



# QUALITY ASSURANCE SPECIFICATIONS™

SFI SPECIFICATION 48.1

EFFECTIVE: JULY 19, 2007\*

PRODUCT: Shift Boot Covers

## 1.0 GENERAL INFORMATION

- 1.1 This SFI Specification establishes uniform test procedures and minimum standards for evaluating and determining performance capabilities for Shift Boot Covers 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 48.1" 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 Shift Boot Covers that meet or exceed the SFI Specification 48.1 test standards, by complying with the requirements of the SFI Specification 48.1 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 Shift Boot Covers in compliance with all requirements of the SFI Specification 48.1 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 Shift Boot Cover: A device made out of fire resistant/retardant material that surrounds a vehicle's gear shift lever and is used to prevent or delay flame and excess heat in the transmission tunnel from entering the driver's compartment.
- 2.2 Layer: Any single woven, non-woven, knitted, or felted flame resistant/retardant cloth. Excluding any combinations, composites or assemblies of single fabrics.
- 2.3 Multiple Layers: Shift Boot Covers can be constructed of a single layer or multiple layers of fabric, and must meet the minimum requirements of this specification.
- 2.4 Closures: Any Velcro closure must of fire retardant/fire resistant material.
- 2.5 TPP: Thermal Protective Performance (see SFI Technical Bulletin 3.2.)
- 2.6 After-flame Time: The time an object continues to flame after the thermal load is removed.
- 2.7 Any shift boot cover pertaining to this specification shall remain as constructed by the original manufacturer and not modified.

### 3.0 CONSTRUCTION

Shift Boot Covers shall be made of fire resistant/retardant material. The weave of the material shall be continuous with no breaks, holes or separations except where necessary to provide functionality. Thread shall be made of fire resistant/retardant material. The "tower" section of the Shift Boot Cover shall be one continuous piece of material (or layers of materials) closed with one (1) vertical seam. When the shift boot cover is installed in the vehicle, the seam shall be located in the forward right quadrant of the cover, i.e., forward and right of the gear shift lever. The shift boot cover shall be secured to the vehicle by means of a metal bracket with a minimum of 5 attachment points utilizing metal grommets or eye holes in the shift boot cover. The inner-most layer of the tower section of the shift boot cover must be a vapor barrier or coating that will not allow liquids to soak into the fabric of the shift boot cover.

### 4.0 MODEL CLASSIFICATION

Shift Boot Cover models are based on materials and construction. Any variation shall be considered a model change.

### 5.0 TESTING

#### 5.1 TPP RATING

Test in accordance with SFI Technical Bulletin 3.2. At least four samples shall be supplied. The test samples are installed in the test assembly so that the side facing in towards the transmission tunnel faces the heat source.

#### 5.2 FLAME RESISTANCE

##### 5.2.1 SAMPLES

Three samples at ambient temperature shall be tested. For multiple layers of different material types, both the outside and inside material layers shall be tested three times each. Samples shall be prepared per SFI Technical Bulletin 3.2 Paragraph 3.1.1.A.

##### 5.2.2 APPARATUS

###### A. THERMAL LOAD

The thermal load shall be a propane flame with a flame spreader device, at the flame location generating a measured temperature of  $790^{\circ} \pm 40^{\circ}\text{C}$  ( $1454^{\circ} \pm 85^{\circ}\text{F}$ ).

## B. TIMING DEVICE

A timing device with an accuracy of  $\pm 0.5$  seconds shall be used to measure the after-flame times.

## C. FIXTURE

A fixture shall be used to support the material sample in a vertical position.

### 5.2.3 PROCEDURE

The flame shall be adjusted to 3-4" in length and positioned perpendicular to the material surface. The sample shall be subjected to the thermal load for a period of  $15 \pm 1$  seconds at a distance of 1-1½" (surface of material to flame tip). Simultaneous with the removal of the flame, the timing device shall be activated. Determine the after-flame time. Conduct the test 3 times each for the inner and outer facing surfaces.

## 5.3 THREAD HEAT RESISTANCE

The test shall be conducted in accordance with FTM 191-1534 unless otherwise specified.

### 5.3.1 SAMPLES

The sample material shall be identical to the thread used in the actual construction of the Shift Boot Cover. Sufficient material for at least three tests shall be supplied. If more than one type of thread is used within one product model, then each type shall be tested.

### 5.3.2 PRECONDITIONING

Samples shall be conditioned at a temperature of  $21 \pm 1$  degrees Celsius  $\{^{\circ}\text{C}\}$  ( $70 \pm 2$  degrees Fahrenheit  $\{^{\circ}\text{F}\}$ ) at a relative humidity of  $65 \pm 5$  percent for one hour. Samples shall be tested not more than five minutes after removal from conditioning.

### 5.3.3 PROCEDURE

Conduct the test three times. The samples shall be tested to a temperature of  $260 \pm 2$  degrees Celsius  $\{^{\circ}\text{C}\}$  ( $500 \pm 4$  degrees Fahrenheit  $\{^{\circ}\text{F}\}$ ).

## 5.4 SEAM STRENGTH TEST

### 5.4.1 SAMPLES

One (1) sample material and seam shall be cut from a fully processed new Shift Boot Cover which is representative of Shift Boot Covers currently produced or to be produced. The sample shall be cut from the approximate center of the seam length and according to the dimensions in Figure 1.

