

TABLE 2 OF § 1051.505—RAMPED-MODAL CYCLE FOR TESTING SNOWMOBILES—Continued

RMC mode	Time in mode	Speed (percent) <sup>1</sup>	Torque (percent) <sup>2,3</sup>
6 Steady-state .....	28	Warm Idle .....	0

<sup>1</sup> Percent speed is percent of maximum test speed.

<sup>2</sup> Advance from one mode to the next within a 20-second transition phase. During the transition phase, command a linear progression from the torque setting of the current mode to the torque setting of the next mode.

<sup>3</sup> Percent torque is percent of maximum torque at maximum test speed.

(b) During idle mode, operate the engine at its warm idle speed as described in 40 CFR 1065.510.

(c) For the full-load operating mode, operate the engine at wide-open throttle.

(d) Ambient temperatures during testing must be between 20 °C and 30 °C (68 °F and 86 °F), or other representative test temperatures, as specified in paragraph (f) of this section.

(e) See 40 CFR part 1065 for detailed specifications of tolerances and calculations.

(f) You may test snowmobiles at ambient temperatures below 20 °C or using intake air temperatures below 20 °C if you show that such testing complies with 40 CFR 1065.10(c)(1). You must get our approval before you begin the emission testing. For example, the following approach would be appropriate to show that such testing complies with 40 CFR 1065.10(c)(1):

(1) Using good engineering judgment, instrument a representative snowmobile built with a representative engine from the family being tested with an appropriate temperature measuring device located in the intake air plenum where fuel spitback is not likely to occur.

(2) Choose a time and location with the following weather conditions: wind-speed less than 10 knots, no falling precipitation, air temperature between –20 °C and 0 °C (–4 °F and 32 °F).

(3) Operate the snowmobile until its engine reaches a steady operating temperature.

(4) Operate the snowmobile on a level surface free of other vehicle traffic. Operate the snowmobile at each specified engine speed corresponding to each mode in the emissions test specific to the engine being tested. When readings are stable, record the temperature in the intake air plenum and the ambient temperature. Calculate the tempera-

ture difference between the air in the plenum and the ambient air for each mode.

(5) Calculate the nominal intake air test temperature for each test mode as –10 °C (14 °F) plus the temperature difference for the corresponding mode determined in paragraph (f)(4) of this section.

(6) Before the emissions test, select the appropriate carburetor jetting for –10 °C (14 °F) conditions according to the jet chart. For each mode, maintain the inlet air temperature within 5 °C (9 °F) of the corresponding modal temperature calculated in paragraph (f)(5) of this section.

(7) Adjust other operating parameters to be consistent with operation at –10 °C (14 °F). For example, this may require that you modify the engine cooling system used in the laboratory to make its performance representative of cold-temperature operation.

[67 FR 68347, Nov. 8, 2002, as amended at 70 FR 40500, July 13, 2005; 73FR 59253, Oct. 8, 2008]

**§ 1051.510 What special provisions apply for testing ATV engines? [Reserved]**

**§ 1051.515 How do I test my fuel tank for permeation emissions?**

Measure permeation emissions by weighing a sealed fuel tank before and after a temperature-controlled soak.

(a) *Preconditioning fuel soak.* To precondition your fuel tank, follow these five steps:

(1) Fill the tank with the fuel specified in § 1051.501(d)(2)(i), seal it, and allow it to soak at 28 ±5 °C for 20 weeks. Alternatively, the tank may be soaked for a shorter period of time at a higher temperature if you can show that the hydrocarbon permeation rate has stabilized.

(2) Determine the fuel tank's internal surface area in square-meters accurate to at least three significant figures. You may use less accurate estimates of the surface area if you make sure not to overestimate the surface area.

(3) Fill the fuel tank with the test fuel specified in §1051.501(d)(2)(ii) to its nominal capacity. If you fill the tank inside the temperature-controlled room or enclosure, do not spill any fuel.

(4) Allow the tank and its contents to equilibrate to  $28 \pm 2$  °C.

