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MILITARY STANDARD

HAZARD ASSESSMENT TESTS FOR NAVY NON-NUCLEAR ORDNANCE

AMSC NO. N3198

AREA SAFT

DEPARTMENT OF DEFENSE
Washington, DC 20301

Hazard Assessment Tests for Navy Non-nuclear Ordnance.

DOD-STD- 2105

1. This Military Standard is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available 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 should be addressed to: Commanding Officer, Naval Ordnance Station, Standardization/ Documentation Division (524), Indian Head, MD 20640, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FOREWORD

1. This document replaces WR-50 "Naval Weapon Requirements - Warhead Safety Tests - Minimum for Air, Surface and Underwater Launched Weapons" which identified tests to be utilized in the safety assessment of certain warheads prior to their acceptance for service use. Through its years of use, the scope of its applicability has been necessarily extended to influence testing programs for the safety assessment of all types of conventional weapons and explosive devices. During this period, changes in Navy logistic concepts have resulted in the emergence of "all up weapons", "wooden rounds", and "ready for issue" systems being transported, handled and stowed. In parallel, and of necessity, due to the added complexity of weapon systems, increased emphasis was being applied to systems safety management and engineering principles in the hazard assessment process during weapon acquisition programs. Due primarily to the economic ramifications, testing must be limited to the extent required for valid safety assessment. To accommodate these needs and limitations and to validate the safety of a weapon design, it is imperative that tests be judiciously selected, as required, in consideration of the total system safety program. Therefore, this standard has been developed to indicate the interface between the testing and analytical phases of the total system safety program as required by MIL-STD-882 "System Safety Program Requirements".

2. This standard contains a description of a core of hazard assessment tests which experience has shown provide information for evaluating the safety characteristics of Navy non-nuclear ordnance systems (see 5.1).. Also included is a list of factors to be considered in performing the hazard analyses, the results of which form the basis for additional tests to be developed or selected from other test document sources.

3. This standard does not contain pass-fail criteria for the tests described. The overall goal of the system safety program is to minimize the risk or conversely provide maximum safety commensurate with considerations of the operational requirement, funding and time. To assess the safety of a weapon system, the results of the hazard assessment tests as described herein are evaluated considering the above factors together with the analytical risk assessment and comparison with similar systems previously tested.

CONTENTS

1. SCOPE

1.1 Scope. This standard establishes a standardized approach in conducting hazard assessment tests for all Navy non-nuclear ordnance and explosive systems, subsystems and explosive devices designed or used or both by the Navy and to those Marine Corps items used operationally from Navy ships and craft or other Marine Corps items at the discretion of the Commandant.

1.2 Purpose. The purpose of this standard is to provide information that has been shown by experience to be useful to the procuring activities, program managers and the Weapon System Explosives Safety Review Board (WSESRB) in evaluating the safety characteristics of Navy non-nuclear ordnance and explosive systems under normal and abnormal environments. The tests described in this standard shall be performed as part of the system safety program and assessment required by MIL-STD-882.

1.3 Application. This standard is applicable to all surface, air, and underwater launched non-nuclear ordnance and explosive systems (such as all up missiles, rockets and pyrotechnics), explosive subsystems (such as fuzes, warheads, propulsion units, safe-arm devices, pyrotechnic devices, and chemical payloads), components and subcomponents, and all devices containing explosives, propellants, pyrotechnics or other energetic materials. Excluded from this standard are nuclear systems.

2. REFERENCED DOCUMENTS

2.1 Government documents. Unless otherwise specified, the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation, form a part of this specification to the extent specified herein.

STANDARDS

MILITARY

MIL-STD-331	Fuze and Fuze Components, Environmental and Performance Tests for
MIL-STD-810	Environmental Test Methods
MIL-STD-882	System Safety Program Requirements
MIL-STD-1648	Criteria and Test Procedures for Ordnance Exposed to an Aircraft Fuel Fire
MIL-STD-1670	Environmental Criteria and Guidelines for Air-Launched Weapons

(Copies of specifications, standards, drawings and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer).

