

Competitor Product Evaluation: Carbon Filled TPE. Elastomer Corrosion resistance

Prepared By: Philip Lessner, Ph.D.
Senior Research Chemist



Chomerics, div. of Parker Hannifin / 77 Dragon Ct. / Woburn, MA 01888 / (1) 781 935 4850
Parker Hannifin PLC / Chomerics Europe / Parkway, Globe Park Estate /
Marlow, Bucks, England SL7 1YB / (44)1628 404000

1 INTRODUCTION

A competitor's carbon filled expanded polytetra-fluoroethylene EMI gasket material is being advertised as a corrosion resistant material. To determine the veracity of these claims, we have tested the material for galvanic compatibility, and electrical and dimensional stability.

2 TEST METHOD

Three samples of the competitor's material were tested per the procedure of CHO- with the following exceptions: (1) a 1 inch diameter sample was die cut due to size limitations and (2) a 0.03 inch (.762mm) thick 6061 aluminum coupon was used.

The initial volume resistivity of the competitor's material is greater than 1 ohm-cm (disk method). The material is reasonably electrically stable in salt fog, that is, it increases its volume resistivity by less than 25%.

The competitor's material undergoes a permanent deformation after compression in salt fog. This is consistent with the PTL results which showed a compression set of greater than 50% when tested for 71 hours at 100°C

Due to the sample size limitation, the competitor's material was not tested in a simulated EMI joint (3" flange). On the basis of the advertisement, we can assume that this material forms a good seal because it is relatively soft (Shore A hardness is 49).

RESULTS

Table 1 summarizes the corrosion results. The competitor's material was extremely corrosive toward 6061-T6 aluminum. Weight loss was

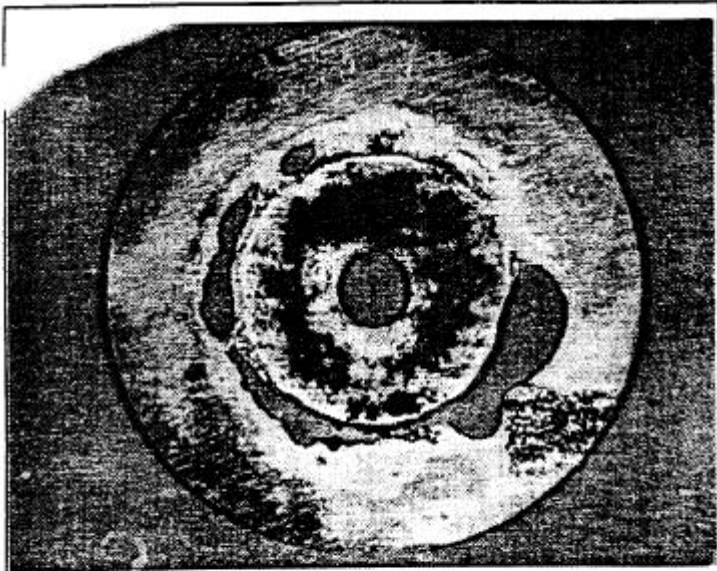
greater than that for CHO-SEAL® 1215. Figure 1 shows the aluminum coupon after exposure. The corrosivity of the competitor's material sample was so great that the coupon was perforated. Some of the gasket adhered to the coupon after removal from salt fog.

Elastomer Type	Weight Loss (mg)	Volume Resistivity (mohm-cm)	Volume Resistivity Spec (mohm-cm)	Swe (%)
Non-Conductive Silicone	0.6	--	--	--
CHO-SEAL 1298	2.3	6.8	12	<1
CHO-SEAL 1287	21	4.2	12	<1
CHO-SEAL 1215	321	9.3	4	<1
Competitor	432*	1,443	1,169**	-7.4

*One inch diameter sample **Initial measurement - specification is unknown

Table 1 Corrosion results of conductive elastomers against 6061-T6 aluminum (MIL-C-5541, Class 3, coated) after 168 hours salt fog exposure.

¹ CHO-TM100 is the Chomerics' document "Test Method For Assessing Galvanic Corrosion Caused By Conductive Elastomers"



**Figure 1 Aluminum test coupon after
168 hours in salt fog against a
competitor's carbon filled TPE material**

4 CONCLUSION

This competitor's EMI gasket material shows extreme galvanic incompatibility with aluminum. If not edge sealed, corrosivity of this material will be a very serious problem. To call this material corrosion resistant is a gross distortion of the meaning of that term.

This competitor's material also undergoes permanent deformation after compression that probably limits its use to areas where it will not be subjected to many open/close cycles. It is electrically stable in salt fog. Due to its soft, conformable and hydrophobic nature it probably can prevent an electrolyte from penetrating underneath its footprint.