(5) Seal the fuel tank using fuel caps and other fittings (excluding petcocks) that can be used to seal openings in a production fuel tank. In cases where openings are not normally sealed on the fuel tank (such as hose-connection fittings and vents in fuel caps), these openings may be sealed using nonpermeable fittings such as metal or fluoropolymer plugs.

(b) *Permeation test run.* To run the test, take the following steps for a tank that was preconditioned as specified in paragraph (a) of this section:

(1) Weigh the sealed fuel tank and record the weight to the nearest 0.1 grams. You may use less precise weights as long as the difference in mass from the start of the test to the end of the test has at least three significant figures. Take this measurement within 8 hours of filling the tank with test fuel as specified in paragraph (a)(3) of this section.

(2) Carefully place the tank within a ventilated, temperature-controlled room or enclosure. Do not spill or add any fuel.

(3) Close the room or enclosure and record the time.

(4) Ensure that the measured temperature in the room or enclosure is  $28 \pm 2$  °C.

(5) Leave the tank in the room or enclosure for 14 days.

(6) Hold the temperature of the room or enclosure to  $28 \pm 2$  °C; measure and record the temperature at least daily.

(7) At the end of the soak period, weigh the sealed fuel tank and record the weight to the nearest 0.1 grams. You may use less precise weights as long as the difference in mass from the start of the test to the end of the test has at least three significant figures.

Unless the same fuel is used in the preconditioning fuel soak and the permeation test run, record weight measurements on five separate days per week of testing. The test is void if a linear plot of tank weight vs. test days for the full soak period for permeation testing specified in paragraph (b)(5) of this section yields  $r^2$  below 0.8. See 40 CFR 1065.602 for the equation to calculate  $r^2$ .

(8) Subtract the weight of the tank at the end of the test from the weight of the tank at the beginning of the test; divide the difference by the internal surface area of the fuel tank. Divide this g/m<sup>2</sup> value by the number of test days (using at least three significant figures) to calculate the g/m<sup>2</sup>/day emission rate. Example: If a tank with an internal surface area of 0.72 m<sup>2</sup> weighed 31882.3 grams at the beginning of the test and weighed 31813.8 grams after soaking for 14.03 days, then the g/m<sup>2</sup>/day emission rate would be—

$$(31882.3 \text{ g} - 31813.8 \text{ g}) / 0.72 \text{ m}^2 / 14.03 \text{ days} = 6.78 \text{ g/m}^2/\text{day}.$$

(9) Round your result to the same number of decimal places as the emission standard.

(10) In cases where consideration of permeation rates, using good engineering judgment, leads you to conclude that soaking for 14 days is not long enough to measure weight change to at least three significant figures, you may soak for 14 days longer. In this case, repeat the steps in paragraphs (b)(8) and (9) of this section to determine the weight change for the full 28 days.

(c) *Determination of final test result.* To determine the final test result, apply a deterioration factor to the measured emission level. The deterioration factor is the difference between permeation emissions measured before and after the durability testing described in paragraph (d) of this section. Adjust the baseline test results for each tested fuel tank by adding the deterioration factor to the measured emissions. The deterioration factor determination must be based on good engineering judgement. Therefore, during the durability testing, the test tank may not exceed the fuel tank permeation standard described in §1051.110 (this is

known as “line-crossing”). If the deterioration factor is less than zero, use zero.

(d) *Durability testing.* You normally need to perform a separate durability demonstration for each substantially different combination of treatment approaches and tank materials. Perform these demonstrations before an emission test by taking the following steps, unless you can use good engineering judgment to apply the results of previous durability testing with a different fuel system. You may ask to exclude any of the following durability tests if you can clearly demonstrate that it does not affect the emissions from your fuel tank.

(1) *Pressure cycling.* Perform a pressure test by sealing the tank and cycling it between +2.0 psig and –0.5 psig and back to +2.0 psig for 10,000 cycles at a rate 60 seconds per cycle.