3. DEFINITIONS

3.1 Energetic material. An energetic material is a solid or liquid substance (or a mixture of substances) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Included are pyrotechnic substances even when they do not evolve gases. This document will refer only to those energetic materials whose application requires that they shall react reliably on demand. The term "energetic" thus includes all solid and liquid materials variously known as high explosives, propellants, together with igniter, primer, initiation and pyrotechnic (e.g., illuminant, smoke, delay, decoy flare and incendiary) compositions.

3.2 All up. Refers to the completely assembled ordnance item as intended for delivery to a target or configured to accomplish its intended mission. This term is identical to the terms all-up-weapon and all-up-round.

3.3 Exudation. A discharge or seepage of material. The material may be either a component of a chemical payload or a component of an explosive/propellant payload.

3.4 Burning. The energetic material is consumed in place nonpropulsively. Its case may open up and vent; however, the test item remains in position (though it may fall due to structural failures). Damage to site is due only to the heat and smoke of the fire.

3.5 Deflagration. The energetic material contained in the ordnance undergoes rapid combustion and ruptures its enclosure. Metal parts and pieces of explosive may be thrown up to 15 meters (maximum) from the initial test location. No damage exists due to blast effects or fragmentation.

3.6 Explosion. Violent pressure rupture and fragmentation of munition case with resulting air shock. Most of metal case breaks into large pieces which are thrown about with unreacted or burning explosive. Some blast and fragmentation damage to environment. Fire and smoke damage as in deflagration.

3.7 Partial detonation. Only part of total explosive load in munition detonates. Strong air shock, and small as well as large case fragments produced. Small fragments are similar to those in normal munition detonation. Extensive blast and fragmentation damage to environment. Amount of damage and extent of breakup of case into small fragments increases with increasing amount of explosive detonated.

3.8 Detonation. Maximum possible air shock is formed. Essentially all of case is broken into small fragments. Blast and fragment damage is at maximum.

3.9 Weapon System Explosives Safety Review Board (WSESRB). A board chartered by the Chief of Naval Operations to assess the explosives safety of weapon systems. The Board is chaired by the Naval Sea Systems Command and its membership is drawn from all the Systems Commands under the Chief of Naval Material. The Board recommendations are made to the appropriate approval authority.

3.10 Weapon system. Refers to a weapon and those components required for its operation and support.

3.11 Explosive system. Refers to an assembled ordnance item that contains explosives, propellants, pyrotechnics, or other energetic material(s) and is configured to accomplish its intended mission.

3.12 Explosive subsystem. Refers to an element of an explosive system that contains energetic material(s) and that, in itself, may constitute a system.

3.13 Explosive device. Refers to an item that contains energetic material(s) and is configured to provide large quantities of gas, heat, or light by a rapid chemical reaction initiated by an energy source usually electrical or mechanical in nature.

4. GENERAL REQUIREMENTS

4.1 General. It is the responsibility of the procuring activity program manager to assure that a hazard assessment test program is conducted. Such a test program shall include as a minimum those tests listed in FIGURE 1. The test program may include additional tests selected from other sources or devised to investigate hazardous conditions and environments identified by hazard analyses performed as part of the system safety program described in MIL-STD-882 (Appendix A). The test program, including identification of any deviations from any mandatory test, shall require the concurrence of the WSESRB. A realistic life-cycle environmental profile, using guideline documents such as MIL-STD-1670, already developed shall be used to perform the hazard analyses and shall be reflected in the master test plan (see Section 6). The test program based on the environmental profile shall include tests that reflect maximum stress levels of the environmental conditions forecast for the specific item undergoing evaluation. Logical combinations of environments and sequences of these tests shall be selected to reflect the real life cycle of the item.

4.2 Test parameters. The safety characteristics of the item shall be determined under conditions that simulate or duplicate the hazards of normal or abnormal, but credible, situation(s) identified by the hazard analysis. The test parameters shall be selected to reflect maximum stress levels forecast.

