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## **SUBJECT: ETHANOL AND GASOLINE/ETHANOL BLENDS SMARTFLEX SUMPS COMPATIBILITY DECLARATION**

NUPI AMERICAS, Inc declares that Smartflex Containment Sumps will not be adversely affected by the below listed fluids, during their intended and proper installation and use:

- **E85 and all other ethanol fuel blends**

Sumps have been evaluated and found to comply with the requirements of **UL2447: outline of investigation for containment sumps, fittings and accessories for fuels**. They are intended for containment of automotive fuels as defined in Par. 1.3 of UL2447:

*Containment sumps, fittings and accessories are intended for containment of automotive fuels and exposure to soil fluids that have similar chemical, physical and material compatibility properties as represented by the test liquids in these requirements based on fuels formulated in accordance with 40 CFR Part 80, Regulation of Fuels and Fuel Additives, and meeting the following ASTM Fuel Specifications and blend limitations:*

- a) ASTM D975, Standard Specification for Diesel Fuel Oils, with biodiesel blends up to a maximum of 5 percent (B5);*
- b) ASTM D7467, Standard Specification for Diesel Fuel Oil and Biodiesel Blends (B6 to B20), with low biodiesel blends from 6 to 20 percent (B6 to B20);*
- c) ASTM D4814 Standard Specification for Automotive Spark-Ignition Engine Fuel, gasoline or oxygenated gasoline, with limited ethanol blends up to a maximum of 10 percent (E10);*
- d) ASTM D5798, Standard Specification for Ethanol Fuel Blends for Flexible-Fuel Automotive Spark-Ignition Engines, with high gasoline/ethanol blends from 51 to 83 percent (E51 - E83); and*
- e) Mid Range Ethanol Blends (E11 to E50) using variable mixtures of ASTM D4814, Low Blend Ethanol and ASTM D5798, High Blend Ethanol.*

The sump materials and systems are evaluated for compatibility to the following liquids, as required by UL2447.

**Compatibility test liquids**

External Soil and Environmental Test Fluids at 40 °C (104 °F)	Flammable and Combustible Test Fuels at 40°C (104°F)
Ph 3.0 sulfuric acid 1 percent hydrochloric acid <sup>a</sup> 1 percent nitric acid <sup>a</sup> Ph 12 sodium hydroxide Ph 10 sodium carbonate/bicarbonate <sup>b</sup> Saturated sodium chloride Distilled water <sup>c</sup>	100 percent ASTM Ref Fuel F F75/B25a <sup>d</sup> C75/E25a <sup>e</sup> C15/E85a <sup>e</sup>
Air at 70°C only for nonmetallic components	
<p>1) Test parameters, such as temperature and concentrations of media, are increased in severity over those of normal operating conditions to obtain observable deterioration in a reasonable time period. This accelerated test does not give a direct correlation with service performance. However, this method of testing yields comparative data on which to evaluate the product.</p> <p>2) ASTM Reference Fuel C and F are described in ASTM D471, Test Method for Rubber Property – Effect of Liquids. Fuel C is a 50/50 mixture of Iso-Octane and Toluene. Fuel F shall be Grade D2 S15.</p> <p><sup>a</sup> Percentage by weight.</p> <p><sup>b</sup> A pH 10 is obtained by mixing 10.6 grams per liter of sodium carbonate and 8.4 grams per liter of sodium bicarbonate. A pH meter shall be used to measure and adjust ratio of sodium carbonate to sodium bicarbonate to obtain a pH of 10.</p> <p><sup>c</sup> Distilled water having a maximum total matter of 2.0 ppm and a maximum electrical conductivity of 5.0 microhms/cm at 25°C (77°F), as described for Type IV grade reagent water in ASTM D1193, Standard Specification for Reagent Water.</p> <p><sup>d</sup> The chemical formulation of UL B100 aggressive biodiesel as a test fuel and component of F75/B25a can be found in Appendix A. B = UL B100 and F = ASTM Ref Fuel F.</p> <p><sup>e</sup> The chemical formulation for aggressive alcohols used in mixing C75/E25a and C15/E85a can be found in Appendix A. C = ASTM Ref Fuel C and E = Ethanol.</p>	

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