INCH POUND

MIL-DTL-19264C (OS)
23 October 2009
SUPERSEDING
MIL-P-19264B (OS)
10 November1993

DETAIL SPECIFICATION
PROPELLANT, BS-NACO, FOR THE MK 65 CLEARING CHARGE AND MK 67 PROPELLING CHARGE

This specification is approved for use within the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the minimum requirements for BS-NACO Propellant for use in the MK 65 clearing charge and the MK 67 propelling charge (see 6.1).

1.2 Classification. The propellant will be cylindrical multiperforated grains.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are cited in Sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 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 cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-G-155	Graphite, Dry (For Use in Ammunition)
MIL-P-193	Potassium Sulfate (For Ordnance Use)
MIL-DTL-244	Nitrocellulose
MIL-E-255	Ethyl Centralite (Carbamite)
MIL-L-18618	Lead, Carbonate, Basic, Dry (For Ordnance Use)
MIL-B-21465	Butyl Stearate, Normal

Comments, suggestions, or questions on this document should be addressed to Department of the Navy, Indian Head Division, NSWC, Code E12P, Document Control, 4123 Artisans Court, Suite 103, Indian Head, Maryland 20640-5085, OFFICIAL BUSINESS, or emailed to amanda.penn@navy.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at http://assist.daps.dla.mil/.

AMSC N/A FSC 1376

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-129	Military Marking for Shipment and Storage
MIL-STD-286	Propellants, Solid; Sampling, Examination and Testing
MIL-STD-652	Propellants, Solid, For Cannons Requirements and Packing
DOD-STD-2101	Classification of Characteristics

(Copies of these documents are available online at http://assist.daps.dla.mil/quicksearch/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 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 or contract.

DRAWINGS

NAVAL SEA SYSTEMS COMMAND (CAGE Code 10001)

3208375	Charge, Propelling, 5-Inch, 54-Caliber, Full Mark 67 Mod 3

(Application for copies of NAVSEA drawings should be addressed to: US Navy Major Caliber Propelling Charge AEA, Naval Surface Warfare Center Indian Head Division Picatinny Detachment, Attn: G2, Picatinny, NJ 07806-5000.)

2.3 Non-Government publications. This section does not apply to this document.

2.4 Order of precedence. Unless otherwise noted herein or in the contract, 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. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.4.

3.2 Composition (M101). The propellant shall meet the requirements of Table I when analyzed (see 4.6.1).

3.3 Grain form and dimensions (M102).

3.3.1 Perforations. The grains shall be cylindrical with seven (7) evenly spaced axial perforations (see 4.6.2, 4.6.3 and 6.6).

3.3.2 Length. The length to outer diameter ratio for the grains shall be between 2.10 and 2.50 (see 4.6.2, 4.6.3 and 6.6).

3.4 Glaze. The propellant shall be glazed with graphite, MIL-G-155, Grade IV (see 4.6.3).

3.5 Integrity. The propellant grains shall be without cracks or incipient cracks between the perforations or between the perforations and the outside edge of the grain (see 4.6.3).

TABLE I. NACO composition.

Material	Specification	Percent by Weight
Nitrocellulose, Grade E, Type I	MIL-DTL-244[1/]	93.55 (nominal)
n-Butyl Stearate	MIL-B-21465[2/]	3.00 ± 0.30
Ethyl Centralite, Class 2	MIL-E-255	1.20 ± 0.20
Basic Lead Carbonate	MIL-L-18618[3/]	1.00 ± 0.20
Potassium Sulfate, Type I	MIL-P-193	1.25 ± 0.30
Moisture	-	1.00 (min) to 3.00 (max)
Total Volatiles	MIL-STD-652, Figure 1	5.0 max
Graphite, Grade IV	MIL-G-155	0.10 ± 0.05

1/ The nitrocellulose shall have an average nitrogen content of 12.00 ± 0.10 percent, and shall have a viscosity of 5 ± 2 seconds. The required nitrogen content may be obtained by blending nitrocellulose containing 11.90 to 12.20 percent nitrogen. Average nitrogen content determination shall be made only when specifically requested in the contract (see 6.2).