4.3 Passing criteria. Explosives safety of a weapon system is primarily a function of the sensitivity of the energetic materials utilized. Wherein energetic materials are required to meet operational requirements, explosives safety must be enhanced by protection afforded by the weapon configuration. The object of the weapon safety program, per MIL-STD-882, is to provide maximum safety within the constraints of time, money and operational requirements. Therefore, it is not necessary or desirable to regard a failure of a weapon to meet some predetermined "passing criteria" as grounds for automatic rejection of a weapon for service use. No such criteria are included in this standard. Rather, the compendium of results of the hazard analyses and test program will be reviewed by the WSESRB and a final recommendation for service use will result therefrom. Safety design goals listed in the test plan are to be established by the procuring activity program manager and approved by the WSESRB. Physical or chemical anamolies with the potential to cause Category I (catastrophic) or Category II (critical) hazards as defined in MIL-STD-882 shall be considered as undesireable for acceptance.

4.4 Test report. The procuring activity/program manager shall be responsible for generation of a test report for submission to the WSESRB. The test report (see Section 6) shall contain detailed information specified herein (see section 5) and shall be consistent with the test plan (see 4.1). This report shall address rationale for deviations from the test plan, test item configuration and identification, test date, test results and safety related conclusions that may be drawn from the test results. The test results shall be described using the definitions of Section 3, as appropriate.

4.5 Hardware. WSESRB reviews for Approval for Service Use will be based on tests conducted with hardware equivalent to production items. When the item differs from production hardware, the test plan shall so indicate. When testing chemical ordnance, chemical simulants may be used in lieu of active chemical materials.

4.6 Test equipment. Unless otherwise specified in this standard or other test standards, test equipment, instrumentation sensors and general test practices shall be selected and employed to meet the requirements of the specific tests in accordance with MIL-STD-810.

4.7 Number of items and test sequences. There shall be at least three items subjected sequentially to a 28-day temperature and humidity test (see 5.1.1) followed by a vibration test (see 5.1.2) and a 4-day temperature and humidity test (see 5.1.3) followed by 12-meter drop test (see 5.1.4). Additionally, as a minimum, there shall be two items subjected to the fast cook-off test (see 5.1.5), two items subjected to the slow cook-off test (see 5.1.6) and two items subjected to the bullet impact test (see 5.1.7). FIGURE 1 illustrates the above requirements.

4.8 Configuration. The test item configuration shall be the same as the configuration of the item in the logistic phase being duplicated by the test. The configuration shall be specified in detail in the test plan. Temperature and humidity, bullet impact, and slow cook-off tests may be done on the major explosive subsystem level.

4.9 Pre-test examination. Prior to the test, the test item shall undergo visual and radiograph inspection to assure that no unusual conditions exist that might invalidate the tests. All unit safety mechanisms and devices or both shall be set or otherwise adjusted to a safe condition.

4.10 Post-test examination. The test item shall undergo visual and radiograph inspection after the test to determine its structural integrity. Post-test and pre-test radiographic examination results shall be compared for evidence of test item deterioration. Obviously complete post-test examination for some destructive tests will not be appropriate.

