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MIL-STD-1289C
17 JANUARY 1995
SUPERSEDING
MIL-STD-1289B
05 NOVEMBER 1990

MILITARY STANDARD

AIRBORNE STORES GROUND FIT AND COMPATIBILITY, REQUIREMENTS FOR

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Aviation and Troop Command, ATTN: AMSAT-R-EDS, 4300 Goodfellow Blvd., St. Louis, Missouri 63120-1798, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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FOREWORD

1. This Military Standard (MIL-STD) is approved for use by all Departments and Agencies of the Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document shall be addressed to the U.S. Army Aviation and Troop Command, ATTN: AMSAT-R-EDS, St. Louis, MO 63120-1798 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document, or by letter.

3. The information contained herein constitutes a standardization of procedures and criteria for testing ground fit and compatibility of munitions and stores with aircraft and armament weapons support equipment. This document is applicable to all persons in the Aircraft/Stores Compatibility area. It is intended to serve as a means of informing, guiding, and providing instructions in the fundamentals and principles involved in the determination of physical, electrical, and operational compatibility of an airborne store with its associated suspension equipment, support equipment, and with the carriage aircraft. The physical clearances included herein are recommended to prevent any major interference or damage from developing. If deviations or waivers are necessary they must be justified, documented, and approved by the recognizant authority responsible for the aircraft.

4. Technical questions may be addressed to the following offices:

Commander
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1.0 SCOPE

1.1 Purpose. This standard establishes the requirements and testing procedures for installations of all munitions and stores carried on an aircraft. It includes testing of all stores defined in 3.2.

1.2 Application. The compatibility qualities of every airborne store undergoing test will be demonstrated in accordance with the provisions of this standard, unless specific deviations are authorized by appropriate service authority or unless special requirements are specified by the development agency.

1.3 Exclusions. The requirement for aircraft electrical circuits which are a part of the arming, safing, and monitoring systems for nuclear bombs or missiles with nuclear warheads are excluded from this document. To assure electrical compatibility of nuclear weapons in those areas, coordination with appropriate nuclear design agencies must be accomplished.

2.0 APPLICABLE DOCUMENTS

The following documents, of the issue in effect on date of invitation for bids, form a part of this standard to the extent specified herein.

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents which are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

MIL-HDBK-300	Technical Information File of Support Equipment
MIL-STD-1385	Preclusion of Ordnance Hazards in Electromagnetic Fields; General Requirements for
MIL-STD-1763A	Aircraft/Stores Certification Procedures
MIL-W-5088	Wiring, Aerospace Vehicle
MIL-E-6051	Electromagnetic Compatibility Requirements, Systems
MIL-S-8512	Support Equipment, Aeronautical, Special, General Specification for the Design of
MIL-A-8591	Airborne Stores, Suspension Equipment and Aircraft-Store Interface (Carriage Phase); General Design Criteria for
MIL-I-8671	Installation of Droppable Stores and Associated Release Systems

MIL-M-9977	Manuals, Technical, and Checklists: Munitions/Weapons Loading Procedures, Nonnuclear and Nuclear - Packages, Standard Data: Munitions Loading Procedures, Nonnuclear, Preparation Of

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Naval Publications and Forms Center, (ATTN: NPODS), 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issue are those cited in the solicitation.

NAVY	
SD-24	General Specification for Design and Construction of Aircraft Weapons Systems
ARMY	
AMCP 706-202	Engineering Design Handbook, Helicopter Engineering Detail Design

2.2 Non-Government publications. Non-government document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issue of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issue of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. However, documentation and approval of deviations or waivers from this standard is required by the recognizant authority responsible for the aircraft. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3.0 DEFINITIONS

3.1 Aircraft. Any vehicle designed to be supported by air, being borne up either by the dynamic action of the air upon the surfaces of the vehicle, or by its own buoyancy. The term includes fixed and movable wing airplanes, helicopters, gliders, and airships, but excludes air-launched missiles, target drones, and flying bombs.

3.2 Store. Any device intended for internal or external carriage and mounted on aircraft suspension and release equipment, whether or not the item is intended to be released in flight from the aircraft. Stores include missiles, rockets, bombs, nuclear weapons, mines, torpedoes, pyrotechnic devices, detachable fuel and spray tanks, line-source disseminators, dispensers, pods (refueling, thrust augmentation, gun, electronic countermeasures, etc.), targets, cargo-drop containers, and launchers such as missile and rocket launchers. When the missile launcher is the store, the missiles fired from the launchers are also stores.

4.0 GENERAL REQUIREMENTS

4.1 Store fit and compatibility test configurations. The store shall undergo fit and compatibility testing on each aircraft specified by the requesting agency as specified by an approved test method. It is essential to ensure that compatibility demonstrations are not unique to test aircraft and store alone, but are applicable also to all models and series of operational aircraft and stores. If this cannot be accomplished, deviations will be recorded and reported. Approved modifications will be required to authorize carriage of all nonstandard stores on test aircraft.

4.2 Store installation requirements. The installation requirements specified in this standard are general in nature and include most of the desired aircraft store criteria. They shall be used unless determined to be not applicable for the store undergoing testing. The requirements are included in NAVY SD-24 and in ARMY AMCP 706-202.

4.2.1 Loading procedures. Store preparation, loading, and handling shall be accomplished in accordance with approved service armament and munitions checklists or an approved munitions checklist. These instructions shall include efficient and safe handling procedures, adjustments, and controlling procedures for the store under all loading and operating conditions expected to be encountered. Verification of the efficiency and correctness of the procedures shall be made in accordance with the Loading Procedure Test (see 5.3.2). Additional information can be obtained in MIL-M-9977.

