



Improving the Built Environment

Building, Construction and Engineering Graham Road (PO Box 56), Highett, Victoria 3190, Australia.
Phone: 61 3 9252 6000, Fax: 61 3 9252 6244 Web: <http://www.dbce.csiro.au>

**Chemical Resistance Testing of
HDPE Cabinet Corners**

Report Number: PDR 00/039

Distribution: Pratt Safety Systems
Safety Technologies Group
84-88 Chifley Drive
Preston
Victoria 3072

Copies: Project file
Master file

Author: Tara Schiller

Authorised: Stewart Burn

Date: 30 January 2001



Introduction

This report details the chemical resistance testing of HDPE chemical cabinet corners. Pratt Safety Systems supplied four HDPE corners, silicon sealed and screwed together with stainless steel screws, as shown in figure 1.

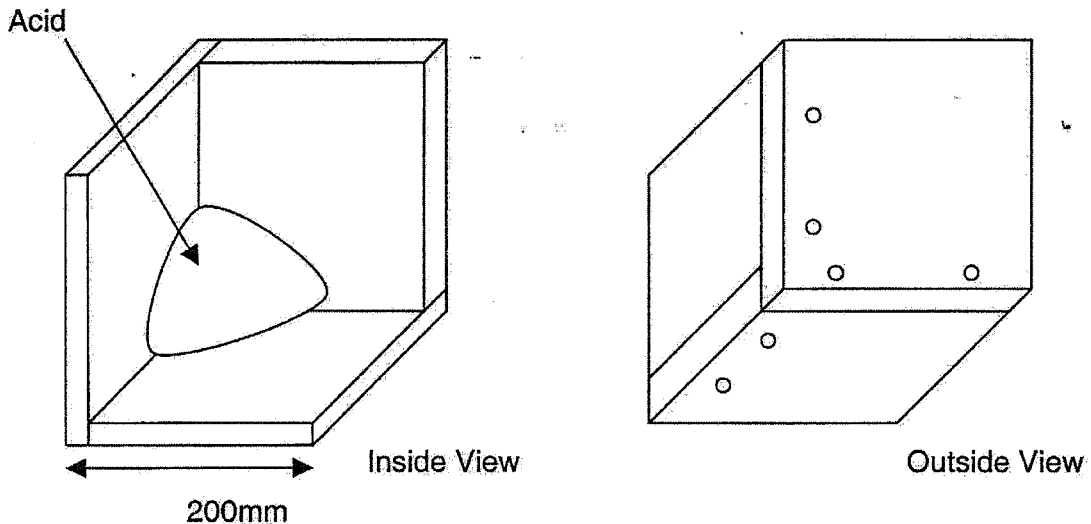


Figure 1 – HDPE corner

Experimental

The corners were placed in a fume hood inside separate containers, with the point of the corner pointing downward.

Approximately 100 ml of Hydrofluoric (48% or 24M), sulphuric (~98% assay or 10M), hydrochloric (36% or 10M), and acetic acid (100% glacial or 17M) were each placed into one of the containers, ensuring that this amount covered the screw line.

The specimens were monitored for two weeks, noting any significant changes. This experiment was conducted at standard room temperature ($23^{\circ}\text{C} \pm 2^{\circ}\text{C}$)

Results

All corners showed no signs of leakage or external damage. In the corner treated with sulphuric acid, pieces of the sealant, under 2mm in length were observed. In the hydrofluoric acid corner the sealant had swelled to approximately 1.5 times the original size. All corners showed minor discoloration, in the area that was affected by the acid. This is displayed in Figure 2.



Improving the Built Environment

Building, Construction and Engineering Graham Road (PO Box 56), Highett, Victoria 3190, Australia
Phone: 61 3 9252 6000, Fax: 61 3 9252 6244 Web: <http://www.dbce.csiro.au>

Test Reagent	Conditions after 14 days	
	Physical Changes	Colour Changes
HF 48%	Sealant swelled X1.5	Minor discoloration
H ₂ SO ₄ 98%	Pieces of sealant broken away	Minor discoloration
HCl 36%	Nil	Minor discoloration
CHCOOH	Nil	Minor discoloration

Figure 2 – Tabulated results

Conclusion

The HDPE cabinets showed no signs of leakage or rusting of the screws on the outside of the cabinet during the two weeks of testing.

The sulphuric acid and hydrofluoric acid affected the silicone sealant during the testing. All corners showed minor discoloration.