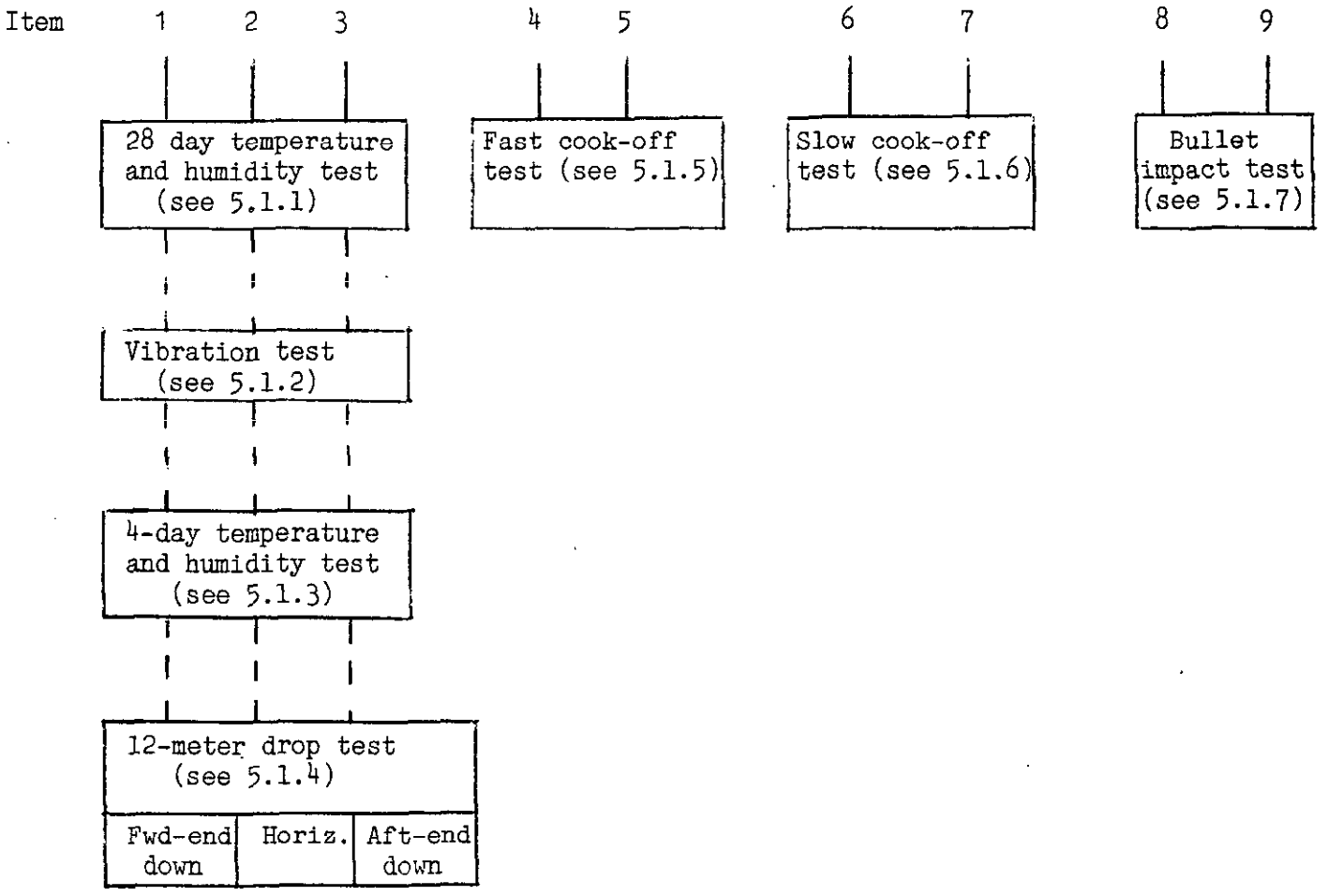

FIGURE 1. Item number and test sequence.

5. DETAILED REQUIREMENTS

5.1 Core tests. The following tests shall be performed as part of the hazard assessment test program.

5.1.1 28-Day temperature and humidity test.

5.1.1.1 Description of test. The 28-day temperature and humidity test consists of exposing the test item to alternating 24-hour periods (no period lasting less than 24 hours) of high and low temperatures at fixed relative humidity levels for a total of 672 hours (28 days). The temperature range and relative humidity shall be derived from the environmental profile of 4.1.

5.1.1.2 Test procedure. The test procedures shall reflect the temperature and humidity conditions measured or forecast. Each test item shall be visually examined prior to testing and the appropriate critical dimensions recorded. Test items containing a high energy content payload or similar material shall be radiographed to determine material condition.

5.1.1.2.1 Test equipment. Equipment shall be capable of producing the temperatures and humidity over the time spans as specified in 5.1.1.1. Equipment design shall be such that it will not obstruct the free flow of air in contact with the item under test. Separate equipment is recommended for each test environment extreme specified. Instrumentation shall be provided to continuously monitor and record the temperature and humidity levels associated with the item under test.