4.2.2 Alignment of stores. Stores shall be capable of being installed with their longitudinal axis parallel to the stores alignment line specified for the aircraft. Except where specified otherwise by the aircraft detail specification, the aircraft stores suspension equipment shall be installed such that the longitudinal axes of stores are aligned in the pitch plane parallel to the flight path of the aircraft for the average cruise condition or to minimize drag caused by carrying the stores. When boresighting provisions are included in the aircraft or store, the adequacy and efficiency of the provisions shall be tested in accordance with the Installation Tests (see 5.3). Stores shall be installed such that removal of components or parts for boresighting is possible without removing the store from the aircraft.

4.3 Clearances. Minimum clearances specified below (measured during static ground fit tests) are intended to ensure adequate clearance during worst-case dynamic in-flight maneuvers. A summary of the clearances required for the aircraft/store combination is included at Appendix A for the use during the test.

4.3.1 Loading clearance. Sufficient clearance shall be provided to enable movement of the store into position when the aircraft is fully serviced and is in its normal attitude on a normal landing or servicing surface. It is desirable that sufficient clearance be provided to allow loading/unloading at maximum aircraft gross weight with tires flat and struts fully compressed. For the purpose of determining this clearance, use of common armament weapons support equipment shall be assumed unless peculiar armament weapons support equipment is designated for use with the store or aircraft. Additional information can be obtained in MIL-I-8671.

4.3.2 External store clearances.

4.3.2.1 Store to aircraft clearance. A minimum clearance of 25.4 mm (one inch) shall be provided between all required stores and aircraft (including flight control surfaces and hoisting equipment of aircraft such as flaps, dive brakes, ailerons, elevators, rescue hoists, etc.) with the surface deflected to the point of the closest proximity to the store. For aircraft with variable wing geometry, the worst-case wing sweep angle shall be used to determine minimum clearance.

4.3.2.2 Store to store clearance. A minimum clearance of 25.4 mm (one inch) shall be provided between adjacent stores noting that additional clearance may be required for fuze clearance (see 4.3.4) with stores mounted on the aircraft stores suspension equipment. For stores configured in tandem, this distance shall be measured from the plane tangent to the rear most surface of the forward store to the closest surface of the aft store or fuze to ensure clearance during separation (see 4.3.2.4 and 4.3.2.5). The clearance shall be maintained with any movable surface or component of the store that is normally free or controlled to move while the store is in its installed position, or deflected to the point of closest proximity to the adjacent store.

4.3.2.3 Store to pylon clearance. A minimum clearance of 12.7 mm (one-half inch) shall be provided between any component along the length of the store and pylon on which it is suspended. Suspension lugs, store sensing switches, sway bracing, and bomb charging well electrical power generator components may be excepted provided that careful review/analysis is performed to ensure sufficient clearance.

4.3.2.4 Rail launched stores clearance. A minimum of 25.4 mm (one inch) clearance shall be provided between any movable surface or component of a rail launched store that is free or controlled to move during launch with the surface deflected to the point of closest proximity to any other store, launcher, pylon, or aircraft surface.

4.3.2.5 Store ejection clearance. A minimum of 25.4 mm (one inch) clearance shall be provided for any movable surface or component of an ejected store during ejection to the point of closest proximity to any other store, launcher, pylon, or aircraft surface. This clearance shall be verified by actual testing or by analysis approved by the procuring agency.

4.3.2.6 Intake duct clearance. An assessment shall be made to determine whether or not the store installation could cause engine compressor stall or flameout as a result of exhaust, shock, gasses or pressure wave interference. The degree of probability of ingestion of fahnstock clips, wire, spent cartridge brass, or other debris in the airstream from store separation shall be noted. The clearance required as a result of the assessment shall be verified on ground.

4.3.2.7 Store arming control system clearance. Adequate clearance must be provided to ensure correct operation of the arming control system during separation. The store arming control system (such as arming loops, swages, or connectors) shall not become jammed or caught on the aircraft, pylon, launcher, or ejector rack to prevent inadvertent initiation of the store arming sequence.

4.3.2.8 Propeller and rotor disk clearance. On propeller and rotor equipped aircraft, a minimum clearance of 152.4 mm (six inches) between the worst case propeller/rotor disk position or any part of the aircraft and the bullet trajectory (bullet trajectory should be the worst-case position in the firing envelope and the worst-case gun dispersion) shall be provided. The clearance during launch for guided and unguided rockets and missiles shall be a five degree half angle cone measured from the trajectory of the outermost surface of the ordnance to the worst-case rotor plane or aircraft structure. The definition of a five degree half angle cone is depicted on figure 1. Clearance shall be sufficient to preclude induced damage from spent cases or any loose items under a worst-case release condition. (The worst-case rotor plane cannot always be located accurately in a static condition and should also be measured in a dynamic situation.)

