



QUALITY ASSURANCE SPECIFICATIONS™

SFI SPECIFICATION 35.3

EFFECTIVE: OCTOBER 22, 2020*

PRODUCT: Alloy Stock Car Wheels

1.0 GENERAL INFORMATION

- 1.1 This SFI Specification establishes uniform test procedures and minimum standards for evaluating and determining performance capabilities for Alloy Stock Car Wheels.
- 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 35.3" 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 Alloy Stock Car Wheels that meet or exceed the SFI Specification 35.3 test standards, by complying with the requirements of the SFI Specification 35.3 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 Alloy Stock Car Wheels in compliance with all requirements of the SFI Specification 35.3 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 Wheel: For this specification, it shall be the specially constructed forged aluminum wheel.
- 2.2 Rim: The supporting member for the tire or tire and tube assembly.
- 2.3 Lot: A quantity of parts of the same type and part number, produced consecutively under similar conditions. A lot may have variable time frames and may be identified by tool number and run number.
- 2.4 Offset: The distance between the mounting surface of the center member and the center line of the rim. This dimension is termed positive when the mounting face of the wheel center is outboard of the rim center line and negative when inboard of the rim center line.
- 2.5 Service Life: The service life of Alloy Stock Car Wheels is five (5) years from the "In Service Date", and they must be replaced at or before that time.
- 2.6 Tire and Rim: The Tire and Rim Association has established specifications for the cross-sectional profile of rim contours. Alloy Stock Car Wheels shall comply with their standard for 5 degree drop center rim contours.
- 2.7 Date of Manufacture: The day and month and year, or week number and year is indicated on the wheel.

3.0 CONSTRUCTION

- 3.1 The Tire and Rim Association has established specifications for the diameters of wheels. The wheels shall be center-lock, with dimensions conforming to sanctioning body requirements.
- 3.2 Powder coating of the wheels is not permitted. Painting of wheels is permitted only with methods approved by the original manufacturer.

4.0 MODEL CLASSIFICATION

A single combination of wheel and fastener(s) having a specific design or style, of a diameter, width, and offset, and produced and processed dimensionally and otherwise in a specific manner with specific materials.

5.0 TESTING

5.1 DYNAMIC CORNERING FATIGUE

Test in accordance with SAE J328 using the information given in this section. For initial design validation and for annual revalidation, two wheels shall be tested.

5.1.1 SAMPLES

Test samples shall be fully processed uncoated new wheels which are representative of wheels currently produced or to be produced. All samples shall be produced from the same lot of wheels. When assembling to the fixture, the wheel nut shall be hand torqued at the beginning of the test to the values recommended by the manufacturer

5.1.2 PROCEDURE

Perform the test at a bending moment of 4,000 ft. lbs. and complete a minimum of 1,000,000 cycles.

5.1.3 INSPECTION

Inspect for any evidence of new fractures or propagation of any existing fractures of any part of the wheel. The front face shall be inspected while the wheel is under full load, with hand rotation of the wheel.

5.2 DYNAMIC RADIAL FATIGUE

Test in accordance with SAE J328 using the information given in this section. For initial design validation, two wheels shall be tested. For annual revalidation, one wheel shall be tested.

5.2.1 SAMPLES

Test samples shall be fully processed uncoated new wheels which are representative of wheels currently produced or to be produced. All samples shall be produced from the same lot of wheels. Use the same model variation as tested in the previous section. When assembling to the fixture, the wheel nut shall be hand torqued at the beginning of the test to the values recommended by the manufacturer. The cold inflation pressure of the test tire(s) shall be 60-70psi.

5.2.2 PROCEDURE

Perform the test at a load of 5,000 pounds for a minimum of 850,000 cycles. In the event of test tire failure while testing, it is acceptable to mount another test tire and continue the test.

5.2.3 INSPECTION

Inspect the rim for any evidence of new fractures or propagation of any existing fractures of any part of the wheel. The front face shall be inspected while the wheel is under full load at zero RPM.

5.3 MECHANICAL PROPERTIES

5.3.1 SAMPLES

Test bars used in determining mechanical properties shall be machined from the wheel. Use of standard test bars of a like material are not acceptable.

5.3.2 APPARATUS

A standard tensile test machine shall be used. The machine shall be capable of applying the required tensile load in accordance with ASTM E-8 and shall have adequate instrumentation to verify the test load. The test machine shall also be in calibration and traceable to the National Institute of Standards and Technology.

5.3.3 PROCEDURE

Record the physical dimensions of the test bar. Increase the tensile load until the test bar breaks. Record the load and elongation in accordance with ASTM E-8 test procedures.

5.3.4 INTERPRET RESULTS

Determine the yield strength, tensile strength and elongation for each sample.