5.1.1.2.2 Temperature cycling. The test shall commence by subjecting the test item to either the high or low temperature environment for the specified 24-hour period. At the end of this period, the test item shall be transferred to the other environment. Test item transfer time shall not exceed 30 minutes. At the time of transfer, the test item shall be inspected for damage and the exudate (if any) collected for chemical analysis. Testing and inspections shall continue for the number of periods specified for the test.

5.1.1.2.3 Test interruptions. Interruptions of the test shall be held to a minimum. If the test is interrupted by slack labor periods (weekends, holiday, etc.), the last test environment encountered prior to the slack period shall be maintained during the slack period.

5.1.2 Vibration test.

5.1.2.1 Description of test. The vibration test consists of exposing the test item to the maximum vibration environment that it will normally encounter during the logistic cycle and shall include, as applicable, all phases of vibration environments, e.g., railroad, truck, ship, aircraft, helicopter.

5.1.2.1.1 Vibration orientation. Vibration test shall be conducted along the appropriate mutually perpendicular axes, and may consist of one or a combination of the following: random vibration, vibration cycling and resonant dwell.

5.1.2.1.2 Test schedule and details. The vibration schedule shall be as derived from the environmental profile of 4.1.

5.1.2.2 Test procedures. Test procedures shall reflect vibration modes and temperatures anticipated in the item's environment.

5.1.2.2.1 Transportation vibration. If the item is always containerized when transported, then the item shall be vibrated in the container. Vibrate the item in the normal configuration as shipped. The item may be vibrated in the bare configuration if it can be shown that testing in the bare configuration produces a more severe environment.

5.1.2.2.2 Aircraft vibration. The item shall be vibrated in the configuration utilized for aircraft carriage.

5.1.2.2.3 Shipboard vibration. The item shall be vibrated in its shipboard stowage configuration. Should the item be carried on a launcher, then the item shall be vibrated in that configuration also.

5.1.2.2.4 Vibration schedule. Vibration schedule shall be selected from the environmental profile of 4.1.

5.1.2.2.5 Changes in test schedule. Changes in the selected schedule of vibration levels, frequency ranges, and time duration of the test can be effected by the program manager or the procuring activity with the approval of the WSESRB.

5.1.2.2.6 Test temperatures. Vibration tests shall be conducted at low and elevated temperatures rather than ambient temperature if the anticipated environment so dictates.

5.1.3 4-Day temperature and humidity test.

5.1.3.1 Description of test. The 4-day temperature and humidity test is a 4-day version of the 28-day temperature and humidity test and consists of exposing the unit to alternating 24-hour periods of temperature range and relative humidity as derived from the environmental profile of 4.1.

5.1.4 12-Meter drop test.

5.1.4.1 Description of test. The 12-meter drop test is a field test designed to evaluate the safety response of the test unit to the stress loads associated with a free-fall impact onto a striking plate in various attitudes. The 12-meter drop test procedures governed by other documents, e.g., MIL-STD-331, may be utilized if appropriate and approved by the WSESRB.

5.1.4.1.1 Impact surface and orientation. The test consists of free-fall drops of the preconditioned units in the bare configuration (one drop per unit) onto the striking plate. The striking plate shall be made of steel with a minimum thickness of 75mm; a Brinnell hardness not less than 200 is preferred. It shall have a reasonably smooth surface and a length and width of at least one and one-half times the maximum dimensions of the unit being tested. The plate shall be solidly supported over its horizontal plane and bearing surface by a concrete foundation. The foundation shall have a minimum thickness of 600 mm. The unit impact attitudes for each drop are:

a. Longitudinal axis horizontal.

b. Longitudinal axis vertical (after-end down).

c. Longitudinal axis vertical (forward-end down).

5.1.4.1.2 Guidance. One or more guiding devices may be used to assure that the unit impacts at the desired striking angle. These devices shall not decrease the striking velocity of 15 meters/sec (m/s) by more than 1.5 m/s, nor shall they impede the unit rebound after impact.