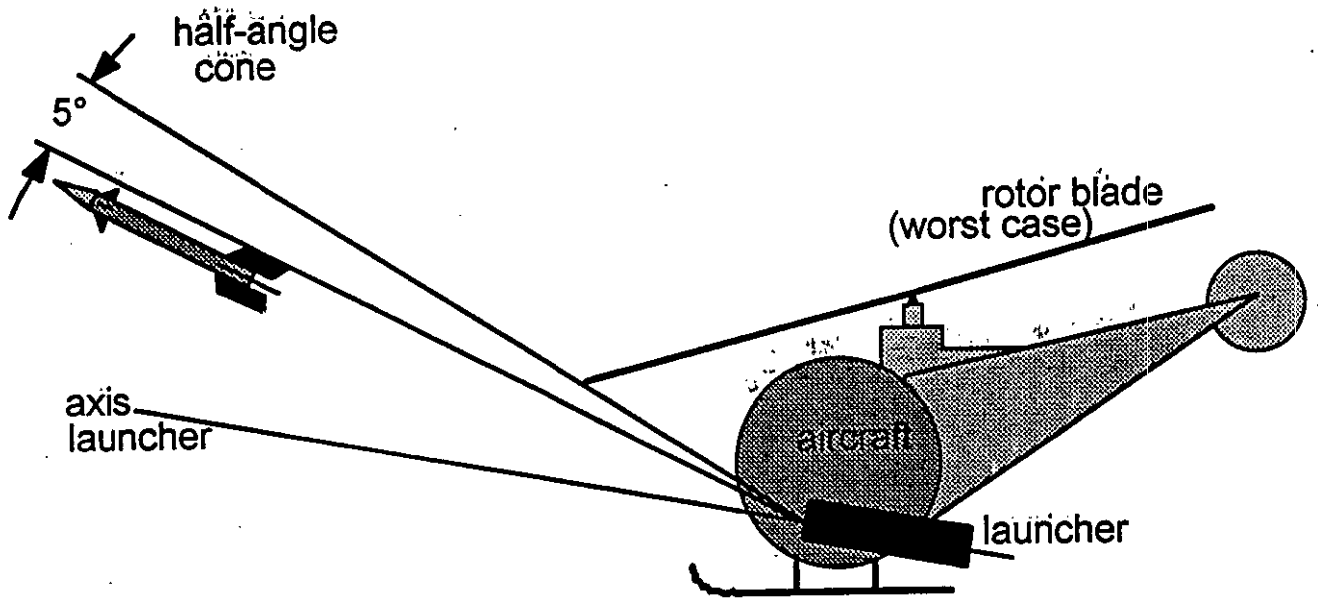


FIGURE 1. Definition of a five degree half angle

4.3.2.9 Clearance for missile tubes. Sufficient clearance shall be provided between adjacent missile tubes on a multi-tube launcher. Clearance shall assure that activation/firing of one missile will not adversely affect or damage the adjacent missile or the environmental cover of an adjacent tube. Clearance between a missile tube and the aircraft surface should be covered by 4.3.2.1. Clearance between two missile tubes on adjacent launchers should be covered by 4.3.2.2.

4.3.3 Internal store clearances.

4.3.3.1 Store to aircraft clearance. A minimum clearance of 25.4 mm (one inch) shall be provided between all required stores and aircraft bay structure, hydraulic equipment, electrical equipment, fuel lines, and any other equipment attached to the aircraft bays which the stores could contact during captive carriage. The 25.4 mm (one inch) clearance applies to the minimum clearance between all stores and mechanisms that move during normal aircraft operation, including bomb doors (and their swept volumes), door actuator systems (and their swept volumes), spoiler systems (and their swept volumes), and any other applicable mechanisms which may contact the stores in the bay. There should also be a 25.4 mm (one inch) clearance between the above aircraft parts and the volume stores sweep out during a trapeze suspension translation or a rotary suspension rotation.

4.3.3.2 Store to store clearance. Same as 4.3.2.2.

4.3.3.2.1 U.S. Navy requirement. Since the U.S. Navy does not use trapeze or rotary suspension systems in those aircraft that have bomb bays, the minimum requirement for clearance between internal stores is still 63.5 mm (2.5 inches) to prevent contact between stores.

4.3.3.3 Store to suspension clearance. Same as 4.3.2.3.

4.3.3.4 Trapeze and rotary suspension to aircraft clearance. There should be 25.4 mm (one inch) clearance between the aircraft (bay structure, bay doors, door actuator systems, hydraulic equipment, electrical equipment, fuel lines, and any other equipment attached to the aircraft bays which the store could contact during captive carriage) and the volume the trapeze or rotary suspension (including the ejection rack) sweep out during the full translation or rotation operation.

4.3.3.5 Intake duct clearance. Same as 4.3.2.6.

4.3.3.6 Store arming control system clearance. Same as 4.3.2.7.

4.3.3.7 Ejection store clearance. Except for the closed bomb bay doors and side rails, no part of the aircraft nor any other obstructions (except required sway braces, displacing gear, etc., which are automatically removed from their obstructive positions as each store is released) shall lie within the clearance space envelope bounded by the imaginary plane surfaces defined as follows:

a. The plane tangent to the uppermost extremity of the store parallel to the armament roll axis and parallel to the pitch axis of the aircraft as shown on figure 2.

b. Four planes tangent to the foremost, rearmost, right, and left extremities of the store and parallel to the pitch axis of the store at an angle 10 degrees away from the vertical, expanding in the direction of the ground as shown on figure 3.

