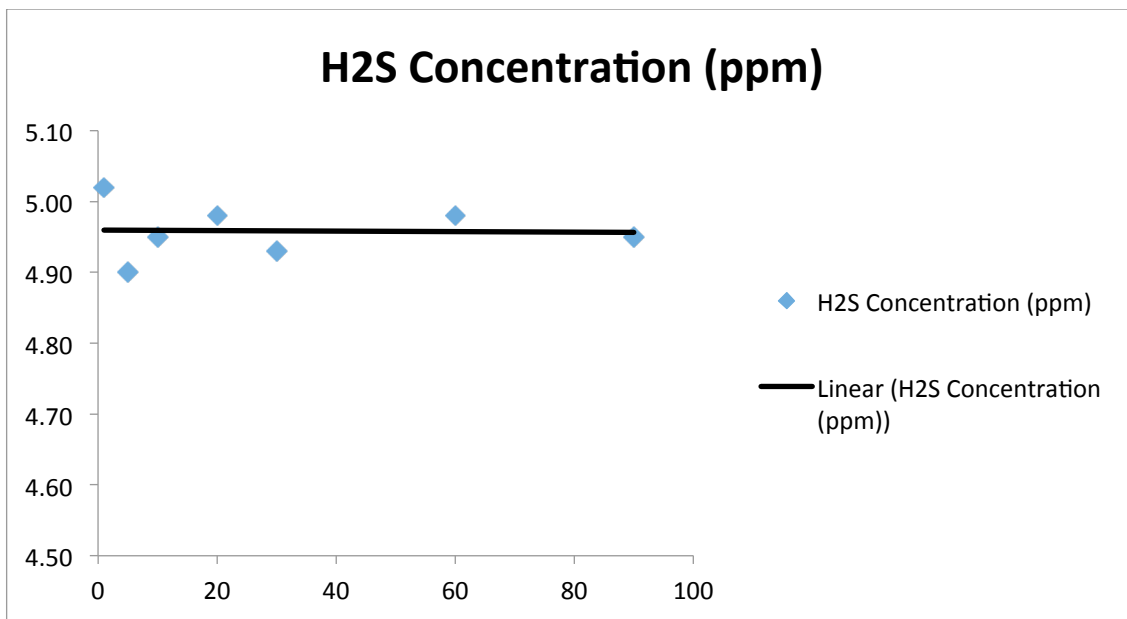
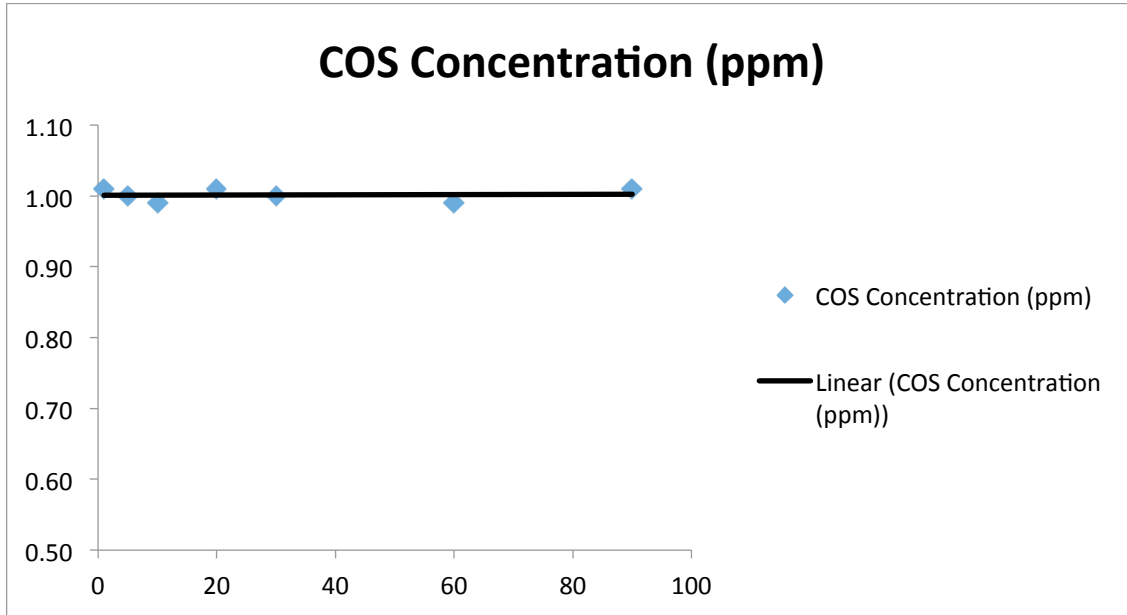
Average analytical Results :

1.00 ppm COS in N2	1.00 ppm +/- 0.01 ppm
5.00 ppm H2S in N2	4.96 ppm +/- 0.04 ppm
1.00 ppm HCN in N2	1.00 ppm +/- 0.01 ppm
1.00 ppm HCL in N2	1.00 ppm +/- 0.02 ppm
1.00 ppm COCl2 in N2	0.94 ppm +/- 0.01 ppm
0.40 ppm NO2 in Air	0.356 ppm +/- 0.01 ppm

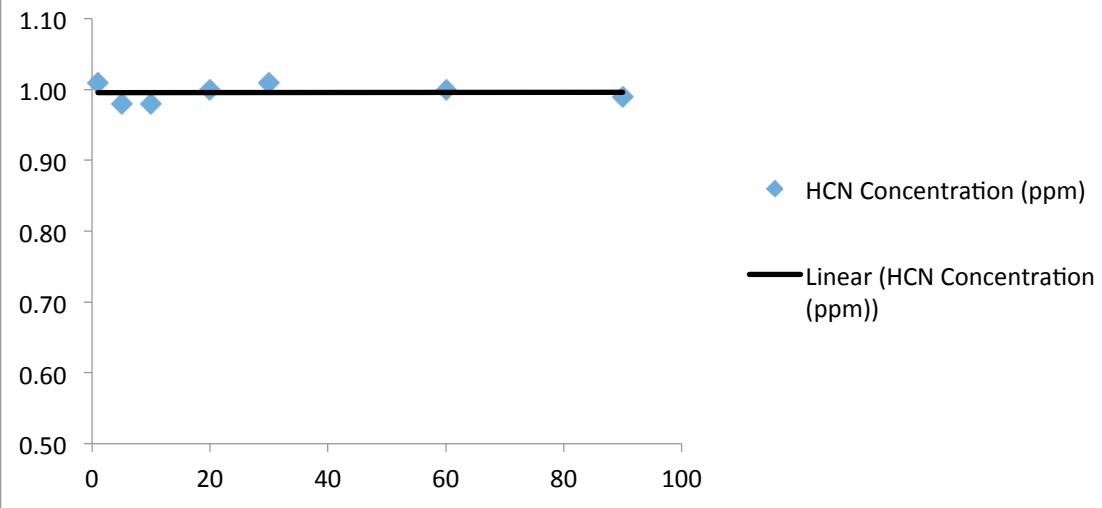
Analysis of each prepared mixture was performed 1, 5, 10, 20, 30, 60 and 90 days after filling.

**Conclusion:**

The SGS Alu cylinder is an excellent cylinder package for preparing and supplying a variety of corrosive component mixtures in the low ppm range. The package’s biggest advantage is the lack of required cylinder pre-conditioning necessary to produce stable mixtures, which minimizes the labor cost and preparation time, and eliminates the need to handle and dispose of hazardous materials. These savings will more than offset the additional cost of the SGS cylinder compared to currently-available alternative packages.



### HCN Concentration (ppm)



### HCl Concentration (ppm)

