§ 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±2 °C.

(5) Seal the fuel tank using nonpermeable fittings, such as metal or Teflon™.

(b) *Permeation test run.* To run the test, follow these nine 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.)

(2) Carefully place the tank within a ventilated temperature-controlled room or enclosure. Do not spill 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±2 °C.

(5) Leave the tank in the room or enclosure for 2 to 4 weeks, consistent with good engineering judgment (based on the permeation rate). Do not stop soaking before 4 weeks unless you know that you can measure the weight loss during the test to at least three significant figures earlier.

(6) Hold the temperature of the room or enclosure to 28±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.)

(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^2 value by the number of test days (using at least three significant figures) to calculate the g/m^2/day emission rate. Example: If a tank with an internal surface area of 0.72 m^2 weighed 31882.3 grams at the beginning of the test and weighed 31760.2 grams after soaking for 25.03 days, then the g/m^2/day emission rate would be: (31882.3 g − 31760.2 g) / 0.72 m^2 / 25.03 days = 6.78 g/m^2/day.

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

(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.

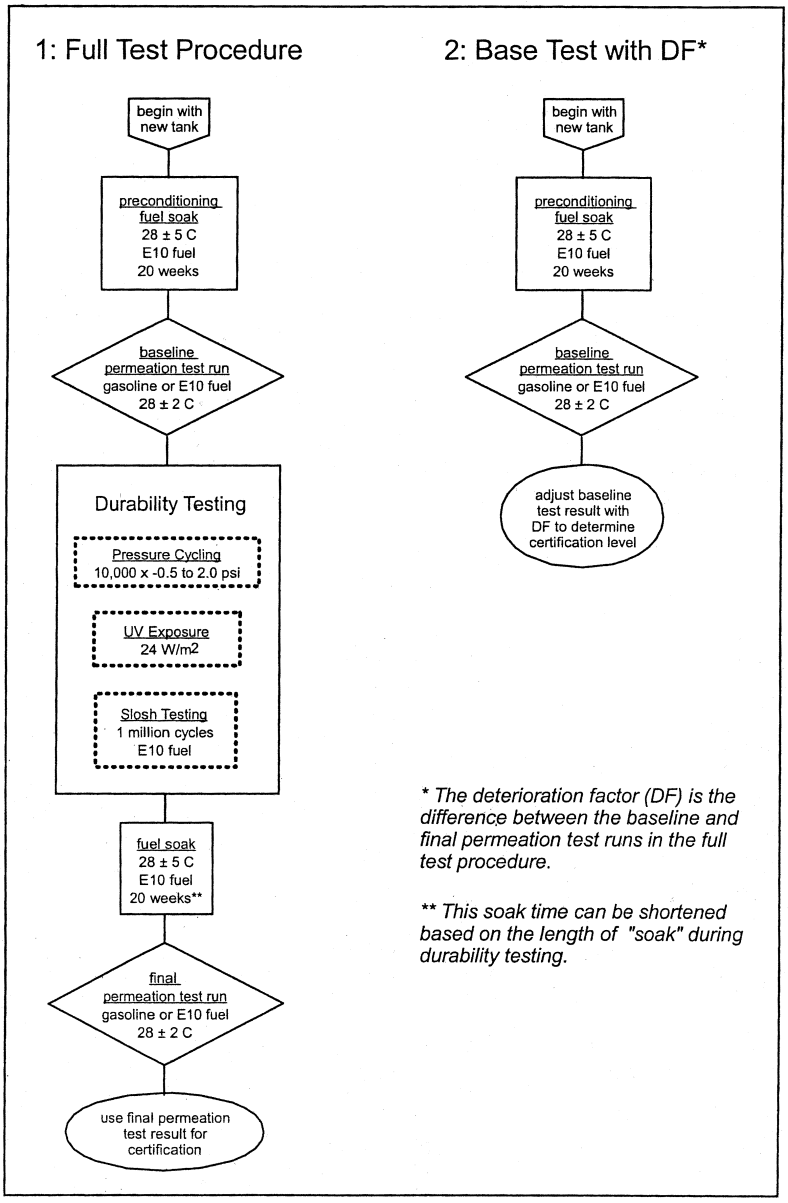
(2) *UV exposure.* Perform a sunlight-exposure test by exposing the tank to an ultraviolet light of at least 24 W/m^2 (0.40 $W\text{-}hr/m^2/min$) on the tank surface for 15 hours per day for 30 days. Alternatively, the fuel tank may be exposed to direct natural sunlight for an equivalent period of time, 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



[67 FR 68347, Nov. 8, 2002, as amended at 69 FR 2442, Jan. 15, 2004]

§ 1051.520 How do I perform exhaust durability testing?

This section applies for durability testing to determine deterioration factors for exhaust emissions. Small-volume manufacturers may omit durability testing if they use our assigned deterioration factors that we establish based on our projection of the likely deterioration in the performance of specific emission controls.

(a) Calculate your deterioration factor by testing a vehicle or engine that is representative of your engine family at a low-hour test point and the end of its useful life. You may also test at intermediate points.

(b) Operate the vehicle or engine over a representative duty cycle for a period at least as long as the useful life (in hours or kilometers). You may operate the vehicle or engine continuously.

(c) You may perform critical emission-related maintenance during durability testing, consistent with §1051.125(a). You may not perform any other emission-related maintenance during durability testing.

(d) Use a linear least-squares fit of your test data for each pollutant to calculate your deterioration factor.

(e) You may ask us to allow you to use other testing methods to determine deterioration factors, consistent with good engineering judgment.

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 are the provisions for exempting vehicles from the requirements of this part if they use engines you have certified under the motor-vehicle program or the Large Spark-ignition program?

(a) You may ask for an exemption under this section if you are the manufacturer of an engine certified under the motor-vehicle program or the Large Spark-ignition program. See §1051.610 if you are not the engine manufacturer.

(b)(1) The only requirements or prohibitions from this part that apply to a vehicle that is exempt under this section are in this section and §1051.610.

(2) If the vehicles do not meet the criteria listed in paragraph (c) of this section, they will be subject to the standards and prohibitions of this part. Producing these vehicles without a valid exemption or certificate of conformity would violate the prohibitions in §1068.101 of this chapter.

(3) Vehicles exempted under this section are subject to all the requirements affecting engines and vehicles under 40 CFR part 86 or part 1048, as applicable. The requirements and restrictions of 40 CFR part 86 or 1048 apply to anyone manufacturing these engines, anyone manufacturing vehicles that use these engines, and all other persons in the same manner as if these engines were used in a motor vehicle or other nonrecreational application.

(c) If you meet all the following criteria regarding your engine, the vehicle using the engine is exempt under this section:

(1) The vehicle is produced using an engine or incomplete vehicle covered by a valid certificate of conformity under 40 CFR part 86 or part 1048.

(2) No changes are made to the certified engine or vehicle that we could reasonably expect to increase any of its regulated emissions. For example, if any of the following changes are made to the engine, it does not qualify for this exemption:

(i) Any fuel system or evaporative system parameters are changed from the certified configuration (this does not apply to refueling emission controls).

(ii) Any other emission-related components are changed.