(2) *UV exposure.* Perform a sunlight-exposure test by exposing the tank to an ultraviolet light of at least 24 W/m<sup>2</sup> (0.40 W-hr/m<sup>2</sup>/min) on the tank surface for at least 450 hours. Alternatively, the fuel tank may be exposed to direct natural sunlight for an equivalent period of time, as long as you ensure that the tank is exposed to at least 450 daylight hours.

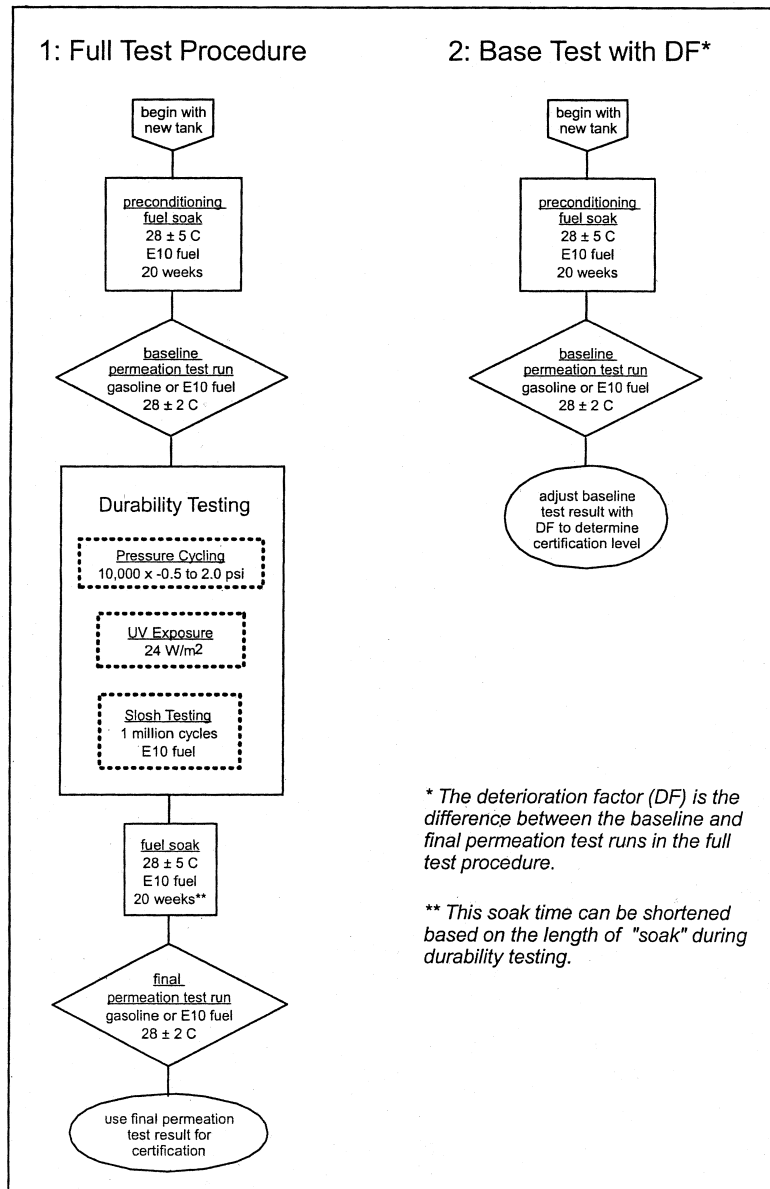
(3) *Slosh testing.* Perform a slosh test by filling the tank to 40 percent of its

capacity with the fuel specified in §1051.501(d)(2)(i) and rocking it at a rate of 15 cycles per minute until you reach one million total cycles. Use an angle deviation of +15° to –15° from level. This test must be performed at a temperature of 28 °C ±5 °C.

(4) *Final test result.* Following the durability testing, the fuel tank must be soaked (as described in paragraph (a) of this section) to ensure that the permeation rate is stable. The period of slosh testing and the period of ultraviolet testing (if performed with fuel in the tank consistent with paragraph (a)(1) of this section) may be considered to be part of this soak, provided that the soak begins immediately after the slosh testing. To determine the final permeation rate, drain and refill the tank with fresh fuel, and repeat the permeation test run (as described in paragraph (b) of this section) immediately after this soak period. The same test fuel must be used for this permeation test run as for the permeation test run performed prior to the durability testing.

