



# QUALITY ASSURANCE SPECIFICATIONS™

SFI SPECIFICATION 42.1

EFFECTIVE: FEBRUARY 15, 1996\*

PRODUCT: Steering Wheel Quick Disconnect/Release

## 1.0 GENERAL INFORMATION

- 1.1 This SFI Specification establishes uniform test procedures and minimum standards for evaluating and determining performance capabilities for Steering Wheel Quick Disconnect/Releases 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 42.1" 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 Steering Wheel Quick Disconnect/Releases that meet or exceed the SFI Specification 42.1 test standards, by complying with the requirements of the SFI Specification 42.1 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 Steering Wheel Quick Disconnect/Releases in compliance with all requirements of the SFI Specification 42.1 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 Hub: The device that unites the steering wheel to/with the steering shaft and may contain the mechanism that permits the rapid removal or separation of the steering wheel from the steering shaft.
- 2.2 Shaft: The device at the end of the steering shaft that unites to/with the Hub and may contain the mechanism that permits the rapid removal or separation of the steering wheel from the steering shaft.
- 2.3 Proof Load: The axial tensile load, velocity at which the load is applied, and length of time the load is applied, that the Hub and Shaft, when connected, must sustain.
- 2.4 Release: The non-destructive successful removal or separation of the Hub from the Shaft.
- 2.5 Release Load: The pressure applied to the release button, collar or component to obtain Release.

## 3.0 CONSTRUCTION

The Steering Wheel Quick Disconnect/Release can be made of various materials, because of the possible presence of flame or extreme heat, plastic is **not** an acceptable material. The requirements, beside passing the tests herein, are those of functionality. Ease of mounting and removal are desirable features. The maximum amount of backlash in the Steering Wheel Quick Disconnect/Release assembly shall not exceed 2° of movement. This is approximately 1/4" on a 14" wheel diameter.

## 4.0 MODEL CLASSIFICATION

A change of material, design or construction method constitutes a model change. If all other factors remain the same, a dimensional change in outside diameter or mounting bolt patterns is not considered a model change.

## 5.0 TESTING

Test samples must be fully processed new Steering Wheel Quick Disconnect/Release mechanisms which are representative of models currently produced or to be produced. All required tests must be conducted on the same test sample. The series of mandatory testing for initial design and periodic revalidation must be performed in the order listed below.

### 5.1 PROOF LOAD

#### 5.1.1 SAMPLES

For a given model, the largest outside diameter with the smallest mounting bolt pattern shall be tested.

#### 5.1.2 APPARATUS

##### A. FIXTURE

A fixture shall simulate the steering shaft of the vehicle that the hub is intended to be used with. The mounting shall also simulate that of an actual vehicle including the steering wheel. The mounting hardware and mounting instructions supplied by the certifying manufacturer shall be used to mount the hub to the shaft.

##### B. TEST MACHINE

The test machine shall be capable of applying a minimum tensile load of 500 pounds {lb} with an excursion travel of four to ten inches per minute {ipm} (10.2 to 25.4 centimeters per minute {cmpm}), and shall have adequate instrumentation to verify the test load. The test machine shall also be in calibration and traceable to the National Bureau of Standards.

### 5.1.3 PROCEDURES

- A. In one head of the test machine, mount the fixture to simulate the steering shaft. Connect the other end to the steering wheel, which shall be fixed to the other head.
- B. Using an excursion rate between four and ten ipm (10.2 to 25.4 cpm), apply an increasing load to the steering wheel. Continue until a load of 500 +10/-0 lb is applied. Hold at that level for ten seconds, then release the load.

### 5.1.4 INSPECTION

Check the hub for damage and for operational dysfunction.

## 5.2 RELEASE LOAD

### 5.2.1 SAMPLES

For a given model, the largest outside diameter with the smallest mounting bolt pattern shall be tested.

### 5.2.2 APPARATUS

- A. A load cell capable of measuring the required release load over the distance required to obtain "Release" shall be used. The load cell must have a maximum measuring range not exceeding fifty (50) pounds and a maximum resolution not exceeding one (1) pound.
- B. One (1) manually operated hydraulic jack.
- C. Two 1/2"(±.1") diameter steel rods, 6.5"(±.2") in length.

### 5.2.3 PROCEDURE

Secure the Steering Wheel Quick Disconnect/Release mechanism in such fashion so as to provide a rigid mounting of the assembly. Additionally, the held hub assembly shall present no obstructions that prevent access to the release mechanism. Setup the apparatus so that the excursion of the hydraulic jack drives the steel rod(s) against the release mechanism. The test load cell shall be positioned in between the rod(s) and the release mechanism.

Compression Type: Apply load vertically from underneath the Steering Wheel Quick Disconnect/Release while recording the load. Repeat the procedure three times.

Push-Button Type: Apply load at a 0° angle horizontally to the Steering Wheel Quick Disconnect/Release for the push button type while recording the release load. Repeat the procedure three times.

#### 5.2.4 INSPECTION

Check the Steering Wheel Quick Disconnect/Release for damage and for operational dysfunction.

#### 5.2.5 INTERPRET RESULTS

Determine the release load in pounds.

### 5.3 PHYSICAL OPERATION

#### 5.3.1 SAMPLES

For a given model, the largest outside diameter with the smallest mounting bolt pattern shall be tested.

#### 5.3.2 APPARATUS

##### A. FIXTURE

The fixture shall be identical to the one used in the "Proof Load" test in Section 5.1.

##### B. GLOVE

A glove meeting SFI Specification 3.3/15 must be used.

#### 5.3.3 PROCEDURE

With one gloved hand, per 5.3.2B, completely release the hub and steering wheel from the steering shaft with one motion. Record the time it takes for removal. Repeat three times.

#### 5.3.4 INSPECTION

Check the Steering Wheel Quick Disconnect/Release for damage and for operational dysfunction.

### 5.3.5 INTERPRET RESULTS

Determine the average release time in seconds.

## 6.0 PROOF OF COMPLIANCE

Steering Wheel Quick Disconnect/Release 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 PROOF LOAD

The hub shall pass the proof load test if it is able to maintain the test load for at least ten seconds without release and remain functional.

#### 6.1.2 RELEASE LOAD

The maximum release load average must be  $\leq 35$  pounds.

#### 6.1.3 PHYSICAL OPERATION

The hub and steering wheel must completely release in a maximum of three seconds or less.

## 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 the 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 42.1 Program, the manufacturer must submit to SFI all information delineated in the Proof of Compliance section. This information shall be provided for each Steering Wheel Quick Disconnect/Release 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 Steering Wheel Quick Disconnect/Release 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 Steering Wheel Quick Disconnect/Releases for sale with the representation that their product meets the SFI Specification 42.1. 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 sticker. 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 42.1" 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 42.1, Steering Wheel Quick Disconnect/Release, 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:	June 22, 1994
	Revised:	February 15, 1996
	Reviewed:	December 6, 1997
	Reviewed:	November 20, 1999
	Reviewed:	December 7, 2002
	Reviewed:	December 10, 2004
	Reviewed:	December 15, 2006
	Reviewed:	December 13, 2008
	Reviewed:	December 10, 2010
	Reviewed:	November 29, 2012
	Reviewed:	December 11, 2014
	Reviewed:	December 8, 2016
	Reviewed:	December 6, 2018
	Edited:	March 26, 2020