2/ The n-butyl stearate specific gravity shall be determined at 25°C/25°C and the sample weight shall be 2.5 to 3.2 grams for iodine test.

3/ The compatibility tests for lead carbonate with Cordite-N propellant shall not be performed.

3.6 Stability (C1). Using the 134.5° Celsius (C) heat test, the methyl violet test paper shall not fade to a salmon-pink color in less than 40 minutes and the propellant shall not self initiate in less than 5 hours (see 4.6.4).

3.7 Packing depth (M103). The minimum production packing depth (PPD) of the assessed charge weight shall be 3.5 inches (measured from the case mouth) (see 4.6.5).

3.8 Gun ballistic assessment requirements.

3.8.1 Velocity (M104). The charge weight of the test propellant (TP) shall be assessed to result in a nominal average projectile muzzle velocity matching that obtained for the reference propellant (RP) via the powder proof firings (see 4.6.6.3.2).

3.8.2 Pressure (M105). The maximum allowed chamber pressure shall be 55,100 pounds per square inch (psi) (see 4.6.6).

3.8.3 Velocity variation (M106). The maximum allowed projectile muzzle velocity standard deviation shall be 10 feet per second (ft/sec) (see 4.6.6).

3.8.4 Pressure variation (M107). The maximum allowed chamber pressure standard deviation shall be 1,700 psi (see 4.6.6).

3.9 Propellant interface test. All first article lots shall be subjected to the propellant interface test. Production lots shall be subjected to the propellant interface test when directed by the procuring activity (see 4.6.9 and 6.5).

3.10 Workmanship. The propellant shall be manufactured using good workmanship and shall be a product free from foreign material. It shall be uniform in quality and manufactured in a manner to assure compliance with requirements of this specification when examined in accordance with 4.6.3.

4. VERIFICATION

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 Inspection conditions. Prior to the first article, all test activities identified in the contract shall submit a description of the proposed procedures and equipment to be used to perform the examination and test to the technical activity and the propelling charge design agent for review.

4.3 First article inspection. First article inspection shall be performed by the contractor, after award of contract and prior to production, at a location acceptable to the Government. First article inspection shall be performed on sample units which have been produced with equipment and procedures normally used in production. First article approval is valid only on the contract under which it is granted, unless extended by the Government to other contracts. The first article sample is intended to provide necessary information to establish the propellant granulation needed to meet the required ballistic performance parameters.

4.3.1 Submission. The contractor shall select three propellant granulations which, from experience, are expected to bracket the requirements of this specification. The contractor shall submit a first article sample as designated by the contracting officer for evaluation in accordance with 4.4.2; it shall consist of three pilot lots of a maximum of 1,000 pounds mass each, representing the three candidate granulations.

4.3.2 Inspections to be performed. Each of the granulations comprising the first article sample and submitted in accordance with 4.4.1 shall be tested by the Government. First article inspection shall consist of the tests specified in Table II.

TABLE II. First article quality conformance tests.

Characteristic	Requirement	Test Method
Composition	3.2	4.6.1
Grain Form and Dimensions	3.3	4.6.2, 4.6.3
Integrity	3.4	4.6.3
Glaze	3.5	4.6.3
Stability	3.6	4.6.4
Packing Depth	3.7	4.6.5
Velocity and Pressure	3.8	4.6.6
Workmanship	3.10	4.6.3

4.3.3 Authorization. Government engineering and quality assurance personnel and the contractor shall review the pilot lot test data and shall select a granulation size which best fits the requirements of this specification. The technical agency shall notify the contracting officer of the selected granulation. The contractor shall request approval from the contracting officer to produce the selected granulation. If none of the pilot lots submitted meets the requirements of this specification, a new first article sample

shall be submitted in accordance with 4.4.1. All future production lots shall be of the same basic granulation.

4.3.4 Failure. Failure of the sample to meet the requirements of this specification shall be cause for rejection of the first article sample.

