

**MIL-I-8672B(AS)**

18 April 1969

**SUPERSEDING**

**MIL-I-8672A(ASG)**

**28 July 1959**

**MILITARY SPECIFICATION**

**INSTALLATION AND TEST OF AIRCRAFT PYROTECHNIC EQUIPMENT  
IN AIRCRAFT, GENERAL SPECIFICATION FOR**

\* This specification has been approved by the Naval  
Air Systems Command, Department of the Navy.

**1. SCOPE**

1.1 This specification covers the general requirements for the installation and test of aircraft pyrotechnic equipment in piloted aircraft.

**2. APPLICABLE DOCUMENTS**

\* 2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

**SPECIFICATIONS**

Military

MIL-S-3928	Switches (Coaxial), Radio Frequency Transmission Line
MIL-B-5087	Bonding; Electrical (For Aircraft)
MIL-W-5088	Wiring, Aircraft, Installation of
MIL-E-5400	Electronic Equipment, Airborne, General Specification for
MIL-T-5422	Environmental Testing, Aircraft Electronic Equipment
MIL-R-5757	Relays, Armature (for Electronic and Communication Equipment)

FSC MISC

**MIL-I-8672B(AS)****SPECIFICATIONS**Military (Continued)

MIL-E-6051	Electromagnetic Compatibility Requirements, Systems
MIL-R-6106	Relays, Electric, Aircraft, General Specification for
MIL-C-6781	Control Panel: Aircraft Equipment, Rack or Console Mounted
MIL-E-7080	Electric Equipment, Piloted Aircraft Installation and Selection of, General Specification for
MIL-F-7179	Finishes and Coatings: General Specification for Protection of Aircraft and Aircraft Parts
MIL-C-7762	Compasses, Installation of
MIL-F-15733	Filters, Radio Interference
MIL-N-18307	Nomenclature and Nameplates for Airborne Electronic and Associated Equipment

**STANDARDS**Military

MIL-STD-143	Specification and Standard, Order of Precedence for the Selection of
MIL-STD-875	Type Designation System for Aeronautical and Aeronautical Support Equipment
MS 21047	Nut, Self-Locking Plate, Two-Lug, Low Height, Steel, 125 KSI, FTU, 450 Degrees F
MS 21048	Nut, Self-Locking Plate, Two-Lug, Low Height, Cres, 125 KSI, FTU, 450 Degrees and 800 Degrees F
MS 33540	Safety Wiring and Cotter Pinning, General Practices for



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3.3 Material and equipment - Material and equipment used in the installation of aircraft pyrotechnic equipment in aircraft, shall be of high quality, suitable for the purpose, and shall conform to the Government specifications applicable under the contracts.

\* 3.3.1 Contractor-furnished equipment - Material and equipment furnished by the contractor (CFE) shall be in accordance with specifications selected in the order of precedence as established by MIL-STD-143, except as specified herein.

3.3.1.1 Standard parts - Standard parts (MS, AN, or JAN) shall be used in the installation of equipment wherever they are suitable for the purpose, and shall be identified on the drawing by their part numbers. Commercial utility parts such as screws, bolts, nuts, cotter pins, etc., may be used, provided they possess suitable properties and are replaceable by standards (MS, AN, or JAN) without alteration, and provided the corresponding standard part numbers are referenced in the parts list and, if practicable, on the contractor's drawings. In the event there is no suitable corresponding standard part in effect on date of invitation for bids, commercial parts may be used provided they conform to all requirements of this specification.

3.3.1.2 Contractor's specifications - Material and equipment conforming to contractor's specifications may be used, provided there are no applicable Government specifications and the contractor's specifications are approved by the procuring activity. If the contractor's specifications are used, the contractor shall, when required by the procuring activity, provide samples for test. The use of contractor's specifications shall not constitute waiver of Government inspection.

\* 3.3.1.3 Modifications - Unless authorized or directed by the procuring activity, the contractor shall not alter, rework, or modify contractor-furnished equipment built to and meeting Government specifications. When such modifications are authorized, the contractor shall identify the equipment. (See 3.23.1.)

\* 3.3.1.4 Equipment requirements - All electronic equipment furnished and installed by the contractor shall conform to MIL-E-5400, and shall be designed to withstand environmental tests described in MIL-T-5422.

3.3.1.5 Console controls - All contractor-furnished remote controls shall be designed for mounting in a console arrangement. These units shall be in accordance with MIL-C-6781.

