SFI SPECIFICATION 34.1 EFFECTIVE: JULY 24, 2023*

PRODUCT: Screw-Type Superchargers

1.0 GENERAL INFORMATION

1.1 This SFI Specification establishes uniform test procedures and minimum standards for evaluating and determining performance capabilities for Screw-Type Superchargers 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 34.1" 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 Screw-Type Superchargers that meet or exceed the SFI Specification 34.1 test standards, by complying with the requirements of the SFI Specification 34.1 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 Screw-Type Superchargers in compliance with all requirements of the SFI Specification 34.1 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. The manufacturer's name, trademark, or symbol, and serial numbers must appear on each rotor, housing, and housing bearing plate of the supercharger assembly. This information is in addition to the required conformance label information of section 11.

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 A Screw-Type Supercharger is a positive displacement device having internal compression for increasing the mass of air available for induction into an internal-combustion engine.

2.2 Screw-Type Superchargers shall be inspected every three (3) years by the certifying manufacturer for re-certification. If the original supercharger manufacturer is no longer producing a given model it is not necessary to conduct periodic revalidation testing. However, the supercharger still must be inspected and recertified every three years by an entity acceptable to the SFI Foundation. When a unit is determined to be acceptable for continued service, a new conformance label marked with the inspection date shall be used.

2.3 Any supercharger pertaining to this specification shall remain as constructed by the original manufacturer and not modified.

2.4 Maximum Engine Crankshaft Speed {MECS}: The greatest rotational speed possible, under any condition, of an internal-combustion engine utilizing a screw-type supercharger. The MECS is assumed to be 13,000 rpm for 450 cubic inch motor, 12,333 rpm for 500 cubic inch motor and 11,759 rpm for 550 cubic inch motor.

2.5 Drive Ratio: The number of revolutions of the drive shaft of the supercharger for each revolution of the engine crankshaft. This ratio is a function of the drive components. The maximum drive ratio {MDR} allowed shall be specified by the submitting manufacturer.

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3.0 CONSTRUCTION

Screw-Type Superchargers shall be made of materials that can endure the load and fatigue encountered in service. Cadmium plated parts shall not be used where they would be normally exposed to fuel. The supercharger shall have two mating rotors. A drive rotor rotated indirectly by the engine crankshaft and a driven rotor rotated by gears located on one pair of shaft ends within the supercharger housing assembly. The drive rotor must be constructed from laminated aluminum sections and shall have male lobes that mesh with the female lobes on the driven rotor. The driven rotor must be constructed from aluminum billet. Cast rotors are not acceptable.

3.1 FEATURES

3.1.1 PRESSURE RELIEF DEVICE

All classes shall have an integral pressure relief device that limits the amount of internal pressure in the outlet chamber of the supercharger. The relief shall be designed to quickly discharge the excess pressure to prevent overstressing of the supercharger components. The opening shall vent to the atmosphere without endangering surrounding components or personnel. The device may be replaceable but shall not be repairable. The device shall meet SFI Specification 23.1.

3.1.2 BEARINGS AND SEALS

Bearings and seals shall be capable of withstanding the radial and longitudinal loads imposed through the rotors at the maximum operational rotating speed and maximum temperature developed in the supercharger.

3.1.3 DRIVE COMPONENTS

Components used to transmit power from the engine crankshaft to rotate the drive rotor shall meet the recommendations of the supercharger manufacturer and the limits of paragraphs 5.1 and 5.2 of this specification.

3.1.4 MANIFOLD MOUNTING

Mounting of the supercharger to the manifold shall require an attachment method that maintains contact unless an abnormal internal pressure occurs. Fasteners shall be supplied or specified by the manufacturer.

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3.2 LABELING

The manufacturer shall specify the maximum rotational speed allowed for the drive shaft of the supercharger. It shall be equal to the MECS times the MDR. These speeds shall be permanently marked on a warning label that shall be placed in a conspicuous location on the supercharger. The label shall also state that if the speed is exceeded, the supercharger shall not be used and shall be returned to the manufacturer for inspection.

4.0 MODEL CLASSIFICATION

Screw-Type Superchargers can have models. Models are based on materials, construction methods and components, i.e. bearings and relief assemblies. Any change of these parameters constitutes a model change.

5.0 TESTING

5.1 ROTOR AND SHAFT ASSEMBLY OVER SPEED TEST

The rotation speed used in this test shall be called the rotor test speed {RTS}. It shall be calculated by multiplying the MECS, times the MDR, as specified by the submitting manufacturer, times square root of 1.5 (Equation 1).

$$RTS = MECS \times MDR \times \sqrt{1.5} = MECS \times MDR \times 1.225 \quad (1)$$

5.1.1 SAMPLES

Samples shall be fully processed, current style rotor and shaft assemblies which are representative of rotor and shaft assemblies currently produced or to be produced. For a given model, the rotor with the greatest diameter and length shall be tested. If a rotor set has different configurations, then both configurations shall be tested. The bearings, used shall be identical in configuration, type and construction to those used in an actual unit.