5.1.4.1.3 Evaluation and disposal. The assistance of qualified Explosive Ordnance Disposal (EOD) personnel shall be used in evaluating damage and in disposing of the ordnance.

5.1.4.2 Test procedures. Test procedures shall include pre-and post-test inspections.

5.1.4.2.1 Height of drop. The unit shall be dropped 12 meters (measured from the lowest point of the unit to the point of impact) complying with one of the orientations specified in 5.1.4.1.1.

5.1.4.2.2 Examination and documentation. The unit shall be examined, and damage documented. A safety waiting period prescribed by the test activity shall be observed after each drop. All safety precautions shall be observed while handling the dropped unit.

5.1.4.3 Instrumentation. Photographic or other instrumentation shall be utilized to verify striking velocity. Recommended instrumentation for the test includes high speed motion picture photography (frame rate of 400 frames per second, minimum), normal speed motion picture photography (frame rate of 18 to 30 frames per second) or video tape closed circuit color TV.

5.1.5 Fast cook-off test.

5.1.5.1 Description of test. The fast cook-off test is used to determine the response of the unit, and the time to this response, when the test item is immersed in an intense fire environment.

5.1.5.2 Test procedure. The test shall be conducted in accordance with MIL-STD-1648.

5.1.6 Slow cook-off test.

5.1.6.1 Description of test. The slow cook-off test is used to determine the minimum payload reaction temperature and to measure the overall safety response of major explosive subsystems to a gradually increasing thermal environment.

5.1.6.2 Test procedures. The test consists of subjecting the test item to a gradually increasing air temperature rate of 3.3°C per hour until unit reaction occurs. To conserve time, the test may begin with the test item preconditioned to 55.5°C below the predicted reaction temperature. Temperatures and elapsed test time shall be observed and measured continuously.

5.1.6.2.1 Test equipment. Test equipment shall be capable of providing a controlled thermal environment over a 40° to 345°C temperature range. The equipment shall be capable of increasing the temperature of the surrounding atmosphere at the rate of 3.3°C per hour throughout the temperature operating range. Its design shall be such as to minimize hot spots and to ensure by circulation (or other means) a uniform thermal environment to the item under test. Occurrence of secondary reactions (such as those caused by exudate contacting the heating devices) shall invalidate the test. A means of relief shall be provided for the increased air pressure that will be generated by the test due to heating.

5.1.6.2.2 Photo coverage. Color still photography shall be used to document the condition of the unit and the test equipment prior to and after the test. Cratering and fragment size is to be documented as an indication of the degree of reaction.

5.1.6.3 Instrumentation. Temperature recording devices (permanent record types) shall be used to monitor temperatures. Instrumentation with an accuracy of +2% over a 38°C to 370°C temperature range shall be used to measure continuously (or sample each thermocouple at least once every 10 minutes) the temperature at these points:

a. The atmosphere air gap adjacent to the unit under test and

b. The exterior surface of the unit.

5.1.7 Bullet impact test.

5.1.7.1 Description of test. The bullet impact test is designed to evaluate the response of major explosive subsystems to the kinetic energy transfer associated with the impact and penetration by a given energy source.

5.1.7.2 Test procedure. The test consists of striking two test items each with one 20 mm projectile.

5.1.7.2.1 Test rounds. Test round shall be a 20 mm, M95 AP or APT (with tracer compound removed) projectile with service muzzle velocity. Firing gun shall be at a range of 30-70 meters from the test item.

5.1.7.2.2 Alternate rounds. Alternate rounds may be substituted for the above provided that:

a. The unit caliber remains unchanged;

b. The projectile types substituted are equivalaent to those above; and

c. The energy of the projectile (equal to 1/2 mv2, where m = mass of projectile and v = velocity) impacting the test item remains unchanged. For example, the 20 mm M53 APIT (with the incendiary/tracer compound removed) may be substituted for the M95 AP round if the energy differences are equalized by a distance (gun muzzle to target) adjustment or a propellant charge adjustment or both.

5.1.7.2.3 Impact points. The striking point on the test item for the 20 mm round shall be selected so that the impacting round penetrate the most shock sensitive material (that is not separated from the main explosive charge by explosive train barriers or other safety devices) contained within the test unit.