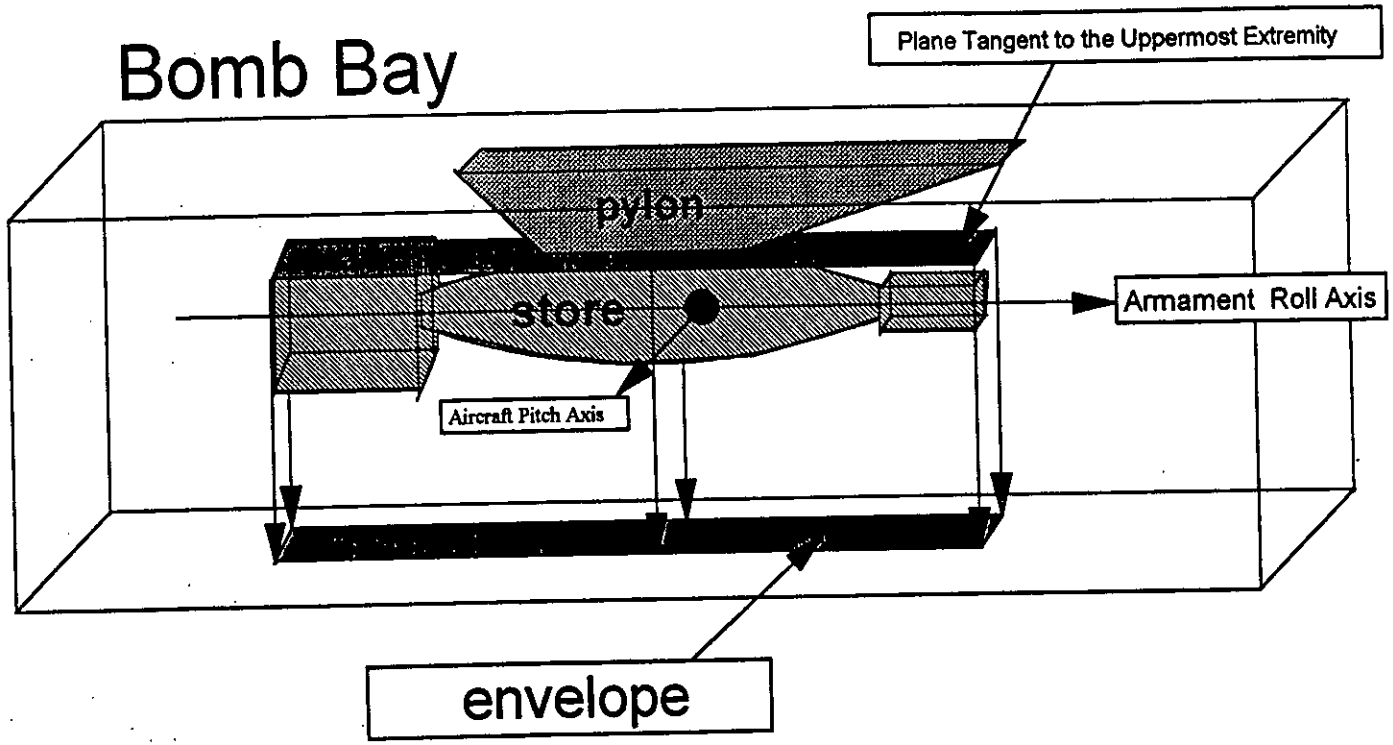
4.3.4 Fuze clearance. For stores that ordinarily are made safe by removal of fuzes, adequate clearance shall be provided to remove or install fuzes on the loaded store without removing the stores from their loaded positions.

4.3.5 Minimum ground clearance. The minimum clearance required between the ground and the maximum composite envelope of all stores carried externally differs from each of the three services, as does the method of establishing the aircraft configuration prior to measurement. Weapon designers should strive for a maximum degree of interoperability between services when developing new weapons, and the service clearance criteria which provides the most critical case should be used whenever possible. Specific requirements for each service are as follows:

a. General Army clearance design guidelines are given in AMCP 706-202. The Army requires a 152.4 mm (six inch) ground clearance in the worst-case condition of flat tire(s) and depressed strut(s), with the aircraft in either a static, takeoff, or landing attitude at maximum allowable gross weight.

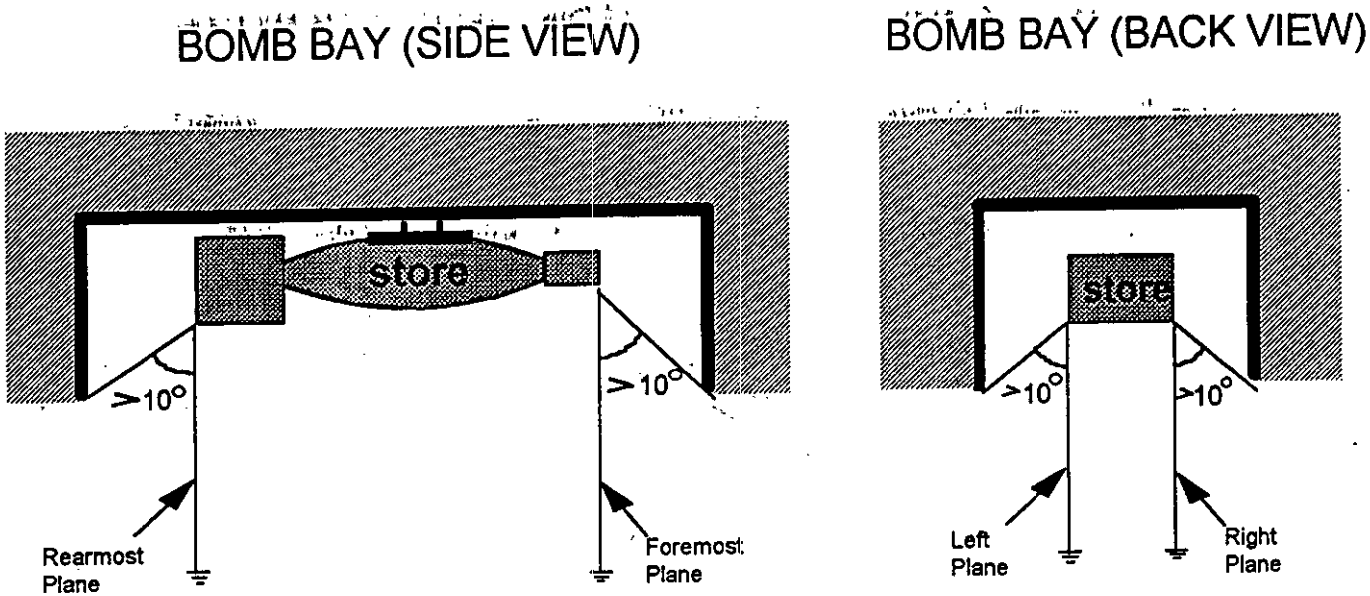
b. The Navy requires a 152.4 mm (six inch) ground clearance with tires flat and depressed struts with aircraft in either a static, takeoff, or landing attitude. For aircraft operated from carriers, Navy Publication SD-24 shall define worst-case conditions for measuring 152.4 mm (six inch) clearance between aircraft/stores and landing area.

