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INCH-POUNDS

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SUPERSEDING
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MILITARY SPECIFICATION

CARTRIDGE, IMPULSE, CCU-69A/A

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the CCU-69A/A impulse cartridge (see 6.1).

2. APPLICABLE DOCUMENTS

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 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).

SPECIFICATIONS

MILITARY

MIL-D-21625	Design and Evaluation of Cartridges for Cartridge Actuated Devices
MIL-P-46994	Pellets/Granules Boron/Potassium Nitrate
MIL-P-82739	Propellant Grains, NOSOL-318

STANDARDS

MILITARY

MIL-STD-453	Inspection, Radiographic
DOD-STD-2101	Classification Of Characteristics

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Indian Head Division, Naval Surface Warfare Center, Standardization Branch (Code 8420), 101 Strauss Avenue, Indian Head, MD 20640-5035, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by sending a letter.

AMSC N/A FSC 1377

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(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins 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 issues are those cited in the solicitation.

DOCUMENTS

Naval Sea Systems Command (CAGE Code 53711)

WS 21535	Ignition Device, (Percussion), PVU-1/A

(Application for copies of WS's should be addressed to: Commander, Indian Head Division, Naval Surface Warfare Center, Attn: Code 8410P, 101 Strauss Ave., Indian Head, MD 20640-5035.)

DRAWINGS

Naval Air Systems Command (CAGE Code 30003)

726AS874	Test Fixture (For CCU-69A/A)
DL 847AS115	Cartridge, Impulse, CCU-69A/A

(Application for copies should be addressed to: Commander, Indian Head Division, Naval Surface Warfare Center, Data Control Branch (Code 8410), 101 Strauss Avenue, Indian Head, MD 20640-5035.)

PUBLICATIONS

Naval Sea Systems Command (CAGE Code 53711)

OP 5	Ammunition and Explosives Ashore (This publication is not furnished to bidders and contractors by the procuring activity. Contractors should contact the Government inspector for use of the publication.)

(Application for copies of OP's should be addressed to: Commanding Officer, Naval Publications and Forms Center, Attn: NPODS, 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

CODE OF FEDERAL REGULATIONS (CFR)

49 CFR 100-199	Transportation

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.)

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2.2 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. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. Unless otherwise specified in the contract or purchase order (see 6.2), a sample shall be subjected to first article inspection (see 6.3) as specified in 4.3.

3.2 Construction. The CCU-69A/A impulse cartridge (847AS115), covered by this specification, shall be manufactured in accordance with DL 847AS115 and all documents listed thereon.

3.3 Materials. All materials used in the manufacture of the cartridge shall conform strictly to the specification referenced on the respective drawings unless specific approval in writing covering a departure therefrom has been obtained from the contracting activity prior to manufacture. When alternate materials or methods of manufacture are specified on the drawings, the bidder's selections shall be clearly stated in the proposal.

3.4 Primary components. The CCU-69A/A impulse cartridge shall consist of the following primary components (see 4.4.1):

a. PVU-1/A Ignition Device (WS 21535)
b. $BKNO_3$ Ignition Powder (MIL-P-46994)
c. Propellant NOSOL-318 (MIL-P-82739)

3.4.1 Ignition device. The ignition devices shall be from a lot which has been manufactured within the past 24 months or recertified within 12 months prior to cartridge lot completion. The ignition devices shall be manufactured in accordance with Drawing 851AS110.

3.4.1.1 Radiographic. Ignition devices shall be free of the following defects as verified by radiographic examination in accordance with 4.5.2: missing or abnormally thin charge; charge broken, cracked, or porous; cracked or off center anvil or other misplaced or deformed inert parts, anvil abnormally close to the ignition device cup dome; and all other observable defects in the assembly.

3.4.2 Propellant charge.

3.4.2.1 Quantity. The propellant charge for the CCU-69A/A impulse cartridge shall be as specified on Drawing 847AS120. Charges shall be determined by weight.

3.4.2.2 Propellant handling and loading. Propellant shall be subjected to no unnecessary handling or exposure to the atmosphere. The handling and loading of propellant exposed to the atmosphere shall be performed only under conditions that do not permit the relative humidity to exceed 75 percent.