5.1.7.2.4 Securing and testing. The test item shall be secured in a holding device with ancillary equipment installed as appropriate. The holding fixture shall be capable of restraining the item against dislodgement caused by the fragment (projectile) striking the item or an ensuing reaction (if any).

5.1.7.2.5 Photo coverage. Motion picture photographs (18 to 30 frames per second) or video tape closed circuit color TV shall be used for visual test documentation. High-speed motion picture photography (400 frames per second, minimum) is recommended to augment film coverage. Post-test inspection of test film and hardware shall be performed to determine the degree of reaction.

5.2 Additional tests. In addition to the core tests of 5.1, tests are to be developed or selected from other test document sources to form the test plan to assess the safety of the weapon system. The following is a non all-inclusive list of factors that should be considered in performing the hazard analyses required as the basis for developing the test plan.

Acceleration
Accidental Release
Acoustical
Aerodynamic Heating
Atmospheric Lightning
Altitude
Catapult and Arrested Landing
Double Feed of Ammunition
Drop
Dust
Electromagnetic Radiation
Electrostatic Discharge
Explosive Atmosphere
Faulty Unit
Flooding
Fungus
HERO - Hazards of Electromagnetic Radiation to Ordnance
Hot Gun Cook-Off
Humidity
Jettison
Jolt
Jumble
Leak Detection - Halogen-helium
Leakage - Immersion
Muzzle Impact/Impact Safe Distance
Pressurization
Radiography
Rain
Salt Fog
Shock
Solar Radiation - Sunshine
Space Simulation - Unmanned Test
Static Detonator Safety
Time to Airburst
Toxicity
Vacuum Steam Pressure
Vibration

6. NOTES

6.1 Data requirements. When this standard is used in an acquisition, the data identified below shall be delivered only when the task paragraph(s) applicable to a specific DID is applied in a contract and the applicable DID is specified on the DD Form 1423, "Contract Data Requirements List (CDRL)." When the DD Form 1423 is not used and DAR 7-104.9(n)(2) is cited, the data identified below shall be delivered in accordance with requirements specified in the contract or purchase order. Deliverable data associated with the requirements of this standard are cited in the following paragraphs.

Paragraph no.	Data requirement title	Applicable DID no.
4.1	Master Test Plan	DI-T-2186
4.4	Reports, Test	DI-T-2072, para 10.1.a
5.1.1.2	Test Procedures	DI-T-2187
5.1.4.2	Test Procedures	DI-T-2187
5.1.4.3	Motion Picture Coverage (Footage)	DI-A-3013
5.1.7.2	Test Procedures	DI-T-2187
5.1.7.2.5	Motion Picture Coverage (Footage)	DI-A-3013

(Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer).

Custodian:
NAVY - OS

Review Activities:
NAVY - AS
MC

Preparing Activity:
NAVY - OS

Project No.
SAFT-N003

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

OMB Approval
No. 22-R255

INSTRUCTIONS: The purpose of this form is to solicit beneficial comments which will help achieve procurement of suitable products at reasonable cost and minimum delay, or will otherwise enhance use of the document. DoD contractors, government activities, or manufacturers/ vendors who are prospective suppliers of the product are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity.

DOCUMENT IDENTIFIER AND TITLE

DOD-STD-2105(NAVY) Hazard Assessment Tests for Navy Non-Nuclear Ordnance

NAME OF ORGANIZATION AND ADDRESS

CONTRACT NUMBER

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY DOCUMENT REQUIREMENT CONSIDERED TOO RIGID

3. IS THE DOCUMENT RESTRICTIVE?

☐ YES ☐ NO *(If "Yes", in what way?)*

4. REMARKS

SUBMITTED BY *(Printed or typed name and address - Optional)*

TELEPHONE NO.

DATE

DD FORM 1 JAN 72 1426

REPLACES EDITION OF 1 JAN 66 WHICH MAY BE USED

S/N 0102-LF-014-1802