5.4 DEFLECTION

5.4.1 APPARATUS

The test machine shall have the capability of applying an increasing bending moment to the wheel while the angular deflection between the bolt circle plate and outer rim cylinder is being measured.

5.4.2 PROCEDURE

The bending moment shall be applied in a plane through the centerline axis of the wheel. The measurements may be taken manually or automatically. If measured manually, the bending moment increment between measurements is not to exceed 250 ft-lb. Before testing, torque the wheel nut to the values recommended by the manufacturer. Optionally, the bending moment can be increased to 1500 ft-lb then reduced to zero and the lug nuts re-tightened to the correct values before the actual test. The moment shall be increased until 17,000 ft-lb is reached or any of the appropriate failure criteria occurs during the test (see Paragraph 6.1.3)

5.4.3 INTERPRET RESULTS

The plot shall have the bending moment as the ordinate values with the angular deflection in degrees as the abscissa values. Load may be substituted for bending moment and linear deflection may be substituted for angular deflection as long as the distances involved remain constant. The scales of the axes shall be linear and adjusted such that the proportional section of the plotted line is between 35 and 55 degrees in relation to the axis of abscissas. The point on the plot where the slope of the line decreases by more than 5 degrees from the average slope of the straight portion of the plot shall be considered the elastic limit.

6.0 PROOF OF COMPLIANCE

Alloy Stock Car Wheel 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 DYNAMIC CORNERING FATIGUE

A wheel shall be considered to have failed if any one of the following occurs:

- A. A visually detected new fracture or propagation of any existing fracture of any part of the wheel.
- B. The wheel nut loosening to less than 60 percent of the initial torque.
- C. Inability of the wheel to sustain the applied load for the required number of cycles.

6.1.2 DYNAMIC RADIAL FATIGUE

A wheel shall be considered to have failed if any one of the following occurs:

- A. A visually detected new fracture or propagation of any existing fracture of any part of the wheel.
- B. The wheel nut loosening to less than 60 percent of the initial torque.
- C. Inability of the wheel to sustain the applied load for the required number of cycles.
- D. Loss of air through the rim on tubeless type wheels.

6.1.3 DEFLECTION

The wheel is acceptable if the bending moment of 17,000 ft. lb. is successfully reached without any of the following failure criteria occurring:

- A. If at any point of the test the measured deflection continues to increase with no increase in applied moment, the test shall be considered a failure.
- B. If at any point of the test any of the wheel retention devices such as wheel nuts, machine or fixture attachment components become loose, distorted or nonfunctional, the test shall be considered a failure.
- C. If visual cracks larger than 0.50-inch-long are observed in any portion of the wheel during or subsequent to the completion of the test, it shall be considered a failure.
- D. If any pieces or fragments of the wheel become separated or dislodged from the wheel during or after the test it shall be considered a failure.

6.1.4 MECHANICAL PROPERTIES

The wheel material shall have mechanical properties in accordance with minimums listed in Table 1.

Table 1			
Material	Minimum Yield Strength psi (kg/cm ²)	Minimum Tensile Strength psi (kg/cm ²)	Minimum Percent Elongation
Wheel Material	35,000 (2,461)	42,000 (2,953)	8

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. 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 Photograph of the test wheel.
- 7.1.8 Nominal thickness of the wheel rim.
- 7.1.9 Nominal thickness of the wheel center.
- 7.1.10 Date of Manufacture of the wheel.

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 35.3 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 testing shall be done for each Alloy Stock Car Wheel 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 12-month period following the date of the initial design validation test for each model of Alloy Stock Car Wheel 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 Alloy Stock Car Wheels for sale with the representation that their product meets the SFI Specification 35.3. 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 SERIAL NUMBERS (VIRTUAL CONFORMANCE LABELS)

A unique serial number of the label shall be permanently marked on the part. The permanently marked number must be visible on the outside face of the wheel. The serial number must appear on the customer invoice to aid in identification and tracking. The date of manufacture, per 2.8, shall be stamped on outer surface of the wheel as follows: Day and month and year, or week number and year. Serial numbers of newly produced wheels to be certified to SFI 35.3 must be submitted to SFI within 30 days of production.

12.0 DECERTIFICATION

Participating manufacturers are subject to decertification when not in compliance with the requirements of this program, when their products are not in compliance with the requirements of this specification or when they are not in compliance with the SFI Quality Assurance Program 35.3. 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. Within thirty days following a request for appeal, the SFI Foundation Inc. will schedule a hearing at an appropriate site to discuss the specific details of the case. If the decertification decision involves a special case of fatigue or performance test failure, the hearing may, at the option of the audit bureau representative, take place at the appropriate test laboratory.

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 35.3" 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 35.3, Alloy Stock Car Wheels Program must demonstrate full compliance with the requirements of this specification within ninety (90) days of the latest effective date.

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