



QUALITY ASSURANCE SPECIFICATIONS™

SFI SPECIFICATION 46.1

EFFECTIVE: FEBRUARY 13, 1998*

PRODUCT: Nitro-Methane Fuel Motorcycle Engine Restraint Devices

1.0 GENERAL INFORMATION

- 1.1 This SFI Specification establishes uniform test procedures and minimum standards for evaluating and determining performance capabilities for Nitro-Methane Fuel Motorcycle Engine Restraint Devices 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 46.1" 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 Nitro-Methane Fuel Motorcycle Engine Restraint Devices that meet or exceed the SFI Specification 46.1 test standards, by complying with the requirements of the SFI Specification 46.1 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 Nitro-Methane Fuel Motorcycle Engine Restraint Devices in compliance with all requirements of the SFI Specification 46.1 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 Nitro-Methane Fuel Motorcycle Engine Restraint Devices are used to constrain the heads, cylinders, upper cylinder components, rocker covers, other components and resultant fragments in the event of separation from the engine due to an explosion or mechanical failure.
- 2.2 Nitro-Methane Fuel Motorcycle Engine Restraint Devices shall be inspected every two years by the original manufacturer for recertification. All engine attachment straps must be covered with flame retardant material to reduce the sensitivity to ultraviolet light.
- 2.3 Any restraint device pertaining to this specification shall remain as constructed by the original manufacturer and not modified.

3.0 CONSTRUCTION

The restraint device shall incorporate a containment configuration to restrict the release of components and possible explosion fragments from the motorcycle heads and cylinders. The restraint device shall have engine attachment straps used to constrain the head and cylinder assembly in the event of detachment from the engine. The restraint device shall be designed as a strap or straps which form a continuous band around the engine crankcase and over the cylinder heads to produce a tension device to restrict the explosion components or fragments.

3.1 ATTACHMENT STRAPS

Straps shall be made of Kevlar 49 or other material rated at a total minimum load of 28,000 lbs (12,730 kg) per cylinder tensile strength with a minimum elongation of 2.0% and a maximum elongation of 4.0% at the test load.

3.2 HEAD CAPS OR COVERS

A cap or cover shall be provided on top of each cylinder head as a portion of the restraint assembly in the form of straps, fabric, metal or netting which covers at least 40% of the area of the top of each head to contain any large fragments and which holds the attachment straps in the position prescribed by the product manufacturer to assure proper loading of the attachment strap in the case of an explosion or mechanical failure.

3.3 MOUNTING CONFIGURATION

When one or more straps are to be continuously wrapped around the underside of the engine crankcase, the minimum restraining load capability of the strap(s) and connecting devices shall be 28,000 lbs (12,730 kg) per cylinder with a minimum strap elongation of 2.0% and a maximum strap elongation of 4.0% at test load is required.

3.4 MOUNTING HARDWARE

On the restraint assembly construction incorporating strap(s) wrapped around the crankcase and attached to itself, the attachment hardware must be connected by a minimum of four (4) 7/16" grade 5 bolts in single shear or equivalent. If other configurations such as bolts in double shear or tension are used, in all cases mounting and attachment hardware must be capable of successfully resisting the test loads specified herein when tested in race configuration.

3.5 MISCELLANEOUS HARDWARE

Buckles, connectors, etc. used for adjustment or quick release are not allowed unless they perform acceptably as a portion of the product assemblies to be tested under Paragraph 5.0 of this spec.

3.6 ADJUSTMENT METHOD

The restraint device must be a snug and tight fit so the attachment and/or mounting method shall include a series of different location holes or adapters to produce a residual light tension in the device when installed per manufacturer's instructions.

4.0 MODEL CLASSIFICATION

Any variation of the original design, i.e. construction, mounting method or hardware, or straps is considered a model change.