3.3.1.5.1 Control panels - All control panels installed for use by the pilot and, if applicable, the co-pilot, shall be grouped together in a console arrangement located for convenient access, with preference given to ease of operation by the pilot. All control panels installed for other crew members shall be grouped in a console arrangement at the crew members' position, and located for convenient operation.

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\* 3.3.2 Government-furnished aircraft equipment - Unless authorized or directed by the procuring activity, material and equipment furnished by the Government (GFAE) shall be installed without modification. Modifications to GFAE shall be subject to inspection and approval by the procuring activity, and shall be suitably identified by additional nameplate, or otherwise, to indicate the rework.

3.3.2.1 Equipment failure - All equipment should arrive at the contractor's plant in fully operable condition, or operable with adjustments, as necessary, in accordance with approved adjustment procedures for the equipment. Equipment arriving at the contractor's plant requiring more than adjustment shall be considered to have arrived in an unsatisfactory condition.

3.3.2.2 Equipment failure report - The contractor shall prepare and submit to the procuring activity a report of failure of any equipment which arrives at the contractor's plant in an unsatisfactory condition. The form and frequency of such reports shall be subject to the approval of the Government Inspector.

3.3.2.3 Equipment repair - The contractor shall render an equipment operable by making minor repairs, as necessary, such as replacement of electron tubes, crystals, resistors, and easily replaceable subassemblies. When specified by the procuring activity, the contractor also shall perform such repairs and adjustments of a major nature as may be required for correction of defective equipment.

3.3.3 Metals - Metals involved in the installation of the equipment shall be a corrosion-resistant type or shall be suitably protected to resist corrosion and electrolytic action during normal service life. The use of dissimilar metals shall be governed by the requirements of MIL-F-7179. The specific requirements of MIL-B-5087 shall apply where the metals are part of a bonding path.

3.3.4 Nonmetals - Nonmetals used, including plastics, fabrics, and protective finishes, shall, insofar as practicable, be moisture and flame resistant, shall not support fungus growth, or shall be so treated as not to support fungus growth, and shall not be adversely affected by aircraft fluids.

\* 3.4 Equipment mounting - Mounting provisions shall exhibit strength and rigidity commensurate with the requirements of the airframe design and the physical characteristics of the equipment.

3.4.1 Strength of mounting brackets, etc. - Supporting members, brackets, racks, cable clamps, and mounting screws, drilled as specified or required for mounting the equipment on the aircraft structure, shall be of sufficient strength to carry the units mounted thereon under the maximum acceleration expected in the aircraft under all normal and emergency conditions and to withstand such incidental abuse as can be expected under all service conditions. The supporting members, brackets, etc., used to support equipments located in compartments occupied by crew members or other personnel, shall be designed to withstand without separation,

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loads in each of the three major axial directions of the aircraft resulting from either impact shocks of  $\pm 30g$  having a time duration of  $11 \pm 1$  milliseconds or a static load of  $\pm 20g$ .

\* 3.4.2 Mounting hardware - Machine screws or bolts of suitable diameter shall be used for mounting the equipment. Whenever the undersurface of the mounting is inaccessible, plate nuts conforming to MS 21047 and MS 21048, or equivalent approved by the procuring activity, shall be used. Self-tapping screws shall not be used for mounting equipment or for making electrical connections.

3.4.3 Mounting position - Units shall not be mounted or installed in any manner other than that for which units or the mountings are designed. In cases where the units or the mountings are to be installed at angles greater than 10 degrees from the designed angle in the normal flight attitude of the aircraft, the contractor shall request approval of the procuring activity. The use of contractor-furnished fixed mounts as an alternate to Government-furnished mounts may be permitted subject to prior approval of the procuring activity; said approval to be based on substantiating data to be submitted by the contractor.

3.5 Protection - Moisture pockets, walls, traps, and the like, in which water and condensed moisture can collect when the equipment is in normal operating position shall be eliminated or properly drained. Protection shall be provided against water or aircraft fluid leakage and condensation onto the equipment, excessive heat, and combustible vapors and fluids. Protection shall be provided against physical damage, such as may be caused by abrasion, crew movements, inadvertent operation of controls, loading and shifting of cargo, loading of armament and munitions, and ejection of shell cases, clips, and sonobuoys. The equipment shall be installed so that it will not cause damage to or be damaged by other equipment, wiring, or plumbing.

3.6 Shock and vibration - The equipment shall be installed so that it will not be subject to shock and vibrations exceeding the limits specified.

3.7 Cooling - Cooling shall be provided to the installed equipment as necessary to insure that the maximum ambient temperatures specified for the equipments are not exceeded in flight. Provisions shall be made for adequate cooling of equipment during ground operation. Provisions shall be made to keep the temperature of pyrotechnic equipment from exceeding  $165^{\circ}$  F.

