SFI FOUNDATION INC.™

QUALITY ASSURANCE SPECIFICATIONS™

SFI SPECIFICATION 32.2 EFFECTIVE: MARCH 24, 2009*

PRODUCT: Stock Car Fill/Vent Check Valve Assembly

1.0 GENERAL INFORMATION

1.1 This SFI Specification establishes uniform test procedures and minimum standards for evaluating and determining performance capabilities for Stock Car Fill/Vent Check Valve Assemblies used by individuals engaged in competitive motorsports.

1.2 The procedures, test evaluations and standards contained herein, are intended only as minimum guidelines for construction and evaluation of products. Certification that products meet such minimum standards is made by the product manufacturer and products are not certified, endorsed or approved by SFI under this program.

1.3 Use of the "This Manufacturer Certifies That This Product Meets SFI Specification 32.2" logo/designation, the authorized artwork style, or conventional lettering by a manufacturer, on a subject product, is intended only to indicate that the manufacturer of the product has represented that they have submitted the product to the recommended tests, with positive results, in compliance with the standards established herein.

1.4 This SFI Specification requires a demonstration that the product of a manufacturer meets or exceeds the requirements when the manufacturer enters the program; and on a periodic basis thereafter. Any manufacturer may participate in the program by providing Stock Car Fill/Vent Check Valve Assemblies that meet or exceed the SFI Specification 32.2 test standards, by complying with the requirements of the SFI Specification 32.2 program, and by signing a licensing agreement with the SFI Foundation, Inc.

1.5 Compliance with this specification is entirely voluntary. However, when a manufacturer provides Stock Car Fill/Vent Check Valve Assemblies in compliance with all requirements of the SFI Specification 32.2 and enters into the licensing agreement with the SFI Foundation, Inc., they may certify that compliance with such standards is in accordance with the guidelines established herein.

1.6 Manufacturers wishing to participate in the program, in addition to the other requirements of this specification, must label each of their products so they can be visually inspected after installation with the manufacturer's name, trademark or symbol, model, serial number, as well as the date of manufacture of the product.

1.7 No manufacturer may display the SFI logo/designation on their product unless the manufacturer has signed a licensing agreement with SFI and has successfully complied with all the requirements of this specification and the self-certification program.

2.0 DEFINITIONS

2.1 A Stock Car Fill/Vent Check Valve Assembly is a valve attached to the fuel inlet opening in the fuel cell bladder (see SFI Spec 32.1) which allows fuel to be introduced into the fuel cell but limits fuel leakage under rapid crash and/or rollover conditions of the stock car race car.

2.2 Any Stock Car Fill/Vent Check Valve Assembly pertaining to this specification shall remain as constructed by the original manufacturer and not modified.

3.0 CONSTRUCTION

3.1 The Stock Car Fill/Vent Check Valve shall be constructed of 6" x 10" x ¼" aluminum plate, 2 ½" OD x 2 ⅛" ID curved fill neck with gusset, 2 ¼" flapper valve assembly, 1 ½" OD x 1 ¼" ID vent tube, spring-assisted "Bullet" or poppet vent valve, #10 AN outlet fitting, bulkhead.

3.2 The "ball check valve" construction is not acceptable under this specification.

3.3 The "flapper valve" type Stock Car Fill/Vent Check Valve herein shall be constructed such that it meets all minimum requirements of this specification.

3.4 All Stock Car Fill/Vent Check Valves pertaining to this specification from any manufacturer shall be capable of mating and attaching to all fuel cells (SFI Spec 32.1) from any other manufacturer and capable of functioning as required by this specification and by the overall requirements of the fuel cell and valve assembly installation (SFI Spec 32.1).

4.0 MODEL CLASSIFICATION

Model designation is based on the dimensions, shape, materials, etc. specified in Paragraph 3.1 of this specification and shall not be changed unless authorized by SFI. It is recognized that any requirement changes brought about by sanctioning bodies, etc. to the fuel cells or installations would require model classification evaluation by SFI. Manufacturer's model designations must be supplied with the test samples.

5.0 TESTING

The Stock Car Fill/Vent Check Valve Assembly ("flapper valve" type) shall be subjected to the following testing:

5.1 FILL/CHECK VALVE ASSEMBLY ROLLOVER LEAKAGE TEST

5.1.1 SAMPLES

Two (2) new Stock Car Fill/Vent Check Valve Assemblies either presently produced or to be produced with either straight up or 90° vent tube shall be supplied with hardware and sealant material by the manufacturer.

5.1.2 APPARATUS

A. A test tank of minimum capacity 17.5 gallons made of appropriate material with a flange opening with bolt and hole pattern and sealing provision capable of mounting the sample flapper valve assembly as defined in Paragraph 3.1 of this specification. The tank may be either mounted in a fixture which can allow rotation of 90° and 180° or the tank must allow manual rotation by test personnel.