c. The Air Force requires a minimum ground clearance of not less than 76.8 mm (three inches), [152.4 mm (six inches) for



Note: The plane tangent to the uppermost extremity of the store parallel to the armament roll axis and parallel to the pitch axis of the aircraft.

FIGURE 2. Internal carriage clearance



Note: Four planes tangent to the foremost, rearmost, right, and left extremities and parallel to the pitch axis of the store at an angle 10 degrees away from the vertical, expanding in the direction of the ground.

FIGURE 3. Internal carriage clearance

aircraft designed to operate on rough terrain] in the worst condition of flat tire(s) and completely depressed strut(s), with the aircraft in either a static, takeoff, or landing attitude. (For example, centerline stores mounted aft of the main landing gear require both main landing gear tires flat and struts compressed to simulate the worst-case ground clearance.)

4.3.6 Landing gear clearance. A minimum clearance of 25.4 mm (one inch) shall be provided between all stores and any portion of the aircraft landing gear. This clearance shall apply both to the landing gear down and locked position as well as throughout the entire retraction and extension cycle.

4.3.7 Engine heat, jet, and munitions blast clearance. Adequate insulation shall be provided to stores from engine heat. Permissible store temperatures shall be those of the ordnance specification. Sufficient clearance for exit cone blast or muzzle blast shall be provided to protect adjacent stores from either blast or corrosive damage.

4.3.8 RAM air turbine clearance. A minimum clearance of 25.4 mm (one inch) shall be provided to prevent contact between stores and deployed or extended RAM air turbines. An assessment shall be made as to the possibility of the store adversely affecting the performance of the RAM air turbine.

4.3.9 Catapult bridle clearance. Aircraft provided with catapult fittings shall have a minimum clearance of 25.4 mm (one inch) between the stores and the catapult bridle fittings during the catapult launch of the aircraft.

4.4 Accessibility. Access shall be provided to enable safe and efficient loading of stores and to adjust, maintain, and safe the suspension and release equipment and loaded stores.

4.4.1 Maintenance access. Convenient access shall be provided for performing maintenance which is allowed with the store in place.

4.4.2 Access for store adjustment. Access shall be provided to enable operation of the necessary hand tools required to make proper adjustments on store and rack fittings, fuzes, arming wires, etc., when the store(s) are mounted on the suspension and release equipment.

4.5 Sway bracing. Sway bracing or other means shall be provided to restrain the store against impact with the aircraft and

against relative motion with respect to the aircraft. The contact area of the sway braces bearing on the store shall be sufficiently large so as to prevent damage to the store. Additional sway brace requirements are defined in MIL-A-8591.

4.6 Ejection mechanism. Where a displacing or ejection mechanism is used for store separation, it shall make contact with the store at the appropriate reinforced or hardback points as defined in MIL-A-8591.

4.7 Release system electrical devices and wiring. Electrical equipment, adequate for control, operation, and release, shall be included to provide for the proper release of the store. Electrical connections/connectors and wiring shall be in accordance with MIL-W-5088 and MIL-E-6051. Special attention shall be given to ensure the electrical connections are adequately protected from damage or short circuits resulting from movement in the airstream, moisture, or from mechanical interference with moving parts of the store.

4.8 Armament Weapons Support Equipment (AWSE) compatibility. AWSE required during store loading shall fulfill intended purposes with respect to mechanical and functional characteristics without restrictions to mobility, impairment of usefulness, or durability imposed by peculiarities of the test item.

4.8.1 Special tools. Store design shall permit installation, disassembly, reassembly, and service maintenance with tools and maintenance equipment normally available as commercial standards. Special tools and commercial standard tools are defined in MIL-S-8512.

4.8.2 Store cradling or handling area. A common area on the store shall be provided to ensure transporting, handling, and hoisting compatibility with various trucks, cradles, skids, and hoists. The strength and size of this area is defined in MIL-A-8591.

4.9 Safety. Store installations shall provide maximum protection against inadvertent release as a result of either human error, carelessness, or the material failure of components of the suspension and release system.

4.9.1 Ground safety device. The store release system shall be equipped with a positive safety device or devices to preclude functioning, dropping, launching, or ejecting of suspended stores or activation of ejector devices when the aircraft is on the ground, even if the release or actuation system is energized.

4.9.2 Erroneous switch selection and single component failure. The control of store stations shall be such that no single operation on the part of any crew member will result in the inadvertent release or function of a store. No single component failure in the function or release control system shall result in the inadvertent function or release of a store.

4.9.3 Safetying. Parts which may cause a hazardous condition by working loose in service shall be safetied or shall have other approved locking means applied.

5.0 DETAILED REQUIREMENTS

5.1 General. For each specific store, applicable portions of the requirements for assuring proper fit and operation shall be selected for verification of compliance based on a review of the general and detailed specifications for that store. Appendix A should be used to document which test were, or more importantly, were not, performed. Dependent on their specific functional and operational characteristics, suitable performance tests shall be included for particular items and components. All applicable test procedures shall be performed unless reference can be made to an identical or more critical store installation which has been satisfactorily demonstrated. No explosive ordnance will be used for the test described herein. During all testing, suitability of safety provisions shall be verified and unsafe conditions reported. The requirements of MIL-STD-1763 Test 100A are also to be noted.

