SAE International™

# SURFACE VEHICLE RECOMMENDED PRACTICE

SAE J288

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## (R) Snowmobile Fuel Tanks

***1. Scope—***To provide minimum performance requirements for non-pressurized fuel tanks used on snowmobiles as defined in SAE J33.

***2. References***

**2.1 Applicable Publications—**The following publications form 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 PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J33—Snowmobile Definitions and Nomenclature—General

2.1.2 ASTM PUBLICATIONS—Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 635—Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position
ASTM D 1525—Test Method for Vicat Softening Temperature of Plastics

***3. Requirements***

**3.1** The tank shall remain functional in a temperature range of −40 to +60 °C when tested in accordance with Section 4.

**3.2** The tank material specifications should indicate resistance to gasoline, lubricating oils, anti-icing, and other additives that may be used with snowmobile fuel.

**3.3** "The plastic material of the fuel tank should be rendered essentially opaque by the addition of at least 0.5% by weight of a suitable pigment that will not affect, nor be affected by, the fuel. This requirement does not apply to tanks which are so mounted or stored that they are not exposed to sunlight.[1]

1. Carbon black imparts maximum resistance to weathering. But if other colors are desired, cadmium pigments have also been found effective.



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**3.4** Non-metallic tank materials shall comply with the following specifications:

3.4.1 A maximum burning rate of 0.64 mm/s when tested per ASTM D 635.

3.4.2 A minimum vicat softening point of 110 °C when tested per ASTM D 1525, rate A.

**3.5** Metal tanks shall not contain dissimilar metal or alloy joints that promote galvanic corrosion.

**3.6** Weight loss from the tank shall not exceed 3% when tested in accordance with 4.4.

**3.7** Tanks shall not leak after cycling per 4.5.

## *4. Tests*

**4.1** Tests shall be conducted with tank cap and fittings in place. Tanks shall be filled to within 90% of overflow.

**4.2** **Pressure Test—**Pressurize an empty tank, using a calibrated pressure gauge, along with its caps and fittings, to a minimum pressure of 35 kPa. Immerse the tank in water for 30 s, with the pressure applied. If no bubbles or other evidence of leaks are observed, this test is passed.

**4.3 Impact Test**

4.3.1 CONDITIONING—Fill three tanks to be tested with snowmobile fuel, allow them to remain at room temperature, for one week. Empty the tank, and refill with a non-flammable liquid having a specific gravity of not less than 0.7, and a freezing point of no more than –40 °C, and which does not attack the tank material.[2, 3]

4.3.2 COLD CHAMBER TEST—Place the filled tanks in a cold chamber at –40 °C ± 3 °C. Keep the tanks at this temperature for no less than 5 h after the tank and its contents have stabilized at this temperature.

4.3.3 DROP TEST—Remove the tank from the cold chamber. Ensure that the fittings and caps are tightly installed. Drop the surface of the tank which is supported in the snowmobile immediately onto a hard smooth surface from a height of 1.25 m. Tanks attached by fasteners through integral bosses to mounting points on the snowmobile should be mounted in a fixture duplicating the mounting.

4.3.4 HOT CHAMBER TEST—Place the same three filled tanks in a hot chamber, filled as in 4.3.1, at 60 °C ± 3 °C. Keep the tanks at this temperature for no less than 5 h after the tank and its contents have stabilized at this temperature.

4.3.5 DROP TEST—Repeat the drop test of 4.3.3.

4.3.6 ACCEPTANCE—Repeat the pressure test of 4.2. If no leaks are seen, this test is passed.



2. A mixture of ethylene glycol and water usually is satisfactory, but should not be used without inquiry unless recommended by the manufacturer of the tank.
3. If the filled tanks are stored indoors, care must be taken to insure the proper ventilation and the absence of any open flame or electrical discharge.

**4.4 Permeability Test—**Fill the tank to be tested with lead-free fuel. Close the tank tightly, and weigh to the nearest 28 g. Store the filled tank for 30 days at 23 °C ± 3 °C. Re-weigh the tank.[4, 5]

4.4.1 ACCEPTANCE—The test is passed if the maximum weight loss is 3% or less.

**4.5 Stress Crack Test—**Fill 4 tanks with snowmobile fuel, and condition for one week as in 4.3.1.[6] Empty the tanks. Mount two of the tanks in a fixture which duplicates the mounting system of the snowmobile[5]. Subject all four tanks to 10 complete temperature cycles of a minimum of 5 h at –40 °C ± 3 °C, followed by a minimum of 5 h at 60 °C ± 3 °C, repeated within a 14 day period.

4.5.1 ACCEPTANCE—Repeat the pressure test of 4.2. If no leaks are noticed, this test is passed.

## *5. Notes*

**5.1 Marginal Indicia—**The change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.



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4. If the tanks have not been pigmented to make them essentially opaque, they must be stored in the dark. Otherwise, the fuel in them may be degraded by ultra-violet radiation.
5. Tanks should be complete with attachments, fuel line, and drain plugs, if any.
6. If same tanks are used after subjecting to test 4.4, they need not to be conditioned for one week.