SFI FOUNDATION INC.™

QUALITY ASSURANCE SPECIFICATIONS™

SFI SPECIFICATION 3.4 EFFECTIVE: OCTOBER 18, 2019*

PRODUCT: Advanced Drivers Suits

1.0 GENERAL INFORMATION

1.1 This SFI Specification establishes uniform test procedures and minimum standards for evaluating and determining performance capabilities for Advanced Drivers Suits 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 3.4" 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 Advanced Drivers Suits that meet or exceed the SFI Specification 3.4 test standards, by complying with the requirements of the SFI Specification 3.4 program, and by signing a licensing agreement with the SFI Foundation, Inc.

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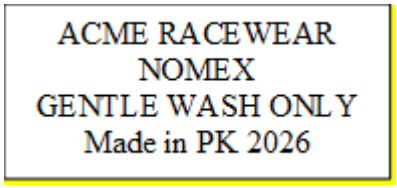
1.5 Compliance with this specification is entirely voluntary. However, when a manufacturer provides Advanced Drivers Suits in compliance with all requirements of the SFI Specification 3.4 and enters into the licensing agreement with the SFI Foundation, Inc., they may certify that compliance with such 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. A certifying manufacturer's identification label sample must be sent to SFI as a validation requirement. If the suit is sold under another brand name, the certifying manufacturer must still be identified on a label in the suit. Example of a label meeting SFI requirements, and containing some information required by US FTC regulations such as country of origin:



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 Driver Suit: A uniform made out of fire resistant/retardant material that is used for fire protection in competitive motorsports. ~~All cuffs (wrists and ankles)~~ Cuffs are required at the wrists and ankles and shall be made out of fire resistant/fire retardant material.

2.2 Suit Layer or 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: Advanced Drivers Suit material can be constructed of a single layer or multiple layers of fabric. A suit's rating is based on the thermal protection capability of the material regardless of the number of layers. The use of underclothing is not considered in the rating of the suit.

2.4 Closures: All closures (metal zipper or Velcro) shall be of fire resistant/fire retardant construction. The zipper closure shall be constructed of metal teeth

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and fire retardant tape. Any Velcro or zipper closure must be covered by fire retardant/fire resistant material.

2.5 Layup: A Test sample of multiple layers representing the construction of a suit model. Each unique combination of materials in a suit model must be represented by a test layup.

2.6 Each 3.4/10 or higher level "manufacturer certified" Advanced Drivers Suit shall be inspected every five years by the "certifying manufacturer" for re-certification. After inspection, when the suit is determined to be acceptable for continued service, a new conformance label marked with the year of inspection shall be used.

2.7 All expansion and/or comfort gusset material, if used, must be tested and must meet the same minimum TPP rating as the entire Advanced Drivers Suit.

2.8 Associated Apparel: Gloves, underclothing, hoods, socks, shoes and helmet supports may be associated with an Advanced Drivers Suit but are not rated by this specification.

2.9 Graphics: Any logo, text or artwork on a driver's suit not consisting of an additional identical outer layer otherwise conforming to this specification. Examples of graphics include embroidery, printing, and patches. A logo, text or artwork consisting of additional otherwise identical outer layer does not require additional testing.

2.10 This specification applies only to Driver Suits supplied from their manufacturers with graphics. Graphics must be tested for flammability per section 5.0 and 6.0 of this specification. If multiple graphic methods are used, each method must be tested for flammability per section 5 and 6 of this specification.

2.11 Openings for cool suit tubes must be designed as to not compromise the TPP or Flammability performance of the suit. The cool suit openings must be covered by a non-removeable flap when the cool suit is not in use.

2.12 The Advanced Drivers Suits shall cover the neck with no gaps, with a collar at least 2" (51mm) high in the back of the neck, and 1 3/8" (35mm) high at the front.

2.13 Pockets constructed of an additional layer (identical to the successfully tested outer layer) sewn to the outside of the suit does not need to be represented by additional testing. Only the body side of the pocket is required to meet construction and TPP requirements for the manufacturer's certification level for the suit if the pouch pocket is fixed to prevent rotation. If the pouch

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pocket is not fixed to prevent rotation, the interior of a pouch pocket (both sides) must meet the construction and TPP requirements for the manufacturer's certification level for the suit.