5.2 Test stores. The store shall be examined to confirm adherence to the detail requirements of the store specifications including adherence to dimensional and weight provisions, workmanship, safety, and maintenance and human engineering provisions. Inert stores - functionally and operationally complete with all accessories including suspension parts, electrical fittings, vent fittings, and other external protuberant fins, fuzes, and arming wires which are necessary to make a complete installation on the applicable aircraft and pylon - shall be installed with the aircraft in its normal ground attitude. The aircraft shall be fully serviced and the gear strut extension within the allowable limits for the aircraft. For bombs, dispensers, and launcher-type stores, simulated stores may be used if the actual inert test items are not available. These stores shall have all exterior dimensions and configurations equivalent to the actual store and shall be dummy fuzed and equipped with arming wires if applicable. The total weight and general weight distribution of the test store shall also be equivalent to the actual store.

5.3 Installation test methods.

5.3.1 Store loading. The stores shall be prepared, handled, and loaded in accordance with established loading procedures. Only tools and equipment generally available to aircraft and armament personnel should be required for the loading; however, it is not intended to preclude the use of special tools or equipment which are to be an integral part of the store associated equipment. The most practical means of loading the store (such as bomb hoists and powered and non-powered weapons loaders) will be used.

The store should be capable of being positioned beneath the suspension equipment on a cradle, skid, munitions transporter, munitions trailer, or dolly without the necessity of jacking of lifting the aircraft or resorting to loading pits or other special provisions.

5.3.2 Loading procedure test. Determination of the most efficient procedure for loading the aircraft shall be made by testing the complete loading procedure. The test shall begin with the store(s) on AWSE outside the circular area which encompasses the extremities of the aircraft. The store(s) shall be moved into position, hoisted, and loaded properly on the appropriate release equipment. The loading procedure test shall include proper alignment and simulated operational checks including systems capable of adjustable firing angles. Data shall be recorded to define the most efficient procedure and the time required for each major action in loading the stores in the required configurations. The loading procedure tests shall be conducted during the original fit test and during subsequent loadings, if required. Where installation conversion (aircraft reconfiguration) is required due to peculiarities of the store being installed, conversion time will be recorded. In computing installation conversion time, reconfigurations shall be performed by a single crew without special tools or equipment other than items which will be available to operational crews performing similar functions.

5.3.3 Clearance tests. The store installation shall be visually inspected and verified to the clearance requirements of 4.3. Satisfactory operation of all external movable equipment (such as flaps, slats, speed brakes, or armament systems capable of adjustable firing angles) shall be demonstrated to their limits. In cases of marginal ground clearances, further investigation and study shall be given to the effect of emergencies or unnatural condition such as deflated struts and flat tires, on runway clearances of suspended stores. Whenever marginal clearance between the external store and the aircraft landing gear system (including the envelope described by parts of the landing gear during retraction/extension) is suspected, the aircraft will be placed on jacks and a landing gear retraction/extension test performed to determine actual clearances.

5.3.4 Accessibility tests. Accessibility requirements will be verified by performance of all operations required for checking, filling or loading, and removing safety pins, and adjusting the stores. The operations will be performed with the aircraft in its normal ground attitude and in the sequence determined by the loading procedure test, see 5.3.2. The appropriate hand tools

will be used to make adjustment on the store fittings, fuze installations, arming wire attachments, and any other equipment maintenance. Hand and tool space shall be evaluated for ability to perform operations, adjustments, etc., considering protective clothing worn by operational loading personnel.

5.3.5 Store reinforced area test. The store shall be checked for proper alignment between the ejection mechanism and the store reinforced area. Applicable preloads shall be introduced to the store through the sway braces. The store structure shall be inspected to verify support of the installation loads without permanent set in any portion of the store structure exceeding that outlined in MIL-A-8591.

5.3.6 Electrical function test. Functional tests or calibrations to demonstrate proper operations of the equipment being tested shall be performed.

5.3.6.1 Electrical interface. All electrical connections between the store and the pylon/aircraft structure shall be checked for possible sources of mechanical and electrical failure caused by improper routing of cables making them susceptible to strains or short circuits resulting from movement by airstream forces and for compliance with the electromagnetic interference and hazardous radiation specifications MIL-E-6051 and MIL-STD-1385. Electrical connectors shall be checked to ensure that they cannot be mated to the wrong pylon or rack plug and that suitable provisions exist to secure and protect unused cables and connectors.

5.3.6.2 Store functional check. Functional checks shall be conducted to ensure proper continuity of all electrical circuits and proper operation of all electrical/electronic equipment. The actual or simulated operation evaluations may be made using special test equipment. This includes validation and verification of store software.

5.3.6.3 Armament control system check. Functional checks on each installation of the control and monitor circuits shall be made. Where possible, it shall include functioning of power sources, functioning of all circuits up to release of firing mechanisms, functioning of all safety devices, and checking of all armament indicator lights. This includes a check of the software used in the operational Flight Program to control the store. Armament systems which are capable of adjustable firing angles (elevation, depressed, azimuth) shall be checked to ensure positive stops and clearances to prevent damage from projectiles to the aircraft structure or rotor disk. Sufficient tests shall

also be conducted to ensure that inadvertent release do not occur as a result of cockpit switch selection procedures or hardware/ software deficiencies.

