



U.S. CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MD 20814

Susan Bathalon
Mechanical Engineer
Directorate of Engineering Sciences
Division of Mechanical Engineering

Tel: 301 504 7566
Fax: 301 504 0533
Email: SBathalon@CPSC

November 8, 2006

Mr. James McNew
OPEI Standard Development Process
341 South Patrick Street
Alexandria, Virginia 22314

Dear Mr. McNew:

The U.S. Consumer Product Safety Commission (CPSC) staff appreciates the opportunity to provide comments* to the Outdoor Power Equipment Institute (OPEI) on the draft standard, *ANSI B71.10 Small Off-road Ground Supported Outdoor Power Equipment Gasoline Fuel Systems Performance Specifications and Test Procedures*. CPSC staff understands that these comments are part of the canvass review process for approval of the draft standard.

A review of CPSC recall data identified as many as 42 recalls involving gasoline-powered outdoor equipment due to fuel leaks since January 2000. Recalled equipment included backpack blowers, hedge trimmers, walk-behind lawn mowers, chain saws, generators, and garden tractors. The number of units of gasoline-powered outdoor equipment recalled from January 2000 to present is approximately two million.

CPSC staff understands that the fuel tanks for handheld and non-handheld outdoor power equipment are manufactured through similar molding processes, and using the same or similar materials. The fuel lines and fuel tanks for both types of equipment have demonstrated identical performance-related failures. For this reason, CPSC staff believes that the scope of the B71.10 draft standard should include both handheld and non-handheld outdoor power equipment. CPSC staff thus recommends that 'ground supported' be deleted from the scope in *Section 1*. Alternatively, CPSC staff would like assurance that an appropriate standard is in place or being developed that addresses similar fuel tank requirements for handheld power equipment. In addition, the scope should reflect all fuel tank sizes. CPSC staff recommends deleting the fuel tank size requirement of one-liter volume capacity in *Section 4.2*.

* These comments are those of CPSC staff and have not been reviewed or approved by, and may not necessarily represent the views of, the Commission.

The test procedure of the current draft standard applies only to “spark ignition engines greater than 80 cc and less than 1 liter displacement.” These criteria would exclude some applications such as tilling equipment with small 4-stroke engines that have displacements of 25 cc. CPSC staff recommends that engine size restrictions be eliminated from the scope, as fuel tank and fuel line testing should be required for all gasoline-powered outdoor equipment.

Sections 4.2 *Tank Integrity*, 4.3 *Resistance to Stress Cracking*, 5.2 *Fuel Tank Cyclic Pressure Integrity Test*, and 5.3 *Fuel Tank Elevated Temperature Fuel Soak Test* reference fuel tank testing based on design changes. Qualification appears to be on a one-time basis. CPSC staff interprets this to mean that although many fuel tanks are manufactured, testing to the standard is only necessary whenever there are significant design alterations. According to recall information, some of the fuel tank failures were related to changes in materials and manufacturing processes. CPSC staff believes that it is important to ensure that products meet or exceed the minimum requirements of a voluntary safety standard on an ongoing basis. As such, this test frequency should not be performed on a one time basis, but rather be determined by the individual manufacturers to ensure their product complies with the standard. In *Sections 4.2 and 4.3*, CPSC staff recommends deleting the language, “shall be qualified one-time...” and in *Sections 5.2 and 5.3* deleting “This test is a one-time test for a given design and material combination.”

CPSC recall information shows that plastic fuel tanks can develop stress cracks after one or several years of use by consumers. CPSC staff believes these stress cracks can be caused by several factors including cyclic temperature flux, impact with hard surfaces, UV (ultraviolet light) exposure, vibration, elevated pressure, and elevated temperature. The draft standard only requires an elevated pressure and elevated temperature test. CPSC staff recommends adding the following tests to replicate actual fuel tank environment conditions:

- **Temperature Cycling:** A cyclic temperature test should specify soak times at high and low temperature points. An example of such a test requirement is contained in SAE J288, *Snowmobile Fuel Tanks*, which specifies testing at 60 degrees and -40 degrees Celsius.
- **Impact Test:** Impact tests would ensure the integrity of the fuel tank in situations such as frontal or side impact for non-handheld products or dropping the product with handheld products. CPSC staff recommends that a drop test be added that is similar to the test in SAE J288, *Snowmobile Fuel Tanks*, and ASTM F 852, *Standard Specification for Portable Gasoline Containers for Consumer Use*. Both of these published standards require a minimum drop height of 1.25 meters (approximately 4 feet) onto a hard surface.
- **UV Exposure:** UV can decrease the toughness of plastic fuel tanks and therefore influence failures in the tanks. ASTM G 154, *Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials*, provides guidelines for appropriate UV test and exposure conditions based on material properties. CPSC staff recommends adding a UV exposure test based on the material guidelines included in ASTM G 154.
- **Vibration:** CPSC staff recommends adding a vibration test to simulate the fuel tank conditions created by engine vibration. The number of cycles should closely resemble use by consumers over the life of the product.

Mr. James McNew

Page 3

To account for fuel tank failures that develop over time, CPSC staff believes that the standard should require tank specimens to sequentially step through the tests described above, including UV exposure, cyclic temperature, cyclic pressure, and vibration testing. This sequence of tests can duplicate the conditions that a fuel tank would likely experience through consumer use. After this sequence of tests, the same tested specimens should be subjected to the impact resistance test and the elevated temperature test. After each of the last two tests, the performance pass/fail criteria should be determined by *5.1 Fuel Tank Leak Test*. This series of tests would more closely represent the typical environmental conditions experienced by a fuel tank in consumer applications.

The current pass/fail criteria specified in *Section 5.4 Fuel Line Assembly Tensile Test* seems to be based on visual observance of slippage. CPSC staff believes that an additional fuel leak performance test should be added that is similar¹ to the fuel leak test procedures in *Section 5.1.1*. This fuel leak test should occur after application of the 30 lbf tensile load (*Section 5.4.2 Initial Assembly Test*) and after application of the 10 lbf tensile load (*Section 5.4.3 Service Test*).

CPSC staff believes that the development of a voluntary standard to address fuel leaks on outdoor powered equipment is a positive step toward the prevention of fire hazards and thermal burn injuries. Thank you for this opportunity to comment and participate as a canvass member for this important safety standard.

Please do not hesitate to contact me with questions about these comments.

Sincerely,

Susan Bathalon

cc: ANSI B71.10 Technical Committee

¹ The leak test procedure could be modified to check for leaks at the fuel line to fuel tank connection.