Society of Automotive Engineers, Inc.
29 West 39th Street
New York City

AERONAUTICAL RECOMMENDED PRACTICE

ARP 489

LEADS, SHIELDED, DETACHABLE SPARK PLUG

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Revised

1. SCOPE AND CLASSIFICATION:

1.1 Scope: This specification establishes the requirements for shielded, detachable high tension spark plug leads for reciprocating engines.

1.2 Classification: The leads shall be of the following grades for use in the stipulated temperature range:

Grade - A	250	to	-35	F
Grade - B	400	to	-65	F

2. REQUIREMENTS:

2.1 Materials: Materials shall be of the best quality and of the lightest practicable weight suitable for the purpose intended.

2.1.1 Metals: All metals used in the shielded detachable leads shall be of a corrosion resistant type or shall be suitably protected to resist corrosion during normal service life. These metals and joints shall be adequate for the temperatures encountered for the particular classification.

2.1.2 Protective Covering: The flexible metal shielding of the detachable leads may be provided with a suitable oil, gasoline, age and weather resistant covering. The covering must provide adequate protection against chafing and abrasion and must withstand the temperature requirements of the applicable grade without adverse affects or restriction of the lead performance.

2.1.3 Cable: Cables shall conform to the specific grade of MIL-C-3162 (ASG) as required by the applicable lead classification.

2.1.4 Miscellaneous Insulation: All insulating materials other than cable shall be adequate for the particular lead classification.

2.2 Design: The detachable leads shall be constructed so as to provide satisfactory radio interference suppression per MIL-I-6181 and to provide mechanical protection to the enclosed cable.

2.2.1 Terminal Connectors: The leads shall be constructed with Ferrules, High Altitude Spark Plug Lead, in accordance with ARP 457 unless otherwise specified.

2.2.2 Terminals: Terminals, sleeves, springs and eyelets shall conform to the requirements of drawing AS 293, unless otherwise specified.

2.3 Marking: Each ignition lead shall be durably and legibly marked at a convenient location or on a metal tag permanently secured to the assembly. Information to be incorporated shall include the manufacturer's name and part number. In addition, Grade A leads shall show manufacturing cable date code.

2.4 Workmanship: All details of workmanship shall be in accordance with high grade practice suitable for aircraft ignition components.

2.5 Performance: Leads shall satisfy the requirements specified in Section 3.

3. INSPECTION AND QUALIFICATION TESTS:

3.1 Test Classifications: The inspection and testing of shielded detachable spark plug leads shall be classified as follows:

3.1.1 Qualification Tests: Qualification tests are those tests accomplished on samples submitted for qualification as a satisfactory product.

3.1.2 Inspection Tests: Inspection tests are those tests accomplished on detachable leads manufactured and submitted towards fulfillment of a contract or purchase order.

3.2 Qualification Tests: Qualification test samples shall consist of a sufficient number of leads to equip the engine for which they are designed plus 12 additional leads. The qualification tests of leads shall consist of the following tests conducted on the quantities indicated and in the order listed:

3.2.1 12 Qualification Test Leads:	Reference Paragraph:
a. Examination of Product	4.2.1
b. Capacitance	4.2.2
c. High Potential Inspection	4.2.3
d. Heat Endurance	4.2.5
e. Cold Bending	4.2.6
f. Electrical Leakage	4.2.4
g. Air Leakage	4.2.7

3.2.2 Engine Set of Leads:	Reference Paragraph:
a. Shielding Properties (Before Eng. Test)	4.2.8
b. Engine Endurance	4.2.9
c. High Potential Inspection	4.2.3
d. Electrical Leakage	4.2.4
e. Air Leakage	4.2.7
f. Shielding Properties (After Eng. Test)	4.2.8

3.3 Inspection Tests: Each lead submitted for acceptance towards fulfillment of a contract or purchase order shall be subjected to the following tests in the order listed.

	Reference Paragraph:
1. Examination of Product	4.2.1
2. High Potential Inspection	4.2.3
3. Electrical Leakage	4.2.4

In addition, leads shall be subject to any of the other tests specified herein which the inspector considers necessary to determine conformance with the requirements of this specification.

4. TEST CONDITIONS AND REQUIREMENTS:

4.1 Test Conditions: The surroundings in which all qualification tests are conducted shall be as close to following conditions as is possible.

4.1.1 The air shall be essentially free from dust, drafts, fumes, and products of combustion.

4.1.2 The temperature shall be approximately 75 F and the pressure should be approximately one atmosphere.

4.1.3 The relative humidity shall be approximately 50%.

4.2 Test Requirements: The detachable leads shall satisfy the qualification and inspection requirements as specified when subjected to the tests headed as follows:

4.2.1 Examination of Product: Each lead submitted for Qualification or Inspection for acceptance under a contract or purchase order shall be carefully examined for conformance with the requirements of this specification and/or applicable drawings for which no test methods are specified.

4.2.2 Capacitance: The capacitance between the conductor and the shielding when measured at approximately 1000 cycles per second shall not exceed 33 micro-microfarads per foot of length, ferrule seat to ferrule seat, for 7 mm cable and 37 micro-microfarads for 5 mm cable.

4.2.3 High Potential Inspection: Leads shall withstand a 60 cycle alternating current potential of 12 KV RMS minimum applied between the conductor and the shielding for 5 minutes, without failure.

4.2.4 Electrical Leakage: Leads shall be subjected to a direct current potential of 15 KV minimum applied between the conductor and shielding. The leakage current shall be equivalent to a minimum resistance of not less than 1000 megohms.