3.4.2.3 Propellant condition. The propellant used shall exhibit no evidence of decomposition (see 4.5.3.).

3.5 Cartridge requirements.

3.5.1 Leakage. Cartridge leakage rate shall not exceed 10^{-5} cubic centimeters (cm^3) of air per second when tested in accordance with 4.5.5.

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3.5.2 Radiographic. Cartridges shall be free of imperfections in components or assembly as verified by radiographic examination in accordance with 4.5.6.

3.5.3 Environmental. The cartridges shall not incur damage or degradation during the environmental tests (drop, cycling, and shock and vibration tests) prescribed in 4.3.2.

3.6 Ballistic requirements. Cartridges shall be meet the requirements listed in 3.6.1 through 3.6.5 when subjected to the test prescribed in 4.5.7.

3.6.1 Peak pressure. The cartridge shall deliver peak pressure of not less than 4200 pounds per square inch (psi) nor greater than 6600 psi over the temperature range from −65°F to +200°F.

3.6.2 Time to peak pressure. The time from start of pressure rise to peak pressure shall be not less than 0.095 second nor greater than 0.220 second over the temperature range from −65°F to +200°F.

3.6.3 Ignition delay. The time between initial firing pin movement and the first indication of continuous pressure rise in the test fixture chamber shall not exceed 10 milliseconds (ms) over the temperature range of −65°F to +200°F.

3.6.4 Shear pressure. The firing pin shear pressure limits over the temperature range from −65°F to +200°F shall be not less than 400 psi nor greater than 600 psi.

3.6.5 Misfire. There shall be no misfire (see 4.5.7.1.1).

3.7 Workmanship. Cartridges shall be constructed and finished in a manner to assure compliance with all requirements of this specification. Cartridges shall be free of the following defects: Burrs, dents, deep scratches, split or cracked edges, damage to closure cup, sharp edges, defective sealant applications around the crimped and ignition device areas, and all other defects which may prevent entry of the cartridges into the firing chamber or adversely affect ballistic performance. All cartridge identification markings shall be verified as proper (see 4.5.4).

4. QUALITY ASSURANCE PROVISIONS

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.3).
b. Quality conformance inspection (see 4.4).

4.2 Classification of characteristics. The characteristics verified by the tests and examination herein are classified as critical, major, or minor in accordance with DOD-STD-2101. Tests and examinations that verify critical characteristics are identified by the symbol (C) and major characteristics by the symbol (M). The number following the classification symbol indicates the serial number of test or examination. Tests and examinations which are not annotated with a classification code are classified minor.

4.3 First article inspection. First article inspection shall be performed after award of contract and prior to production by a facility designated in the contract (see 6.2). A first article sample acceptable for environmental and function testing shall be considered as a sample which has met the requirements of 3.2 through 3.4.2.3 and 3.7. First article inspection shall be performed on sample units which have been produced using the same materials, equipment, processes, and procedures as will be used in regular production. All parts and materials

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including packaging and packing, shall be the same as used for regular production and shall be from the intended sources of supply. Any production prior to notification by the contracting agency of first article acceptability shall be at the contractor's risk.

4.3.1 Sample size. The first article sample shall consist of 87 cartridges.

4.3.2 Inspection routine. Eighty four (84) cartridges shall be expended in the tests listed in Table I, and three (3) shall be retained for investigative purposes. The following tests in Table I shall be performed in accordance with MIL-D-21625F: 6-foot drop, 28-day temperature and humidity cycling and 20 "g" shock and vibration. No cartridge shall produce results which fail to meet the requirements of 3.6.1 through 3.6.5.

4.3.3 Failure. Failure of any cartridge to meet the requirements of 3.1 through 3.7 shall be cause for rejection of the first article sample.

TABLE I. First article inspection routine for the cartridge assembly.

Test Sequence	Test / Inspection	Requirement Paragraph	Test Paragraph	No. of Cartridges Required					Total
1	Visual	3.7	4.5.4	6	18	12	12	36	84
2	Radiographic	3.5.2	4.5.6	6	18	12	12	36	84
3	Leakage	3.5.1	4.5.5	6	18	12	12	36	84
4	6-foot drop	3.5.3	4.3.2	6					6
5	Vibration	3.5.3	4.3.2		18				18
6	T & H C	3.5.3	4.3.2			12			12
7	20 "g" shock	3.5.3	4.3.2				12		12
8	Radiographic	3.5.2	4.5.6	6	18	12	12		48
9	Leakage	3.5.1	4.5.5	6	18	12	12		48
10	Ballistic test @ -65°F	3.6	4.5.7					12	12
11	Ballistic test @ 70°F	3.6	4.5.7					12	60
12	Ballistic test @ 200°F	3.6	4.5.7	6	18	12	12	12	12

4.4 Quality conformance inspection. Quality conformance inspection shall consist of verification of the characteristics classified on Drawing 847AS115 and associated drawings and of the tests and examinations of Table II.