5.0 TESTING

5.1 TENSILE STRENGTH

5.1.1 SAMPLES

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

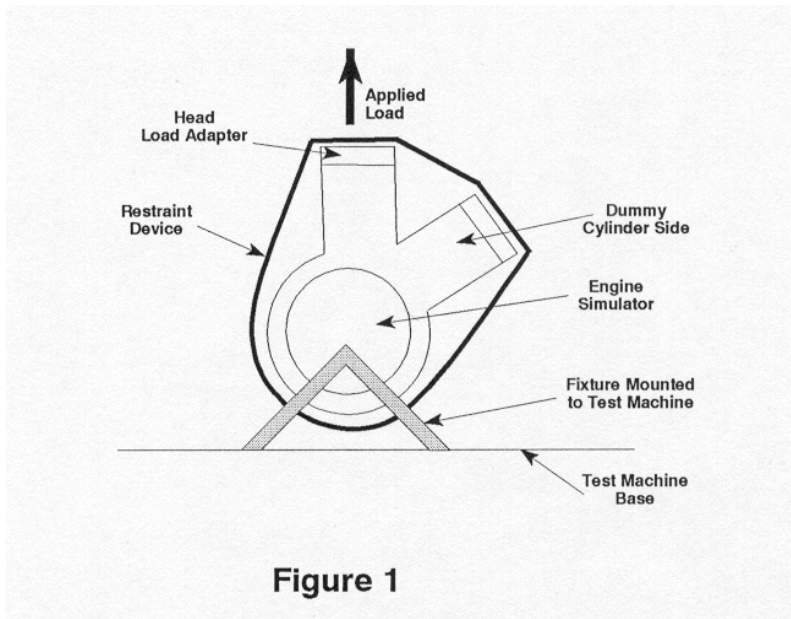
5.1.2 APPARATUS

A. TEST MACHINE

The test machine shall be capable of applying a minimum tensile load of 36,000 lbs (16,330 kg) with an excursion travel of four to five inches per minute (10.2-12.7 cm/min), 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.

B. TEST FIXTURE

The test fixture shall duplicate the mounting system prescribed by the manufacturer of the restraint device and shall provide a ram adapter which approximates the general shape of the cylinder head of a top fuel motorcycle engine (Figure 1). Only one cylinder head test shall be performed. The fixture shall be capable of withstanding the test machine load capability specified in Paragraph 5.1.2A above. On the restraint device of the continuous type wrapping around the crankcase and over the two (2) heads (Figure 1), a dummy cylinder head shape must be located in the proper relative location to the head adapter (which duplicates the engine configuration) such that the load applied on the ram adapter will produce the same tension in the continuous strap(s) as on the actual installation.



5.1.3 PROCEDURE

- A. The restraint device shall be mounted to the test fixture per manufacturer's instructions with the supplied attachment hardware.
- B. The test fixture shall be installed into the test machine such that the prescribed load can be applied to one cylinder head adapter location only.
- C. Using an excursion rate between four (4) and five (5) inches per minute (10.2-12.7 cm/min), apply an increasing load to the restraint device until a load of $28,000 \pm 280$ lbs ($12,730 \pm 130$ kg) is reached. Hold the load at that level for ten seconds, then release the load.
- D. At the point where the maximum load is being held, total elongation in tenths of an inch of the restraint device with respect to the machine base shall be measured and recorded.

5.1.4 INTERPRET RESULTS

At the conclusion of tensile testing, the sample restraint device shall be inspected visually for any evidence of damage or failure to the webbing or hardware. No visual cracks in hardware or major separation in the webbing is allowed.

6.0 PROOF OF COMPLIANCE

Nitro-Methane Fuel Motorcycle Engine Restraint Devices 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 which shall include the values of load applied and elongation experienced in addition to information required in Paragraph 7.0 of this spec.

6.2 TENSILE STRENGTH

The sample restraint device shall pass all applicable tensile strength tests without visual damage per Paragraph 5.1.3 to be acceptable.

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.

7.2 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 46.1 Program, the manufacturer must submit to SFI all information delineated in the Proof of Compliance section. This information shall be provided for each Nitro-Methane Fuel Motorcycle Engine Restraint Devices 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 Nitro-Methane Fuel Motorcycle Engine Restraint Devices 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 Nitro-Methane Fuel Motorcycle Engine Restraint Devices for sale with the representation that their product meets the SFI Specification 46.1. 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. One (1) label shall be attached to each restraint device, facing outward. The month and year of original manufacturer shall be punched out with an 1/8" hole punch on each patch. For recertification, the old labels shall be removed and the foregoing procedure shall be followed using new labels.

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 46.1" 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 46.1, Nitro-Methane Fuel Motorcycle Engine Restraint Device, Program, must demonstrate full compliance with the requirements of this specification within ninety (90) days of the latest effective date.

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