B. A catch-can under the tank marked such that the quantity of liquid drained into the can may be recorded (ounces).

5.1.3 PROCEDURE

A. The Stock Car Fill/Vent Check Valve Assembly shall be installed on the empty test tank using the manufacturer's provided hardware, sealant method, and instructions.

B. The tank and valve assembly shall be installed in the rollover fixture or any stand which can support the tank for the subsequent test action. The catch-can shall be positioned directly below the point where the valve will be located when the tank is inverted.

C. Fill the tank through the Fill/Vent Check Valve Assembly using a fill nozzle fabricated to fit into the flapper valve with 17.5 to 18.0 gallons of room temperature water. The valve shall be held at vertical top position.

D. Rotate tank and valve assembly 90° either in the roll over fixture or manually and hold for one (1) minute and measure and record all leakage of water into the catch-can (ounces).

E. Rotate tank and valve assembly an additional 90° (180° from original position putting valve on bottom) in fixture or manually and hold for one (1) minute while measuring and recording all leakage (ounces) into the catch-can. Rotate tank back to original vertical position (check valve on top).

F. Repeat Paragraphs A through E on the second test sample (starting with an empty catch can).

5.2 FILL/CHECK VALVE ASSEMBLY PRESSURE TEST

5.2.1 SAMPLES

One (1) of the same Stock Car Fill/Vent Check Valve Assembly samples used in paragraph 5.1.3 shall be used for the pressure test.

5.2.2 APPARATUS

A. A second tank ("supply tank") of approximately 10 to 20 gallons capacity with a provision for applying an air pressure which can be attached to the test tank in paragraph 5.1.2 above with a piping and supply valve mechanism between tanks that can produce an instantaneous surge of water flow using a supply pressure of 60-80psi from the supply tank into the fuel cell side of the Fill/Check Valve Assembly mounted on the 5.1.2 test tank. The supply tank and

piping/supply valve must be mounted and sealed against leakage securely to the test tank in a fixture which can withstand the liquid surge impact without separation or damage to the system.

B. A catch-can of sufficient size to capture the quantity of water expelled during the subsequent pressure test.

C. Hoses of appropriate size shall be connected to both the fill and vent tubes on top of the Fill/Vent Valve and the hoses positioned near the catch can bottom.

5.2.3 PROCEDURE

A. Mount the combination of the two empty tanks connected by the piping and supply valve in the fixture in 5.2.2.A where the Fill/Check Valve is assembled to the test tank and on vertical top location using the manufacturer's provided hardware, sealant method and instructions.

B. The supply tank shall be mounted such that the piping connecting the two tanks will be submerged when the supply tank is filled.

C. Fill the 5.1.2 test tank with approximately 2 gallons of room temperature water through the fill valve port or a fill fitting on the tank. If used, close the fill fitting on the tank.

D. Fill the supply tank with 9 to 10 gallons of room temperature water.

E. Apply 60-80psi air pressure to the supply tank with the supply valve in the closed position.

F. Quickly open the supply valve to allow flow surge from the supply tank to the test tank.

G. Measure liquid accumulation in catch can (if any).

H. Remove hoses and remove the Fill/Check Valve from the 5.1.2 test tank and visually inspect.

6.0 PROOF OF COMPLIANCE

Manufacturers of the Stock Car Fill/Vent Check Valve Assembly pertaining to this specification are required to provide the following information to enroll in this program:

6.1 TEST RESULTS

Test results shall be documented in a test report.

6.1.1 FILL/CHECK VALVE ASSEMBLY ROLLOVER LEAKAGE TEST

The total amount of leakage remaining in the catch-can after completion of each Paragraph 5.1.3.E and F above shall be no more than 16 ounces (1 pint or .47 liter) in each case.

6.1.2 FILL/CHECK VALVE ASSEMBLY PRESSURE TEST

A. The total amount of leakage accumulated in the catch can after completion of paragraph 5.2.3.G of this specification shall be no more than 16 ounces (1 pint or .47 liter).

B. After inspection of the Fill/Check Valve per paragraph 5.2.3.H, even if the total leakage is within limits, no flapper valve dislodging or tearing through the flapper valve body or any structural damage to Fill/Check Valve Assembly which shows potential for complete surge leakage shall be acceptable.