4.4.1 Production lot size. Unless otherwise specified in the contract or purchase order (see 6.2), the minimum and maximum production lot size shall be 200 and 3,200 cartridges, respectively. Only primary components from a single lot shall be used in a production lot of cartridges; however, a primary component production lot may be used in more than one cartridge production lot.

4.4.2 Sampling. Unless otherwise specified in the contract or purchase order (see 6.2), the number of cartridges selected from each production lot for tests shall be in accordance with Table III. This sample (plus the retained sample) shall be selected at random from the production lot cartridges in such a manner as to assure complete lot representation. The retained sample shall be held for investigative purposes until lot acceptance.

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TABLE II. Quality conformance tests and examinations.

Item	Nature of test	Requirement paragraph	Test paragraph	Classification (DOD-STD-2101)
Primary component	Single lot verification	3.4	4.4.1	(M101)
Ignition device	Age, loading, and acceptance	3.4.1	4.5.1	(M102)
Ignition device	Radiographic examination	3.4.1.1	4.5.2	(M103)
Propellant	Acceptance and weight	3.4.2	4.5.1 and 4.5.3	(M104)
Cartridge	Visual examination	3.7	4.5.4	(M105)
Cartridge	Leakage	3.5.1	4.5.5	(M106)
Cartridge	Radiographic examination	3.5.2	4.5.6	(M107)
Cartridge	Ballistics tests	3.6	4.5.7	(M108)
Cartridge	Preservation-packaging, and marking	Section 5	4.6	(M109)

TABLE III. Quality conformance sample size.

Lot size	Test sample size	Retained sample	Total selected
151-280	32	10	42
281-500	50	10	60
501-1200	80	10	90
1201-3200	125	10	135

4.5 Tests.

4.5.1 Ignition device verification. Verification shall be provided that the ignition devices used were manufactured, loaded, and accepted in accordance with the requirements of 3.4.1 (see 6.4).

4.5.2 Ignition device radiographic examination. All ignition devices shall be radiographically examined in accordance with MIL-STD-453; those having any of the defects specified in 3.4.1.1 shall be rejected. Pressure-sensitive tape may be used as an aid in positioning the ignition devices in suitable grooved racks. For the most revealing exposure, the ignition devices shall be laid on their side with the anvil cutouts vertical.

4.5.3 Propellant condition. Propellant shall be inspected in accordance with the applicable paragraphs of OP 5. Evidence of decomposition shall be cause for rejection.

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4.5.4 Visual examination. All cartridges shall be visually examined. Those having any of the defects specified in 3.7 shall be rejected.

4.5.5 Leakage. Each cartridge in the first article sample and production lot sample shall be leak tested in a dry gas leak tester. Cartridges which exhibit a leak rate in excess of 10^{-5} cm^3 per second of air at a pressure differential of 1.0 ± 0.1 atmosphere shall be considered defective. Defective cartridges of the first article sample shall be rejected. If one or more cartridges of the production lot sample are defective, then the leak test shall be performed on 100 percent of the lot being tested. All defective cartridges shall be rejected.

4.5.6 Cartridge radiographic examination. All cartridges shall be radiographically examined in accordance with MIL-STD-453; any observable imperfections in assembly shall be cause for cartridge rejection. The cartridges shall be positioned on their sides for the most revealing exposure. All cartridges shall be identified with serial numbers prior to examination. The cartridge serial numbers shall be in consecutive order beginning with the number 001 in each production lot. The cartridge shall be arranged on trays or boards in consecutive numerical orders, and each radiograph shall carry a permanent identification of the cartridges displayed thereon. The radiograph identification shall include the item contract number, complete lot number, as stamped on the cartridges, and the span of serial numbers displayed. Discontinuities in serial numbers shall be identified on the X-ray. Defective cartridges found by the vendor shall be clearly identified on the X-ray and removed from the production lot. The serial numbers shall be pen or ink stamped on the cartridges with approximately 1/8-inch-high characters. The serial numbers shall be located apart from the other cartridge markings. Radiographs or copies of the entire production lot shall accompany the ballistic sample to the activity conducting the production lot acceptance test (see 6.2.).