3.8 Safety wiring - Equipment, snap-slide fasteners, and other fastening devices that provide for means of safetying shall be safety-wired to prevent vibration from loosening equipment during flight. When the component is equipped with four snap-slide fasteners, it will be satisfactory to safety-wire only two diagonally opposite fasteners. Safety wiring shall be in accordance with MS 33540. Tape of any nature shall not be used for safetying components.

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3.9 Bonding - Bonding of all equipment and tests pertaining thereto shall be in accordance with MIL-B-5087.

3.10 Compass deviation - Components and wiring of equipment installations shall not cause magnetic compass deviations in excess of those specified in MIL-C-7762.

3.11 Circuit protective devices - Circuit protective devices and installation thereof shall be in accordance with MIL-E-7080.

3.12 Switches - Switches (toggle, push-button, rotary, etc.) and installation thereof shall be in accordance with MIL-E-7080.

3.13 Relays - All relays shall be sealed and shall conform to MIL-R-5757, MIL-R-6106, or MIL-S-3928, as applicable.

3.14 Resistors - Resistors shall conform to applicable specifications listed in ANA Bulletin No. 400, including MIL-E-5400.

3.15 Power receptacles - When required for test equipment, receptacles shall be installed to provide d.c. or a.c. power or both, in accordance with wiring diagrams furnished by the procuring activity.

3.15.1 Receptacle installations - When more than one power receptacle of the same type is required at the same position in the aircraft (see 3.15), the contractor may install only one receptacle, provided:

- (a) The wire sizes and circuit protector ratings comply with maximum test power requirements.
- (b) Frequency regulation is adequate for each equipment.
- (c) The location of receptacle with respect to applicable equipment conforms to requirements of applicable drawings.
- (d) The receptacle is completely identified.

3.15.2 Receptacle location - When a junction box for equipment is located near enough to applicable equipment to meet the requirements of drawings calling for test power receptacle(s), the receptacle(s) shall be installed in a wall of the junction box.

3.15.3 Receptacle identification - Each power receptacle shall be identified as POWER RECEPTACLE. In addition thereto, the identification shall include the following: Types (in volt-amperes) of electrical power and amount provided by

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the receptacle and frequency range, if alternating-current power is provided as in the following examples:

28V DC	115V 1-PHASE
280 VA	380-420 REG
	300 VA

\* 3.16 Radio interference - The installation shall comply with MIL-E-6051 governing interference limits and methods of measurement.

\* 3.16.1 Filters - Filters shall be in accordance with MIL-F-15733 and shall be installed only when it is demonstrated to the procuring activity that they are necessary to insure compliance with MIL-E-6051.

3.17 Wiring, cables, and connectors - Interconnecting wiring, cables, and connectors shall be installed in accordance with the individual equipment interconnecting wiring diagram, or cable diagram, or both, and in accordance with MIL-W-5088. In case of discrepancy between MIL-W-5088 and requirements of applicable drawings furnished by the procuring activity, the drawings shall in all cases prevail. Cables shall not be routed through equipment mounting bases. Cables shall be of sufficient length and shall be so supported as not to interfere with the operation of vibration isolators. Cables shall be cut with sufficient excess length to facilitate at least one service replacement of connectors.

3.18 Connectors - Approved connectors shall be installed where cables are routed through structural members requiring a disconnect for pressurization or to facilitate production assembly. Extra contacts in these connectors shall be provided in accordance with the requirements of MIL-E-5400. All radio-frequency connectors, except bayonet-locking types, located in positions inaccessible during flight, shall be safety-wired in accordance with applicable drawings.

3.19 Coaxial cables - Coaxial cables shall be the type specified on applicable wiring diagrams. Cable clamps shall be of a size to provide a snug fit without deforming the cable. Cable clamps shall be located at each end of all bends where the radius is 3 inches or less.

3.19.1 The routing shall be as direct as possible avoiding unnecessary bends and shall be designed to permit easy replacement of the cables without requiring the removal of fixed skin section or major items of fixed equipment.

