SFI FOUNDATION INC.™

QUALITY ASSURANCE SPECIFICATIONS™

SFI SPECIFICATION 4.1 EFFECTIVE: MARCH 27, 2013*

PRODUCT: Automatic Transmission Shields

1.0 GENERAL INFORMATION

1.1 This SFI Specification establishes uniform test procedures and minimum standards for evaluating and determining performance capabilities for Automatic Transmission Shields 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 4.1" 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 Automatic Transmission Shields that meet or exceed the SFI Specification 4.1 test standards, by complying with the requirements of the SFI Specification 4.1 program, and by signing a licensing agreement with the SFI Foundation, Inc.

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1.5 Compliance with this specification is entirely voluntary. However, when a manufacturer provides Automatic Transmission Shields in compliance with all requirements of the SFI Specification 4.1 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 with the manufacturer's name, trademark or symbol 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 Automatic Transmission Shields can either be in the form of a one piece flexible blanket that wraps around the transmission, or a one piece rigid material that bolts to the transmission and/or vehicle, or a rigid material that is internal to the transmission. The internal style can consist of either a slip in liner or the transmission case itself may act as the shield as long as it is of sufficient thickness to prevent penetration.

2.2 All external types of Automatic Transmission Shields shall cover the surface from the rear of the bellhousing to the start of the tail housing of the transmission.

2.3 The flexible blanket type of Automatic Transmission Shield shall be inspected for modification and deterioration every two years. If it is acceptable, it may be recertified by the manufacturer. If the blanket is not acceptable, it must be replaced. When a unit is determined to be acceptable for continued service, a new conformance label marked with the inspection date shall be used.

2.4 The rigid type of Automatic Transmission Shield shall be inspected for damage or modification every five years. If it is acceptable, it may be recertified by the manufacturer. If the shield is not acceptable, it must be replaced. When a unit is determined to be acceptable for continued service, a new conformance label marked with the inspection date shall be used.

2.5 Any shield pertaining to this specification shall remain as constructed by the original manufacturer and not modified.

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2.6 A Certification Card is a document provided by the original manufacturer indicating the serial number(s) of components certified by the original manufacturer as being in conformance with this specification.

3.0 CONSTRUCTION

Automatic Transmission Shields may be constructed by any method or may use any material that can meet the performance requirements of the specification.

4.0 MODEL CLASSIFICATION

For either type, the major factors for model determination are materials, material thickness and mounting configuration. A variation of any of these parameters is considered a model change and requires additional testing.

5.0 TESTING

For a given model and type, the largest diameter from the manufacturer shall be tested.

5.1 PENETRATION RESISTANCE – RIGID MATERIAL

5.1.1 SAMPLES

Test samples shall be fully processed new shields which are representative of shields currently produced or to be produced. All necessary mounting hardware along with mounting instructions shall be supplied with the shield.

5.1.2 APPARATUS

The test fixture shall provide a mounting surface resembling the rear portion of an engine block. A suitable containment chamber shall be used to protect test personnel. The fixture shall incorporate the following features:

A. A tachometer with an accuracy of ±2% at 13,000 revolutions per minute {rpm}.

B. A high gear drum to provide the destructive force to test the shield. The drum shall be modified to disintegrate between 12,000 and 14,000 rpm.

C. A spindle that can be driven to a rotational speed of 12,000 rpm or greater. The spindle must allow the high gear drum to be attached rigidly and concentrically. The axial location for the drum shall be adjustable so that the drum can be positioned in its stock location relative to the transmission case.

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D. An automatic transmission case compatible with the high gear drum and spindle. It shall be attached to the fixture with the axis of the case concentric with the axis of the spindle.

5.1.3 PROCEDURE

A. The high gear drum shall be attached to the spindle in the appropriate location.

B. The automatic transmission case shall be attached to the fixture.

C. The shield to be tested shall be attached to the transmission case and fixture per the manufacturer's installation instructions. The appropriate mounting points shall be added to the test fixture to simulate the mounting points as required in the instructions. The hardware supplied by the manufacturer (if required) shall be used to mount the shield to the automatic transmission case and the mounting points. All bolts used to attach the shield to the case of fixture shall be tightened to either the manufacturers torque specification or SAE torque specifications for commercially made nuts and bolts.