7.0 TEST REPORTS

A separate test report, or set of test reports if required, shall be submitted for each product model. If more than one test facility is required to complete all necessary tests, then a separate test report shall be submitted from each one. A test report shall be submitted for each model, if tested separately. The test facility shall assign a unique number to each test report. This number along with the report date and page number shall appear on each page. Each test report shall include:

7.1 RELEVANT INFORMATION

7.1.1 Manufacturer's name, contact name, address and telephone number.

7.1.2 Name, address and telephone number of the test facility.

7.1.3 Name and signature of the responsible test supervisor.

7.1.4 Actual date of the test.

7.1.5 SFI Specification 32.2 number and effective date.

7.1.6 Product name, description and model designation.

7.1.7 Component name and description.

7.2 TESTS

Each test conducted shall be listed showing the test name, apparatus used, procedure used and test results obtained along with any other appropriate information.

7.3 AUTHENTICATION

Test reports shall be authenticated and stamped by a Professional Engineer who is registered in the state in which the testing is conducted. If necessary, SFI may allow an equivalent entity to provide authentication.

8.0 INITIAL DESIGN VALIDATION

To receive initial recognition from SFI as a participant in the SFI Specification 32.2 Program, the manufacturer must agree that the product to be tested will be obtained on a commercial basis through an outlet in the normal stream of commerce. This information shall be provided for each Stock Car Fill/Vent Check Valve Assembly model offered by the applicant that is to be included in the program. Any change in design, materials and/or methods of manufacturing not specifically excluded is considered a model change and, therefore, requires initial design validation.

9.0 PERIODIC REVALIDATION

Test reports with successful test results must be submitted to SFI at least once every 24 month period following the date of the initial design validation test for each model of Stock Car Fill/Vent Check Valve Assembly manufactured by the participant. If multiple test reports are required to obtain all test results, then the earliest test date shall be used to determine when the periodic revalidation reports are due.

10.0 CERTIFICATION OF COMPLIANCE

Upon demonstration of successful compliance with all the requirements of the specification and the self-certification program and upon entering the licensing agreement with SFI, the manufacturer may advertise, present and offer the Stock Car Fill/Vent Check Valve Assembly for sale with the representation that their product meets the SFI Specification 32.2. Continuing certification is contingent upon the following additional considerations: (1) the product shall be resubmitted for testing following any change in design, materials and/or methods of manufacturing not specifically excluded, and (2) periodic revalidation test reports are submitted when due to SFI.

The manufacturer is required to keep all top drawings, copies of test reports, and all other engineering records which define the specific product under safe keeping and in its possession, available for inspection by SFI, for not less than fifteen (15) years after

approval is granted, or for five (5) years after the last Fill/Vent Check Valve Assembly is manufactured.

11.0 CONFORMANCE LABELS

The conformance label is a sticker. The serialized sticker shall be placed on the exterior plate surface, ***in a location easily readable by technical inspectors***. The date of manufacturer and sticker serial number shall be permanently marked on the exterior plate surface. The permanent markings shall not be affected by fuels used in the cell. The serial number should appear on the customer invoice to aid in identification and tracking.

12.0 DECERTIFICATION

Participating manufacturers are subject to decertification when not in compliance with the requirements of this program or when their products are not in compliance with the requirements of this specification. Decertification will provide SFI the right to effect any and all remedies which are available to SFI in the licensing agreement.

13.0 APPEAL PROCEDURE

In the event of decertification, the manufacturer is entitled to an appeal of the decision of SFI. Requests for appeal must be received by SFI no later than thirty days following receipt of the notice of decertification. Appeals of such decisions will be heard at the next meeting of the Board of Directors of SFI.

14.0 STATEMENT OF LIMITATIONS

Testing procedures and/or standards contained in this specification are intended for use only as a guide in determining compliance with the minimum performance requirements as defined herein. The granting and assignment of the "This Manufacturer Certifies That This Product Meets SFI Specification 32.2" logo/designation is in no way an endorsement or certification of product performance or reliability by SFI. SFI, its officers, directors and/or members assume no responsibility, legal or otherwise, for failure or malfunctions of a product under this program.

15.0 COSTS

All costs involved in this program will be absorbed by the submitting manufacturer.

16.0 COMPLIANCE PERIOD

As this specification is revised to reflect changes in technology and/or field conditions, to remain current, participating manufacturers in the SFI Specification 32.2, Stock Car Fill/Vent Check Valve Assembly, Program must demonstrate full compliance with the requirements of this specification within ninety (90) days of the latest effective date.

---

*	Draft 1:	February 3, 2006
	Draft 2:	May 16, 2006
	Original Issue:	July 31, 2006
	Reviewed:	December 16, 2006
	Edited:	March 19, 2008
	Reviewed:	December 18, 2008
	Revised:	March 24, 2009
	Reviewed:	December 11, 2010
	Reviewed:	December 1, 2012
	Reviewed:	December 13, 2014