3.19.2 The use of right-angle adapters shall be held to the absolute minimum to avoid the resulting signal losses and to reduce the susceptibility to moisture effects. Where cables cannot be so routed as to avoid a termination bend radius less than six times the diameter of the cable, approved right-angle adapters may be installed unless the detail equipment installation specification or drawings

prohibits their use. Standard coaxial cables shall not be installed in locations where ambient temperatures will exceed 180 degrees F (82 degrees C). Special high-temperature cables are available for installation in areas where ambient temperatures exceed 180 degrees F (82 degrees C). Information relative to these cables may be obtained from the procuring activity. Cables which are subject to damage due to extreme cold conditions shall not be utilized in any location where flexure will occur during normal operation. Cables assembled by the aircraft manufacturer shall be prepared in accordance with drawings approved by the procuring activity and shall be tested for continuity, insulation, high potential, and correct connections before and after installation.

3.20 Clearance - Space shall be provided for each component to insure adequate ventilation, unobstructed shock-mount operation, and accessibility for pre-flight testing, for replacement, and for inflight operation. Space requirements for each component shall be determined by the airframe contractor based upon the following factors:

- (a) Clearances shall be provided in accordance with installation drawing(s) for the component, and in accordance with the special requirements for accessibility for preflight testing, for replacement, and for inflight operation and for adequate ventilation as dictated by the basic design of the airplane.
- (b) Where no approved drawing exists, the airframe contractor shall utilize detail equipment installation specifications, handbooks, mockup equipment, actual equipment, vendor's drawings, and such other sources as are available and are approved by the procuring activity.

3.21 Pressurization - When more than one equipment requiring pressurization is installed in the same airframe, the contractor shall explore the feasibility and practicability of obtaining the required pressurization from a common source.

3.22 Presentation devices - Indicators and presentation devices shall be installed at normal eye level in front of the operator to provide maximum readability and ease of adjustment at all times during operation. When more than one presentation device is to be located in one operating position, a priority for choice location will be established by the procuring activity.

\* 3.23 Identification - The type designation portion of the nomenclature (e.g. AN/APS-00), unless classified, for major components of electronic equipment shall be affixed to adjacent structure to identify the location of the components and shall conform to MIL-STD-875. Letter size and method of affixing shall be accomplished within such practical limits as determined by the contractor.

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3.23.1 Identification of contractor-furnished equipment components - The contractor shall submit to the procuring activity a list of contractor-furnished equipment components, of the types listed below, which do not have Government designations or nomenclature, with a brief description of the function of the component, requesting determination as to which of the items will require Government nomenclature. In those cases where nomenclature is desired by the procuring activity, the contractor shall request assignment of nomenclature and nameplate approval in accordance with the requirements of MIL-N-18307.

- (a) Control panels in accordance with MIL-C-6781.
- (b) Contractor-furnished, contractor-modified equipment (see 3.3.1.3).
- (c) Marriage units.
- (d) Special mountings.
- (e) Indicating devices.

3.24 Performance - The entire equipment installation shall provide acceptable performance as defined by the applicable detail equipment test specification, equipment handbook, and such other information as may be furnished by the procuring activity.

3.25 Safety - The installation shall provide maximum convenience and safety to personnel while installing, operating, and interchanging a complete equipment assembly, or component part thereof, in aircraft. Satisfactory means shall be provided to prevent personnel from accidental contact with voltages in excess of 40 volts, including radio-frequency voltages on binding posts.

3.26 Ventilation - Provisions shall be made for adequate ventilation of the space in which pyrotechnic items are installed to remove the noxious fumes which may be given off in the event of accidental ignition.

3.27 Workmanship - Details of workmanship shall be in accordance with high-grade aircraft armament equipment installation practice, and shall be of sufficient quality to insure safety, proper operation, and service life.

#### 4. QUALITY ASSURANCE PROVISIONS

\* 4.1 Responsibility for inspection - Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved

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by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

\* 4.2 Classification of tests - The inspection and testing required in connection with the installation of aircraft pyrotechnic equipment in aircraft shall be classified as follows:

- (a) Engineering approval tests (4.3.1).
- (b) Bench tests (4.3.2).
- (c) Preflight tests (4.3.3).
- (d) Flight tests (4.3.4).

#### 4.3 Tests -

4.3.1 Engineering approval tests - These tests, consisting of both flight and ground tests, shall be adequate to show that the design of the installation is satisfactory and shall demonstrate that the system will perform in a manner commensurate with the tactical capabilities of the equipment. These tests shall determine interference levels, equipment ambient temperature levels, and system stability and reliability. When acceptable limits have not been established by the procuring activity, limits shall be proposed by the contractor and submitted for approval. Normally, engineering approval tests shall be conducted on the first production aircraft and other selected aircraft as stipulated by the procuring activity.