5.3.7 Armament Weapons Support Equipment (AWSE) compatibility test. AWSE compatibility shall be verified by performance of all operations required during transporting, filling, and loading/downloading the stores and other weapon components, containers, etc., intended for use in the weapon logistic system.

5.3.7.1 Test conditions. Compatibility with AWSE shall be determined under normal field operating conditions existing at the test site. Consideration shall be given to any limitations due to adverse weather conditions. Standard military or Government equipment shall be used wherever feasible. Equipment types, capacities, and sizes established as standard for military departments are listed in MIL-HDBK-300.

5.4 Documentation of observations. A report documenting the conduct and the results of the ground fit and compatibility effort shall be prepared for the certification agency. The report written shall contain the test objectives, test plan, a detailed description of the test articles and test aircraft including electrical wiring interface, facilities, other required equipment, conditions, procedures and sequences used, test results (including Appendix A completed for the particular test), observations, photographs documenting the overall test configurations and all necessary separation/clearances or anomalies, data accuracy, and, if requested by the certification agency, conclusions about the utility of the data. Test articles and equipment shall be identified by model and serial numbers, with any deficiencies clearly identified, as necessary to repeat the test at a later date. The specific size and type of AWSE auxiliary equipment used in preparation, handling, loading, and removing shall be recorded. A preliminary store or store/ container and support equipment flow chart shall be prepared and shall show store/container flow through each storage and handling phase of the installation test. The specific functional operations performed on the store and all equipment, tools, and other devices required to accommodate the store to determine unusual strains, overloads, and wear occurring during handling shall be recorded. Similarly, all replacements, alterations, modifications, or adjustments other than those considered normal for the equipment or store shall be recorded.

5.5 Safety standards. The following safety standards shall be considered in the evaluation of the store and its installation procedure.

a. There shall be positive measures to prevent inadvertent or accidental arming, launching, firing, actuating, or releasing. As a minimum a separate, guarded, Master Armament switch shall be provided which provides a positive control of electrical power to all armament circuits.

b. Components and circuitry shall be provided which will "fail safe" in the event of failure or malfunction.

c. Every possible safety precaution shall be provided to make installation of the store a safe operation.

d. The store installation shall provide positive safety lock and latching mechanisms which can readily be checked for secure and proper installation by direct visual and mechanical means on the ground.

e. Administrative controls such as safety rules and directives issued by competent authority shall be provided.

6.0 NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory).

6.1 Intended use. This standard is intended to present important required and desired characteristics of store installations which are achievable in the majority of store and auxiliary equipment designs and to preclude serious aircraft installation discrepancies. Since this standard presents a general procedure, it cannot properly account for the various special problems which appear in new store and nuclear weapon designs. Therefore, review must be given to the requirements of this standard and the applicable documents to determine the specific requirements of each store based on the detail specification for that store.

6.2 Issue of DODISS. When this standard is used in acquisition, the applicable issue of the DODISS must be cited in the solicitation (see 2.1.1, and 2.2).

6.3 Consideration of data requirements. The following data requirements should be considered when this standard is applied on a contract. The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DOD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

6.4 Types of tests. The inspections and testing requirements may further be altered by the type of test being conducted, i.e., feasibility, development, advanced development, etc. In all cases, however, the fit and compatibility test shall be adequate to show the installation is satisfactory and shall demonstrate adequately that the system will perform in a manner commensurate with the requirements of the entire test program.

6.5 Subject term (keyword list) listing.

Accessibility
Airborne store
Alignment
Armament Weapons Support Equipment (AWSE)

Carriage aircraft
Clearance
Compatibility test
Ejection mechanism
Loading procedure
Release system electrical device
Safety
Store fit
Store installation requirement
Suspension equipment
Sway bracing

6.6 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

6.7 International standardization agreements. Certain provisions of this document are the subject of international standardization agreements. When change notice, revisions or cancellation of the document is proposed which will affect or violate the international agreement concerned, the preparing activity shall take appropriate reconciliation action through international standardization channels, including departmental standardization offices to change the agreement or make other appropriate accommodations. Applicable international standardization documents are NATO STANAG 3899 and Air Standardization Coordinating Committee AIR STD 20/21.

Custodians:

Army-AV
Navy-AS
Air Force-11

Preparing Activity:

Army-AV

Review Activities:

Army-MI
Air Force-22

Project No. GDRQ-0155

APPENDIX A to
MIL-STD-1289C

GROUND FIT AND COMPATIBILITY OF _-___ __/__AIRCRAFT WITH _____ __/__STORE

TOPIC (Paragraph Reference) (Requirement of MIL-STD-1289C)	COMPLIES	PHOTO TAKEN	DEVIATIONS/ COMMENTS
Test Item Descriptions Test Aircraft and Stores Suspension Equipment (SSE) Representative of Fleet? (Para. 4.1 and 5.2)			
- Aircraft Tail No / Mod Status / OFP Version(s)			
- SSE Serial No / Mod Status / OFP Version			
Test Store representative of Fleet (Para. 5.2) - Store Model No / Mod Status / OFP Version(s)			
Loading Procedures (Para. 4.2.1) Loading Procedures/Checklist Approved (in Task Plan)			
Copy of Procedures is provided at Enclosure 1			
Alignment of Stores (Para. 4.2.2) Longitudinal axis of stores parallel with stores alignment line specified for aircraft?			
Longitudinal axis of stores aligned in pitch plan parallel to flight path of aircraft for average cruise condition (or to minimise drag)?			
Boresighting possible without removing store from aircraft?			