2.14 Stirrups may be non-FR material if they are only in contact with the sock and inside of the shoe.

2.15 Embroidery threads and patch attachment threads must only penetrate the outer layer of the suit, unless the thread conforms to the 5.3 and 6.1.3 heat resistance requirements of this specification.

3.0 CONSTRUCTION

Advanced Drivers Suits can either be a one-piece coverall type, or a two-piece traditional type, consisting of a jacket and pants. A two-piece suit must have an eight-inch (203mm) overlap in the waist area as a minimum. Any flame retardant chemicals, that by their nature, application and/or chemistry would not be expected to survive exposure to water, i.e. "non-durable finishes" are not acceptable for use on materials qualified for "manufacturer certified" Advanced Drivers Suits constructed in accordance with the guidelines of this specification. All material layers in an Advanced Drivers Suit must fully extend all the way to all seams. The shortening of any layer prior to the seam is not permitted.

4.0 MODEL CLASSIFICATION

If all other factors remain the same, Advanced Drivers Suit models are not a function of size or color.

5.0 TESTING

5.1 TPP RATING

Test in accordance with SFI Technical Bulletin 3.2. At least four samples shall be supplied.

5.2 FLAMMABILITY

5.2.1 Advanced Drivers Suits

Test each individual suit layer (single and multiple layer levels) as defined in Section 2.2 in accordance with SFI Technical Bulletin 3.2. For layers with graphics, the graphics are not required to be applied to the layer for this test. See test 5.2.3 below.

5.2.2 Cuffs (wrists and ankles)

Test in accordance with SFI Technical Bulletin 3.2.

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5.2.3 ~~Multi-layer~~ Flammability with applied graphics

Test each individual suit layup for which graphics are applied for that model in accordance with SFI Technical Bulletin 3.2. There shall be a minimum of 5 samples each (these may be cut from a single larger sample). Samples with representative graphics must be capable of being cut into strips with a solid area of graphics at least 2.75” (70mm) wide by 4” (102mm) long at one end, and 2.75” (70mm) x 7” (178mm) overall. The solid graphics must extend to the lower edge of the test strip, and the lower edges of all layers must align. The lower edge of the layup may not be folded, but the lower edge of the layup will be closed by stitching or a common office staple. The Multi-layer flammability test is not required for unique layups where graphics are not applied (e.g., gusset layup).

5.3 THREAD HEAT RESISTANCE

All Advanced Drivers Suits that are required to undergo the TPP test shall be subjected to this test. 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 Advanced Drivers Suit. Sufficient material for at least three tests shall be supplied.

5.3.2 PRECONDITIONING

Samples shall be conditioned at a temperature of 21 ±1 degrees Celsius {°C} (70 ±2 degrees Fahrenheit {°F}) at a relative humidity of 65 ±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 ±2 degrees Celsius {°C} (500 ±4 degrees Fahrenheit {°F}).

5.4 ZIPPER HEAT RESISTANCE TEST

5.4.1 SAMPLES

The sample material shall be identical to the zipper and fire retardant tape used in the actual construction of the Advanced Drivers Suit. Specimen length shall be at least 6 inches (152mm).

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5.4.2 PRECONDITIONING

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

5.4.3 PROCEDURE

The forced circulating air oven shall achieve and maintain an air temperature of 260 ±3 degrees Celsius {°C} (500 ±10 degrees Fahrenheit {°F}) for a period of not less than 5 minutes. Oven recovery time after the door is closed shall not exceed 90 seconds. The specimen shall be suspended by metal clips at the top and centered in the oven so that the entire specimen is not less than two (2) inches (50.8 mm) from any oven surface or other specimen, and airflow is parallel to the plane of the material. Specimens, mounted as specified, shall be placed in the circulating air oven for 5 minutes, +0.15/-0.0 minutes. Specimen exposure time shall begin when oven has recovered to an air temperature of 260 ±3 degrees Celsius {°C} (500 ±10 degrees Fahrenheit {°F}).