4.3.2 Bench tests - Prior to installation in aircraft, each and every piece of equipment shall be bench tested at the installation point to determine that the equipment has not been damaged nor the performance and operation affected in shipping and handling or during the interchange of components, and to establish that their controls function properly and that basic operating characteristics are within prescribed limits.

4.3.3 Preflight tests - Completed installations of equipment shall be tested and adjusted as required to establish that the equipment has been installed properly and that basic performance requirements are met. Preflight tests shall consist of such tests and adjustments, in accordance with approved procedures, to insure that all cabling is satisfactory, primary power is adequate, and operation is above the minimum standard for acceptance.

4.3.4 Flight tests - These tests shall be conducted on each aircraft to establish that the entire system is functioning properly. Production flight tests shall check all individual equipment and systems using a greatly abbreviated version

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of the engineering approval flight tests. Such tests shall include at least those items which were shown to be marginal or difficult to control in the production aircraft as a result of the engineering approval flight tests.

4.4 Test procedures - The procedures for making the Bench, Pre-flight, and Flight test, generally will be furnished by the procuring activity in the form of test specifications, equipment handbooks, or letters of instruction. The procedure for any required test which is not furnished by the procuring activity shall be prepared by the contractor and submitted to the procuring activity for approval. The proposed test procedure shall be submitted in sufficient time to permit its review by the procuring activity and incorporation of all necessary revisions by the contractor prior to the start of any testing. Where tests cannot be accomplished in accordance with approved procedures owing to circumstances beyond the control of the contractor, the tests shall consist of such alternate procedures as approved by the procuring activity to insure satisfactory equipment operation.

4.5 Testing of provisions for Service-installed equipment - Where contractors are authorized or requested to make provisions for Service-installed equipment, the contractor shall make temporary installations of the equipment in each aircraft so that Preflight and Flight tests may be accomplished. The contractor shall request the procuring activity to provide the necessary equipment required for the temporary installation.

4.6 Check-off list - Results of tests conducted on each equipment shall be recorded by the contractor, on a check-off list. These data shall be retained by the contractor for review by the contractor and by representatives of the procuring activity in connection with studies leading to proposals for simplifying or otherwise improving the test requirements involved. Copies of these check-off lists normally will not be required for transmission to the procuring activity or to the cognizant Government inspector.

## 5. PREPARATION FOR DELIVERY

5.1 This section not applicable to this specification.

## 6. NOTES

6.1 Intended use - This is a general specification and is intended to require important desirable characteristics of installations which are known to be achievable in the majority of airplane designs of today, and to prohibit serious installation design discrepancies which have appeared in aircraft. Since this is a general specification and cannot properly account for the various special problems which appear in new airframe designs, airframe contractors are encouraged to review the requirements of this specification, subordinate specifications, and supporting installation and test specifications, with the intent of developing proposals to

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deviate from specifications whenever such deviation is predicted to yield simplification, greater reliability, better logistics, reduced cost, or improved operations.

6.2 Unpacking and mechanical inspection for damage - All equipments furnished by the Government are tested before shipment. Careful handling helps to keep these units in acceptable working condition when reassembled. The equipment should be unpacked carefully and examined for apparent damage and shortages. Any dust and packing material should be removed from all units. When compressed air is used, extreme care should be exercised to avoid damage to the equipment. Units received in an unsatisfactory condition should be reported in accordance with existing instructions.

\* 6.3 The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationships to the last issue.

Preparing Activity:  
Navy - AS  
Project No. MISC-N574

SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 119-R004
INSTRUCTIONS		
This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity (as indicated on reverse hereof).		
SPECIFICATION <b>INSTALLATION AND TEST OF AIRCRAFT PYROTECHNIC EQUIPMENT</b>		
<b>MIL-I-8672B(AS) IN AIRCRAFT, GENERAL SPECIFICATION FOR</b>		
ORGANIZATION (Of submitter)	CITY AND STATE	
CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT
MATERIAL PROCURED UNDER A		
<input type="checkbox"/> DIRECT GOVERNMENT CONTRACT <input type="checkbox"/> SUBCONTRACT		
1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? A. GIVE PARAGRAPH NUMBER AND WORDING.		
B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.		
2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID		
3. IS THE SPECIFICATION RESTRICTIVE? <input type="checkbox"/> YES <input type="checkbox"/> NO      IF "YES", IN WHAT WAY?		
4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)		
SUBMITTED (Printed or typed name and activity)	DATE	

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DEPARTMENT OF THE NAVY  
Naval Air Engineering Center  
Philadelphia, Pennsylvania 19112

POSTAGE AND FEES PAID  
NAVY DEPARTMENT

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