TOPIC (Paragraph Reference) (Requirement of MIL-STD_1289C)	COMPLIES	PHOTO TAKEN	DEVIATIONS/ COMMENTS
Clearances Covers worst-case inflight dynamic manoeuvres (Para. 4.3) and covers moveable surfaces (Para. 4.3.2)			
Loading Clearance (Para. 4.3.1) Sufficient to conduct loading/unloading?			
Sufficient at aircraft maximum AUW			
External Store Clearances (Para. 4.3.2) Store to Aircraft (Para. 4.3.2.1) (Minimum is 25.4 mm-Wing Sweep Limits [if applicable])			
Store to Store (Para. 4.3.2.2 see also Para. 4.3.4 for fuzes) (Minimum is 25.4 mm for adjacent and tandem)			
Store to Pylon (Para. 4.3.2.3) (Minimum is 12.7 mm-Noting that exceptions allowed)			
Rail Launched (Para. 4.3.2.4) (Minimum is 25.4 mm)			
Ejection Launched (Para. 4.3.2.5) (Minimum is 25.4 mm)			
Intake Duct (Para. 4.3.2.6) (Assessment of aircraft Stall/Flameout/FOD?)			
Arming Control System (Para. 4.3.2.7) (Adequate to enable operation of ACS?)			
Propeller/Rotor Disk Clearance (Para. 4.3.2.8) (Minimum is 152.4 mm + 5° half angle)			
Damage from spent ammunition precluded (Para. 4.3.2.8)			

TOPIC (Paragraph Reference) (Requirement of MIL-STD 1289C)	COMPLIES	PHOTO TAKEN	DEVIATIONS/ COMMENTS
Internal Store Clearances (Para. 4.3.3) Store to Aircraft (Para. 4.3.3.1) (Minimum is 25.4 mm)			
Store to Store (same as Para. 4.3.2.2) (Minimum store to store is 25.4 mm; Navy 63.5 mm)			
Store to Suspension (same as Para. 4.3.2.3) (Minimum is 12.7 mm-Noting that exceptions allowed)			
Ejection Store Clearance (Para. 4.3.3.7) (10 degree fall line required)			
Fuze Clearance (Para. 4.3.4) (Sufficient for Installation/Removal of Fuzes?)			
Ground Clearance (Para. 4.3.5) (Worst case with flat tyre and depressed strut; in either static, take-off or landing attitude at a max AUW are: Air Force - 76.8 mm and 152.4 mm for rough terrain, Navy - 152.4 mm, and Army - 152.4 mm)			
Landing Gear Clearance (Para. 4.3.6) (Minimum is 25.4 mm)			
Engine Heat/Jet/Munitions Blast (Para. 4.3.7) (insulation and blast and corrosion prevention provided)			
RAM Air Turbine Clearance (Para. 4.3.8) (Minimum is 25.4 mm)			
Catapult Bridle (Para. 4.3.9) (Minimum is 25.4 mm)			
Accessibility (Para. 4.4) (Sufficient to safe suspension and release)			

TOPIC (Paragraph Reference) (Requirement of MIL-STD_1289C)	COMPLIES	PHOTO TAKEN	DEVIATIONS/ COMMENTS
Maintenance (Para. 4.4.1) (Sufficient to safe store and suspension and release equipment)			
Store Adjustment (Para. 4.4.2) (Sufficient to safe and adjust store)			
Sway Bracing (Para. 4.5) (contact area satisfactory IAW MIL-STD-8591)			
Ejection Mechanism (Para. 4.6) (contact reinforced area IAW MIL-STD-8591)			
Release System Electrical Devices and Wiring (Para. 4.7 and Para. 5.3.6) Test done to meet MIL-W-5087 and EMC/EMI criteria of MIL-E-6051			
Ensure no mechanical strain due to airstream forces exists			
Satisfactory function of complete system demonstrated			
Electrical Function Test (Para. 5.3.6.1)			
Store Functional Test (Para. 5.3.6.2)			
Armament Control System (Para. 5.3.6.3)			
Armament Weapons Support Equipment Compatibility (Para. 4.8) Type Evaluated/Serial No Under normal field operating conditions			

TOPIC (Paragraph Reference) (Requirement of MIL-STD_1289C)	COMPLIES	PHOTO TAKEN	DEVIATIONS/ COMMENTS
Special Tools (Para. 4.8)			
Meets intended purpose, no restriction in mobility			
Are all tools normally available (see also MIL-S-9512) (Para. 4.8.1)			
Store Cradling/Handling (Para. 4.8.2) (Common area provided IAW MIL-A-8591)			
Safety (Para. 4.9 and Para. 5.5)			
Ground Safety (Para. 4.9.1) (Positive Measures to prevent inadvertent stores: Function, Dropping, Launching, or Ejecting including details of tests conducted to verify this)			
Switch Selection (Para. 4.9.2) (No single operation by crew will result in inadvertent release or function of store)			
Safetying (Para. 4.9.3) (Parts which may work loose and create hazard shall be safetied)			
Safety standards Addressed			
Notes:			

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
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I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-STD-1763A	2. DOCUMENT DATE *(YYMMDD)*

3. DOCUMENT TITLE
AIRCRAFT/STORES CERTIFICATION PROCEDURES

4: NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6: SUBMITTER

a. NAME *(Last, First, Middle Initial)*	b. ORGANIZATION	
c. ADDRESS *(Include Zip Code)*	d. TELEPHONE *(Include Area Code)* (1) Commercial (2) AUTOVON *(If applicable)*	7. DATE SUBMITTED *(YYMMDD)*

8. PREPARING ACTIVITY

A. NAME ASD/SK	B. TELEPHONE *(Include Area Code)* (1) Commercial: 904-882-9051 (2) AUTOVON *(If applicable)*: 872-9051
C. ADDRESS *(Include Zip Code)* Eglin AFB, Florida 32542-5000	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340

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