5.5 ~~MULTIPLE LAYER~~ THERMAL SHRINKAGE RESISTANCE TEST

5.5.1 SAMPLES

The sample material shall be identical to the ~~multiple layer~~ ensemble used in actual driver suit construction for SFI 3.4/5 and higher. Specimen size shall be 15" x 15" ±.5" (381mm x 381mm ±13mm).

5.5.2 PRECONDITIONING

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

5.5.3 PROCEDURE

The forced circulating air oven shall achieve and maintain an air temperature of 260 ±3 degrees Celsius {°C} (500 ±10 degrees Fahrenheit {°F}) for a period of not less than 5 minutes. Oven recovery time after the door is closed shall not exceed 90 seconds. The specimen shall be suspended by metal clips at the top and centered in the oven so that the entire specimen is not less than two (2) inches (50.8 mm) from any oven surface or other specimen, and airflow is parallel to the plane of the material. Specimens

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mounted as specified, shall be placed in the circulating air oven for 5 minutes, +0.15/-0.0 minutes. Specimen exposure time shall begin when oven has recovered to an air temperature of 260 ±3 degrees Celsius {°C} (500 ±10 degrees Fahrenheit {°F}).

6.0 PROOF OF COMPLIANCE

Advanced Drivers Suit 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

An Advanced Drivers Suit, as represented by the material tested in accordance with SFI Technical Bulletin 3.2, shall be classified by the TPP rating. The material shall be considered to have passed the TPP test if it qualifies for an SFI grade as delineated in Table 1.

Table 1

SFI Grade	TPP Rating	
	Cal/cm^2	W-sec/cm^2
1	≥ 6	≥ 25.1
3	≥ 14	≥ 58.6
5	≥ 19	≥ 79.6
10	≥ 38	≥ 159.1
15	≥ 60	≥ 251.2
20	≥ 80	≥ 335.0
25	≥ 100	≥ 418.7
30	≥ 120	≥ 502.4

6.1.2 FLAMMABILITY

An Advanced Drivers Suit and Cuffs (Wrists and Ankles) and multi-layer layups with graphics, as represented by the material tested in accordance with SFI Technical Bulletin 3.2, and section 5.2 of this specification shall be considered to have passed the flammability test if each layer that is required to be tested passes the criteria listed below.

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A. INTERPRET RESULTS for INDIVIDUAL LAYERS

The average after-flame time for all samples shall be 2.0 seconds or less for the layer to pass. The average char length for the five samples shall be six (6) inches (152mm) or less for the layer to pass. Any melting or dripping of the material shall be cause for test failure.

B. INTERPRET RESULTS for MULTI LAYER LAYUPS with GRAPHICS

The average after-flame time for all samples shall be 2.0 seconds or less for the or layup to pass. Any melting or dripping of the material shall be cause for test failure.

6.1.3 THREAD HEAT RESISTANCE

A. INTERPRET RESULTS

For each sample, determine its condition at the specified temperature.

6.1.4 ZIPPER HEAT RESISTANCE TEST

A. INTERPRET RESULTS

Specimen shall remain in original form and shall not melt, drip, separate, or ignite when tested.

6.1.5 ~~MULTIPLE~~ LAYER THERMAL SHRINKAGE RESISTANCE TEST

A. INTERPRET RESULTS

The total shrinkage for SFI 3.4/5 and higher shall be ≤10%, the maximum percent consumed shall be ≤20% consumption by weight, and shall not melt, drip, separate or ignite when tested.

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:

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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.

7.2 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 3.4 Program, the manufacturer must submit to SFI all information delineated in the Proof of Compliance section. This information shall be provided for each Advanced Drivers Suit 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 Advanced Drivers Suit 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

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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 Advanced Drivers Suits for sale with the representation that their product meets the SFI Specification 3.4. 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 serialized patch which, on a one piece suit or jacket, shall be sewn to the left sleeve facing outward, between the wrist and the shoulder seam or corner. The patch may not be sewn on the wrist cuff. If area on the left sleeve is not available, the conformance patch may be sewn to the back of the garment, centered below the collar and not more than four (4) inches below the collar. On pants, the patch shall be sewed on the left side or rear center at the belt line.

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 3.4" 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.

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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 3.4, Advanced Drivers Suit, Program, must demonstrate full compliance with the requirements of this specification within ninety (90) days of the latest effective date.

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