

IGNITER, SPARK, AERONAUTICAL ENGINE (HIGH TENSION)

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Revised

1. SCOPE

- 1.1 Scope: This specification establishes the qualification and acceptance limits for aeronautical engine high tension spark igniters.
- 1.2 Classification: Spark igniters of the following gap types and outline configurations are covered by this specification.

OUTLINE CONFIGURATIONS

Class A - Right angle, flange mounting  
Class B - Straight, flange mounting  
Class C - Threaded mounting

GAP TYPES

Type I - High Voltage, air  
Type II - High Voltage, surface  
Type III - High Voltage, air surface

2. APPLICABLE DOCUMENTS

- 2.1 The following specifications and standards of the issue in effect on the date of qualification form a part of this specification.

STANDARDS

SAE Aerospace Standards  
AS 341 Nomenclature for Aircraft Engine Parts

SAE Aerospace Recommended Practice  
ARP 422 Spark Igniter Outline, Right angle  
flange mounting  
ARP 423 Spark Igniter Outline, Flange mounting  
ARP 424 Spark Igniter Outline, Threaded mounting  
ARP 475 Gasket - Igniter Plug  
ARP 543 Gasket  
ARP 484 Nomenclature for Spark Igniters  
ARP 670 Terminal Standards

3. REQUIREMENTS

- 3.1 Materials: Materials which are not described herein shall be of the best aeronautical quality and suitable for the purpose intended.

Section 8.3 of the SAE Technical Board rules provides that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report, in formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against infringement of patents."

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- 3.2 Design: This document specifically covers the performance qualification and acceptance limits for aeronautical engine high tension spark igniters. Design details shall conform where practicable to SAE Aerospace Standards and Aerospace Recommended Practices.
- 3.3 Gasket: When specified by the purchaser, a gasket shall be furnished with each igniter. The purchaser shall also specify the material and construction. Dimensionally, the gasket will be in accordance with SAE ARP 543 or ARP 475 as applicable, unless specified otherwise by the purchaser.
- 3.4 Performance: The spark igniter shall perform satisfactorily when subjected to the tests described in this specification.
- 3.5 Identification: Each spark igniter shall be permanently and legibly marked with the following information:
- (a) The manufacturer's name, model number and applicable change letter shall appear around the circumference of the shielding barrel or shell, or on two faces of the wrenching hex, or on the mounting flange as designated on the applicable drawing.
  - (b) A manufacturing date code or batch designation shall appear near the above identification. The manufacturer may establish his own dating code when mutually agreed upon by the purchaser.
- 3.5.1 Special Identification - Similar appearing, non-interchangeable spark igniters: When it is physically possible to install the spark igniter in an engine model other than the engine model in which the spark igniter is or will be qualified for use, the purchaser may require that an apparent physical difference from other similar appearing spark igniter models be provided in that area of the spark igniter which is external to the engine and accessible for visual inspection as installed. Such special identification may consist of, for example, color coding, knurling, ribbing, banding, etc. and shall be mutually agreed upon by the vendor and purchaser.

#### 4. QUALIFICATION

- 4.1 Classification of Tests: The inspection and testing of spark igniters shall be classified as follows:
- (a) Qualification Tests: Qualification tests are those tests accomplished on samples submitted for qualification as a satisfactory product.

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(b) Inspection Tests: Inspection tests are those tests accomplished on spark igniters manufactured and submitted for acceptance under contract.

4.2 Qualification Tests: Qualification of a spark igniter shall consist of the following two sections:

- (a) Laboratory (bench) tests
- (b) Engine tests

4.2.1 Laboratory Tests: The laboratory tests may be conducted by the manufacturer under witness by the purchaser at his option. Or, the purchaser may optionally conduct the laboratory tests within his own facilities. Tests may also be conducted by a testing agency mutually agreed upon by the manufacturer and the purchaser. At least ten (10) spark igniters of the qualifying type shall be submitted to the following tests as described under "Test Methods", paragraph 4.4:

- (a) Examination of product
- (b) Gas leakage
- (c) Insulation breakdown

4.2.2 Engine Tests

4.2.2.1 Ground Tests: Following the laboratory tests, four or more sample spark igniters shall be used to accumulate a minimum of 1000 hours of engine operation. No individual spark igniter shall be operated fewer hours than are required in the endurance portion of the engine qualification specification. The accumulated engine time shall include at least one endurance test as specified in the engine model specification. The 1000 hour requirement shall not be applicable for qualification in engines not subject to 150 hour model test requirement. Instead, successful operation for three times specified engine endurance life of two engine sets or six spark igniters, whichever is greater, shall be required. During all ground tests, the spark igniters shall be connected to the engine ignition system and shall be operated in accordance with the applicable engine model specification.

4.2.2.2 Flight Tests: Upon satisfactory completion of the laboratory and engine tests, one engine set of spark igniters shall be tested to determine that altitude starting performance of the qualifying igniter meets the altitude performance requirements of the engine model specification.

4.3 Inspection Tests: Acceptance of a spark igniter shall consist of satisfactorily meeting the requirements of the following two paragraphs:

- (a) Certification
- (b) Acceptance tests