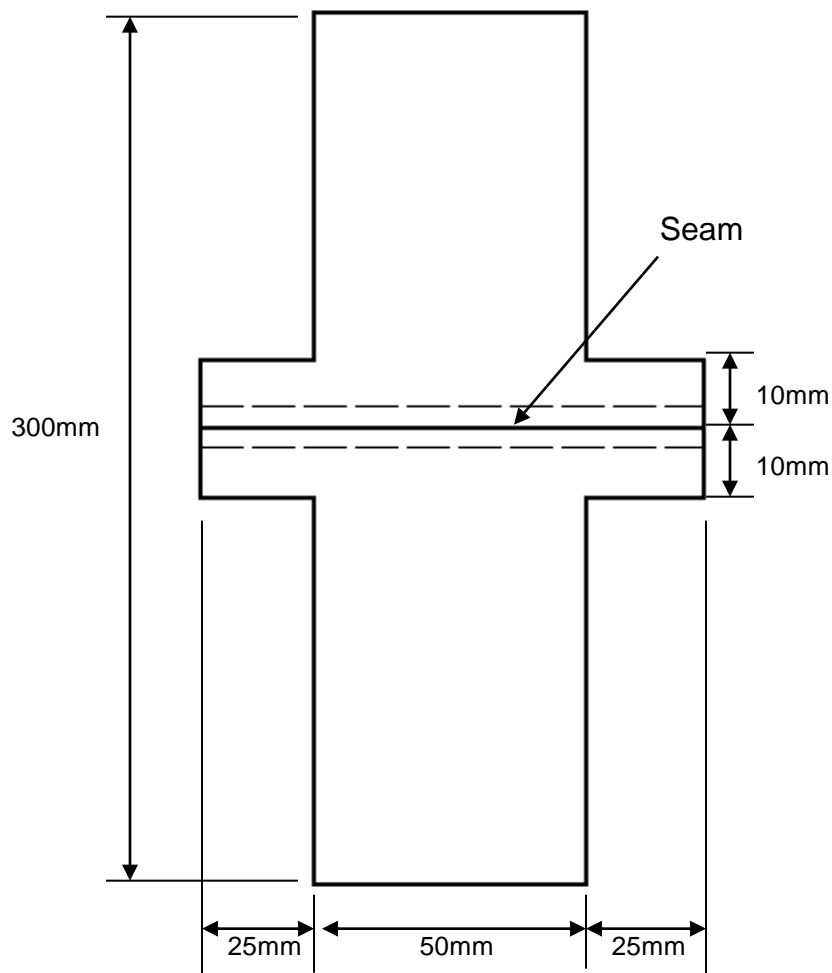


Figure 1  
Seam Strength Test Sample Size

## 5.4.2 APPARATUS

### A. TEST MACHINE

A standard tensile test machine or equivalent shall be used. The test machine shall be capable of applying a minimum tensile load of 100 pounds {lb} (445 newtons {N}) with an excursion travel of four (4) inches per minute {ipm} (10.2 centimeters per minute {cmpm}), and shall have adequate instrumentation to verify the test load. The test machine shall be capable of setting the gauge length to  $7.8 \pm 0.5$  inches ( $200 \pm 12.7$ mm). The test machine shall also be in calibration and traceable to the National Institute of Standards and Technology (NIST).

### B. TEST FIXTURE

The clamping device of the machine shall be equipped with jaws capable of holding the test sample without allowing it to slip and designed so that they do not cut or otherwise weaken the test sample.

## 5.4.3 PROCEDURES

- A. Clamp the test specimen centrally so that its longitudinal center line passes through the center point of the front edges of the jaws and the force is applied perpendicularly to the seam in the middle of the gauge length. After closing the upper jaw, avoid pretension when adjusting the test specimen in the lower jaw, so that the fabric hangs under its own weight when the lower clamp is closed.
- B. Using an excursion rate of four ipm (10.2cmpm), apply an increasing load to the sample. Continue until the point of rupture and record the load at break and whether the rupture is caused by:
  - 1) fabric tear
  - 2) fabric tear at the jaws
  - 3) fabric tear at the seam
  - 4) breakage of sewing threads
  - 5) thread pull-out
  - 6) any combination of these

- C. If rupture occurs by 1) or 2), these results shall be excluded and further tests shall be carried out until one seam rupture is obtained.

## 6.0 PROOF OF COMPLIANCE

Shift Boot Cover 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 TPP RATING

A Shift Boot Cover, as represented by the material tested in accordance with SFI Technical Bulletin 3.2, shall have a minimum TPP rating of 30.0 cal/cm<sup>2</sup> (125.5 W-sec/cm<sup>2</sup>) to be acceptable.

#### 6.1.2 FLAMMABILITY

The after-flame time shall be three (3) seconds or less. Additionally, no melting or dripping may occur.

#### 6.1.3 THREAD HEAT RESISTANCE

For each sample, determine its condition at the specified temperature. The specimen shall not melt or ignite when tested.

#### 6.1.4 SEAM STRENGTH TEST

The breaking strength of the seam shall be equal to or greater than 100 lbs (445N) of force.

## 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 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 Photograph of submitted part.

## 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 48.1 Program, the manufacturer must submit to SFI all information delineated in the Proof of Compliance section. This information shall be provided for each Shift Boot Cover 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 Shift Boot Cover 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 Shift Boot Covers for sale with the representation that their product meets the SFI Specification 48.1. 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. Each individual Shift Boot Cover shall have a label attached to the exterior surface. The patch shall have the month and year of manufacture punched out and easily identified.

## 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 48.1" 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.

## 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 48.1, Shift Boot Cover, Program, must demonstrate full compliance with the requirements of this specification within ninety (90) days of the latest effective date.

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*	Original Issue:	August 11, 2005
	Revised:	July 19, 2007
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