5.1.2 DIMENSIONAL PRETEST INSPECTION

A. ROTORS

Measure and record the overall length of the rotor at two locations 180 degrees apart. Measure and record the diameter of the rotor in five places, at each end and at one-fourth, one-half and three-fourths length. Repeat for each rotor in the set. Measurement accuracy must be to .001 of an inch.

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5.1.3 APPARATUS

The test fixture shall suspend the rotor. A suitable containment chamber shall be used to protect test personnel. In order to reduce the energy necessary to drive the rotor to the RTS, the containment chamber may be operated in a vacuum. The test fixture shall incorporate the following features:

A. A tachometer with an accuracy of ±2% at the RTS. The tachometer may be mechanical or photosensitive.

B. A spindle that can engage the rotor shaft, be driven to the RTS and allow attachment of the tachometer, if applicable. The spindle shall be capable of being attached rigidly and concentrically to the shaft.

C. A motor capable of rotating the spindle and therefore, the rotor to the RTS. A speed multiplying device may be used.

5.1.4 PROCEDURE

This procedure shall be followed for each rotor and shaft assembly that is required to be tested.

A. As appropriate, assemble the rotor and shaft assembly and bearings in the test fixture.

B. Engage the spindle with the rotor and shaft assembly and attach or position the tachometer.

C. If necessary, create a vacuum in the containment chamber. The drive rotor shall be rotated to the RTS and maintained at that level for a minimum of 15 seconds. The driven rotor speed may be reduced to correspond to the drive ratio between it and the drive rotor. After spinning the required time, reduce the rotational speed to zero.

D. Repeat the previous step a minimum of three times~~. on three separate samples for a total of at least nine tests.~~

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5.1.5 POST TEST INSPECTION

Upon completion of the test, the rotor and shaft assembly shall be examined for signs of distress, such as cracks, by either Fluorescent Dye Penetrant Inspection or Magnetic Particle Inspection. The dimensions taken before the test shall be taken again. The bearings shall also be inspected for signs of distress such as roughness or overheating.

6.0 PROOF OF COMPLIANCE

Screw-Type Superchargers 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 ROTOR AND SHAFT ASSEMBLY OVER SPEED TEST

Differences in before and after inspections shall not reveal any component with a dimensional change greater than 0.2 percent. After the test, a component shall have no signs of distress such as cracks or deformations. The bearings shall also show no signs of distress. Any discrepancy shall be cause for failure.

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.

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7.1.6 Product name, description and model designation.

7.1.7 Component name and description.

7.1.8 Photographs of the submitted parts

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 34.1 Program, the manufacturer must submit to SFI all information delineated in the Proof of Compliance section. This information shall be provided for each Screw-Type Superchargers 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.

Note: A model certification is based on successful tests using rotors with the greatest diameter and length. A screw-type supercharger variation shall not be considered certified under this model if it is later produced using rotors with a greater diameter and/or length unless it is also successfully tested.

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 Screw-Type Supercharger manufactured by the participant. After the second retest cycle following the initial design validation test (a total of three test occurrences), successful test results must be submitted to SFI at least once every 48 months. 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.

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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 Screw-Type Superchargers for sale with the representation that their product meets the SFI Specification 34.1. 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 two-part sticker. Each of the two parts will have the same SFI conformance label serial number. The stickers shall be marked with the month and year the unit is sold or inspected, and the manufacturer's serial number (may be the same as the SFI serial number), and protected with a transparent cover. The larger label must be installed across the mating seam of the rear cover and main housing, the smaller label must be installed near the top of the left side of blower, in a position visible when the car is in competition. The SFI conformance label serial number must always be permanently marked on the unit, even when additional manufacturer's serial numbers are used. The permanently marked SFI conformance label serial number must be in the same location as the large label. For a periodic inspection, the old label shall be removed and the foregoing procedure shall be followed using a new label. The serial number should appear on the customer invoice to aid in identification and tracking.

12.0 DECERTIFICATION

Participating manufacturers are subject to de-certification when not in compliance with the requirements of this program or when their products are not in compliance with the requirements of this specification. De-certification 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 de-certification, 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 de-certification. Appeals of such decisions will be heard at the next meeting of the Board of Directors of SFI.

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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 34.1" 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 34.1, Screw-Type Supercharger, Program, must demonstrate full compliance with the requirements of this specification within ninety (90) days of the latest effective date.

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