D. Rotate the high gear drum to a minimum of 12,000 rpm. Maintain the speed between 12,000 and 14,000 rpm until it bursts.

5.2 PENETRATION RESISTANCE – FLEXIBLE BLANKET

This test is based on Military Standard 662D, "Ballistic Test for Armor" (MIL-STD-662D).

5.2.1 SAMPLES

One square sample, 15 by 15 $\pm$1 inch (38.1 by 38.1 $\pm$2.5 centimeters) shall be supplied. The sample shall have the identical layer fabric, layer order and construction, thread and stitch composition, and overall assembly as that of the blanket that is being evaluated.

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5.2.2 APPARATUS

The apparatus shall comply with MIL-STD-662D.

A. PROJECTILE

Caliber .22 - Type 2, fragment simulators conforming to MIL-P-46593A shall be used.

5.2.3 PROCEDURES

The sample shall be tested in accordance with MIL-STD-662D for the Ballistic Limit, V_{50} BL(P). The maximum velocity span shall be 150 feet per second {fps} (46 meters per second {mps}).

5.2.4 INTERPRET RESULTS

The V_{50} BL(P) shall be calculated by taking the arithmetic mean of the two highest partial, and the two lowest complete, penetration impact velocities within the allowable velocity span.

6.0 PROOF OF COMPLIANCE

Automatic Transmission Shield manufacturers 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 PENETRATION RESISTANCE

A. RIGID MATERIAL TYPE

There shall be no penetration of any of the explosive fragments through the rigid material. The mounting brackets can distort due to the explosion but shall remain in the same approximate location.

B. FLEXIBLE BLANKET TYPE

The ballistic resistance of the sample shall be greater than or equal to a V_{50} BL(P) of 1125 (343 mps).

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7.0 TEST REPORTS

A separate test report, or set of test reports if required, shall be submitted for each product type and 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 component, 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 Specification number and effective date.

7.1.6 Product name, description and model designation.

7.1.7 Component name and description.

7.1.8 For a rigid-type transmission shield, pre and post-test photographs of the submitted shield. For flexible blanket-type shields, pre and post-test photographs of the submitted ballistic samples.

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.

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8.0 INITIAL DESIGN VALIDATION

To receive initial recognition from SFI as a participant in the SFI Specification 4.1 Program, the manufacturer must submit to SFI all information delineated in the Proof of Compliance section. This information shall be provided for each Automatic Transmission Shield 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.

Note: A model certification is based on a successful test of a shield with the largest diameter. A shield variation shall not be considered certified under this model if it is later produced with a larger diameter unless it is also successfully tested.

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 Automatic Transmission Shield 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. Also, SFI shall retain the option to conduct random audit reviews. SFI shall purchase the product on a commercial basis and test for compliance to the specification. The submitting manufacturer shall reimburse SFI for all audit costs.

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 Automatic Transmission Shields for sale with the representation that their product meets the SFI Specification 4.1. 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.

11.0 CONFORMANCE LABELS

The conformance label is a "punch out" label for the flexible type shield and a sticker for the rigid type. On both types, the label shall be marked with the month and year the part is sold and be placed on the outside surface. The flexible type label may be protected by lamination if needed. The sticker shall be protected with a transparent cover sticker. The rigid type sticker is marked with a serial number. Alternately, for the rigid shield, the conformance label may be placed on a certification card. For the rigid shield, besides placing the sticker on the part or certification card, the serial number of the sticker along with the date shall be permanently marked on the outside of the part. For a periodic inspection, the old label shall be removed and the foregoing procedure shall be followed

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using a new label. The serial number of either type should also 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 4.1" 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.

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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 4.1, Automatic Transmission Shields, Program, must demonstrate full compliance with the requirements of this specification within ninety (90) days of the latest effective date.

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