4.5.7 Ballistic tests. The ballistic test sample shall be divided into three groups of as near equal number as possible, to be conditioned at −65 ± 5 °F, +70 ± 5 °F and +200 ± 5 °F respectively with the 2 extra cartridges conditioned at −65 °F and +200 °F. The cartridges allocated for −65 ± 5 °F and +200 ± 5 °F shall be conditioned for not less than 4 hours nor more than 24 hours. The cartridges allocated for +70 ± 5 °F shall be conditioned for not less than 4 hours. Cartridges shall be removed from conditioning and fired in the test fixture configuration shown on Drawing 726AS874 within 3 minutes after removal. If any cartridge is not fired within 3 minutes after removal from conditioning, it shall be reconditioned for not less than 4 hours nor more than 8 hours before test firing. The reconditioning may be performed as many times as necessary.

4.5.7.1 Criteria of acceptability. Cartridges of the ballistic sample shall meet all the requirements of Drawing 847AS115. All cartridges subjected to the ballistic test of 4.5.7 shall meet the requirements of 3.6. A failure of any cartridge to meet any one of these requirements shall be cause for rejection of the lot represented.

4.5.7.1.1 Misfire. The failure of any cartridge to fire shall be cause for rejection of the lot represented, unless such failure is plainly attributable to faulty test equipment or procedure.

4.5.7.2 Retest. There shall be no retests except for misfires allowed by 4.5.7.1.1.

4.5.7.2.1 Test failure. If test failure is attributable to an assignable cause, excluding the test cartridge, original test results should be discarded and that part of the test reconducted.

4.6 Examination of packaging. The preservation-packaging, packing, and marking of the cartridges, shall be examined for conformance to the requirements of section 5.

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5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DOD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

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

6.1 Intended use. The CCU-69A/A impulse cartridge was designed primarily for use in the Pacific Scientific Company powered-retracting, inertia-locking, restraint harness take-up device P/N 0103190-01 and P/N 0103190-09 which have grease in the gas lines.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification

b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.1.2)

c. Whether first article inspection is required and, if so, specify the test activity (see 3.1 and 4.3)

d. Production lot size and test activity (see 4.4.1)

e. Directions for shipping radiographs of entire production lot and ballistic sample to the activity conducting production lot acceptance test (see 4.5.6)

f. Preservation, packing, and marking shall be Level A or B as specified by the contracting activity. Level A and Level B preservation, packing, and marking shall be in accordance with SPI 01-356-7847.

g. Ammunition data cards shall be prepared for each lot and submitted in accordance with MIL-STD-1167 (see 6.2 and 6.4).

h. That the safety precaution requirements of the "Contractors' Safety Manual for Ammunition, Explosives, and Related Dangerous Material," DOD 4145.26M, are applicable and should be specified in the contract as required by Federal Acquisition Regulation (FAR) 23.3. NOTE: When this specification is used as part of the description of work to be accomplished by a Government activity the safety precaution requirements of "Ammunition and Explosive Ashore, OP 5, are applicable.

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6.3 First article. When a first article inspection is required, the contracting officer should provide specific guidance to offerors whether the item(s) should be a preproduction sample, a first article sample, a first production item, a sample selected from the first production items, standard production item from the contractor's current inventory (see 3.1) and the number of items to be tested as specified in 4.3. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.4 Hazard notice. The cartridge described herein and certain of its components are flammable, toxic, or explosive and present hazards in manufacture, handling, storage, and shipment. The contractor should recognize these properties and take appropriate measures to guard and protect against fire, explosion, adverse environment, corrosive atmosphere, rough handling, and electrically induced incidents.

6.5 Explanation of terms. For the purpose of this specification, NAVSUPINST 4030.28 shall be used to clarify terms.

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

6.7 Subject term (keyword) listing.

Ejection systems, aircrew
Emergency escape systems, aircrew
Escape systems, aircrew
Life-saving systems, aircrew

Preparing activity
Navy - OS
(Project 1377-0052)