SAE INTERNATIONAL

SURFACE VEHICLE RECOMMENDED PRACTICE

J1737™ AUG2019

Issued 1997-08
Stabilized 2013-05
Revised 2019-08

Superseding J1737 MAY2013

Test Procedure to Determine the Hydrocarbon Losses from Fuel Tubes, Hoses, Fittings, and Fuel Line Assemblies by Recirculation

RATIONALE

This document is being revised to include an alternative test method as the current methodology is not adequate to measure the low emission levels of new materials and constructions.

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1. SCOPE

This SAE Recommended Practice is intended for the determination of the losses of hydrocarbon fluids, by permeation through component walls, as well as through "microleaks" at interfaces of assembled components while controlling temperature and pressure independently of each other. This is achieved in a recirculating system in which elements of a test fuel that permeate through the walls of a test specimen and migrate through the interfaces are transported by a controlled flow of dry nitrogen to a point where they are measured. That measurement point is a device, such as a canister containing activated charcoal or other means of collection or accumulation where the hydrocarbon losses are then measured by weight change or analyzed by some other suitable means.

2. REFERENCES

2.1 Applicable Documents

The following publication forms a part of the specification to the extent specified herein. Unless otherwise indicated, the latest revision of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J30 Fuel and Oil Hoses

SAE J1527 Marine Fuel Hoses

SAE J1681 Gasoline, Alcohol, and Diesel Fuel Surrogates for Materials Testing

3. BACKGROUND INFORMATION

Government regulations continue to evolve and establish more stringent standards for limiting the total quantity of evaporative hydrocarbon emissions that are permitted to come from a vehicle. Besides indicating much lower levels of emissions to be achieved, they are also establishing schedules and deadlines for achieving those levels.

Hydrocarbon evaporative emissions can arise from many sources on a vehicle. A major part of those are associated with the fuel and fuel vapor systems. These hydrocarbon emissions can come from the many different parts of the fuel system and from its general usage:

a. Refueling the vehicle.

b. Breathing losses from the engine’s air intake system and from the fuel system vent through canisters.

c. Permeation of the fuel constituents through the walls of the components that contain the fuel.

d. Migration of the fuel or vapor through connections, interfaces, and any other potential leak paths of the fuel system (microleaks).

3.1 General Comment - This Procedure

This document describes a procedure that has several advantages over the other measurement techniques that are commonly used:

- It has a better level of sensitivity needed for measuring very low rates of permeation.
- It’s better suited to be run at higher temperatures (up to 60 °C). This allows steady state to be achieved more quickly, and yields higher measured rates of permeation that are easier to use for comparison among components.
- When alcohol blend fuels are used, this procedure can account for all the alcohol that’s present in the permeate. (Doesn’t account for all if you use a FID to measure.)