(e) *Flow chart.* The following figure presents a flow chart for the permeation testing described in this section, showing the full test procedure with durability testing, as well as the simplified test procedure with an applied deterioration factor:

Figure 1051.515-1: Flow Chart of Permeation Test Procedure with and without DF Determination



## § 1051.520

## 40 CFR Ch. I (7–1–13 Edition)

[67 FR 68347, Nov. 8, 2002, as amended at 69 FR 2442, Jan. 15, 2004; 70 FR 40501, July 13, 2005]

### § 1051.520 How do I perform exhaust durability testing?

Sections 1051.240 and 1051.243 describe the method for testing that must be performed to establish deterioration factors for an engine family.

[70 FR 40501, July 13, 2005]

## Subpart G—Compliance Provisions

### § 1051.601 What compliance provisions apply to vehicles and engines subject to this part?

Engine and vehicle manufacturers, as well as owners, operators, and rebuilders of these vehicles, and all other persons, must observe the requirements and prohibitions in part 1068 of this chapter and the requirements of the Act. The compliance provisions in this subpart apply only to the vehicles and engines we regulate in this part.

### § 1051.605 What provisions apply to engines already certified under the motor vehicle program or the Large Spark-ignition program?

(a) *General provisions.* If you are an engine manufacturer, this section allows you to introduce into commerce new recreational vehicles, and engines for recreational vehicles, if the engines are already certified to the requirements that apply to spark-ignition engines under 40 CFR parts 85 and 86 or 40 CFR part 1048 for the appropriate model year. If you comply with all the provisions of this section, we consider the certificate issued under 40 CFR part 86 or 1048 for each engine to also be a valid certificate of conformity under this part 1051 for its model year, without a separate application for certification under the requirements of this part 1051. See § 1051.610 for similar provisions that apply to vehicles that are already certified to the vehicle-based standards for motor vehicles.

(b) *Vehicle-manufacturer provisions.* If you are not an engine manufacturer, you may install an engine certified for the appropriate model year under 40 CFR part 86 or 1048 in a recreational vehicle as long as you meet all the re-

quirements and conditions specified in paragraph (d) of this section. If you modify the non-recreational engine in any of the ways described in paragraph (d)(2) of this section for installation in a recreational vehicle, we will consider you a manufacturer of recreational vehicles. Such engine modifications prevent you from using the provisions of this section.

(c) *Liability.* Engines for which you meet the requirements of this section are exempt from all the requirements and prohibitions of this part, except for those specified in this section. Engines exempted under this section must meet all the applicable requirements from 40 CFR parts 85 and 86 or 40 CFR part 1048. This paragraph (c) applies to engine manufacturers, vehicle manufacturers who use such an engine, and all other persons as if the engine were used in its originally intended application. The prohibited acts of 40 CFR 1068.101(a)(1) apply to these new engines and vehicles; however, we consider the certificate issued under 40 CFR part 86 or 1048 for each engine to also be a valid certificate of conformity under this part 1051 for its model year. If we make a determination that these engines do not conform to the regulations during their useful life, we may require you to recall them under this part 1051 or under 40 CFR part 85 or 1068.505.

(d) *Specific requirements.* If you are an engine or vehicle manufacturer and meet all the following criteria and requirements regarding your new engine or vehicle, the vehicle using the engine is eligible for an exemption under this section:

(1) Your engine must be covered by a valid certificate of conformity issued under 40 CFR part 86 or 1048.

(2) You must not make any changes to the certified engine that could reasonably be expected to increase its exhaust emissions for any pollutant, or its evaporative emissions. For example, if you make any of the following changes to one of these engines, you do not qualify for this exemption:

(i) Change any fuel system or evaporative system parameters from the certified configuration (this does not apply to refueling controls).