FUEL SYSTEM COMPATIBILITY

Application

This test method describes the procedures required to evaluate the permeability and compatibility of materials such as metals, elastomers, and polymers used in fuel systems to various fuel blends such as ASTM Reference Fuel C, methanol, auto-oxidized fuels, etc.

Apparatus Required

HDPE Bottles with Screw Caps

Test Tubes
200 mL capacity with 34/45 ground glass joints.

Water Jacketed Condensers

Heaters
Oil baths, or aluminum aging blocks, all with appropriate temperature controllers. For temperatures above 60°C, aging containers such as Parr reaction vessels should be used.

Ovens
The aging ovens for dryout should be class 'A' type with fuel handling capability.

Circulating Hot Water Bath
Bath must be capable of maintaining a temperature of 60°C (90°C for diesel fuel).

Materials Required

Samples
As appropriate for the desired material, property under evaluation, and/or as specified by the engineering document. If possible, use part or cut down parts for test samples.

Date	Action	Revisions	
2009 08 06	Revised	See Summary of Revisions	T. Covert, NA
2002 03 15	Revised	Rev para 5	A. Reaume
1996 10 30	Activated		J. Spencer

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Method A - Metal Corrosion and Coated Metal Adhesion

Setup	Fuel Blend:	As specified in FLTM AZ 105-02
	Temperature:	60 +/- 2 °C (90 +/- 2 °C for diesel fuel)
	Time:	6 months

Sample Preparation

Scribe coated coupons to the substrate with an "X" on the top and bottom per ASTM D 3359
Method A -X-cut tape test.

Stamp one end of each coupon with an identifying number. The stamped end is considered the top of the coupon.

Label the test bottles or screw-caps using the IDs stamped on the coupons, or any other identification that will assure that samples and bottles do not get mixed up.

Extra samples of each material should be kept untested for comparison purposes and post test evaluations if necessary.

Test Procedure

Conduct all testing in a properly ventilated area.

Be sure to agitate the fuel mixture storage container just prior to filling each bottle; very rapid phase separations occur with some of the fuel/methanol blends.

Test two samples per fuel (2 samples each per 7 fuels - 14 samples total).

Place one coupon in the corresponding High Density Polyethylene (HDPE) bottle so that the stamped end is at the top. Fill with the appropriate test fuel until half the sample is covered with fuel. During the test, this will assure that the sample will be subjected to liquid fuel on the bottom half and vapor on the top half. Repeat this step for the remaining samples and fuels.

Tighten the screw-on polypropylene caps and retighten the next day after reaching soak temperature to assure the best possible seal.

Place all bottles in the circulating hot water bath set at 60°C (90 °C for diesel fuel). Use a separating mechanism and a heavy top to keep the bottles from floating.

Inspect the coupons every two weeks. Record detailed notes of the findings at each inspection. (See evaluation details below.)

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