4.4 Quality conformance inspection. Quality conformance inspection shall consist of the examinations and tests of 4.6 to determine conformance to the requirements of this specification. Failure of any sample to conform to any requirement specified herein shall be cause for rejection of the lot represented. Alternate methods and test procedures may be used provided prior written approval has been obtained from the procuring activity and the technically cognizant personnel at the following address: Department of the Navy, Naval Surface Warfare Center, Indian Head Division, ATTN: Gun Propelling Charge Design Agent (Code E14), 3767 Strauss Avenue, Suite 201, Indian Head, MD 20640-5150. Requirements and their corresponding tests are summarized in Table II.

4.4.1 Lot size. Unless otherwise specified in the contract or purchase order, the propellant shall be produced in lots of not less than 100,000 pounds mass nor greater than 500,000 pounds mass.

4.4.2 Sampling. The samples shall be selected from the full propellant packing containers (6.7.1) so as to be representative of the lot. All samples shall be selected following the final packing of the lot. All samples shall be packed in moisture-proof airtight containers and marked with the following in accordance with MIL-STD-129.

a. Propellant description
b. Propellant lot number
c. Number of pounds in lot
d. Manufacturer
e. Contract number

4.4.2.1 For gun performance tests. Sample size shall be approximately 2,420 pounds mass randomly selected from full propellant packing containers (6.7.1).

4.4.2.2 For physical characteristic tests. A 10 pounds mass sample shall be randomly selected from full propellant packing containers (6.7.1).

4.4.2.3 For surveillance tests. A 5 pounds mass sample shall be randomly selected from the full propellant packing containers (6.7.1) and forwarded to the Navy's designated surveillance activity for propellants specified in the acquisition documentation (6.2).

4.5 Classification of characteristics. The characteristics verified by the tests and examinations herein are classified as critical, major or minor in accordance with DOD-STD-2101. Requirements for 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 the characteristic. Requirements not annotated with a classification code are classified minor.

4.6 Methods of inspection.

CAUTION
This specification covers sampling and testing of chemical, toxic, or explosive materials, which are hazardous to personnel.

4.6.1 Chemical analysis. The chemical composition shall be determined using the methods specified in Table III. The requirements of 3.2 shall be met or the lot shall be rejected.

TABLE III. Chemical analysis test methods.

Material	Test Method of MIL-STD-286
Nitrocellulose	209.2.1
n-Butyl Stearate	222.1
Ethyl Centralite	202.2.3
Basic Lead Carbonate	311.1.3 or 316.1
Potassium Sulfate	310.3.1, 310.4.2, or 316.1
Moisture	103.5
Total Volatiles	103.5
Graphite	308.1.4

4.6.2 Grain dimensions. Grain dimensions shall be determined in accordance with MIL-STD-286, method 504.1.1 or 504.6.1. The requirements of 3.3 shall be met or the lot shall be rejected.

4.6.3 Visual examination. The propellant grains selected for the physical characteristic tests shall be visually examined prior to conducting the physical characteristic tests (4.6.1 and 4.6.2) to verify that:

a. Grain form conforms to the requirements of 3.3.
b. Grains are uniformly coated with graphite, conforming to the requirements of 3.4.
c. Workmanship conforms to the requirements of 3.10.

4.6.4 Stability. Stability shall be determined in accordance with MIL-STD-286, method 404.1.2 (134.5°C heat test). The requirements of 3.6 shall be met or the lot shall be rejected.

4.6.5 Packing depth. Prior to all maximum packing depth (MPD) pour testing the propellant shall be conditioned for a minimum of four days at 90 ± 3° Fahrenheit (F). The MPD is the distance, measured to the nearest tenth of an inch, from the case mouth to the upper level of any given propellant charge in a loaded cartridge case. The PPD is the MPD, less the empirical value of 0.7 inches, in the MK 9 cartridge case. MPD is determined by pouring the propellant charge steadily from a height of 30 inches above the mouth of a primed case, over an interval of sixty (60) seconds while the outside of the case is briskly tapped with a soft mallet adjacent to the rising level of the propellant during pouring. The MPD shall be determined for each lot of propellant by pouring three (3) different charge weights, spanning the expected assessed charge weight range, three (3) times each for a total of nine (9) pours. The MPD for each of the nine (9) pours shall be recorded and a curve should be fitted to the PPD values derived from the MPD pouring data to allow for interpolative prediction of the PPD. Subsequent to acceptance tests of each lot of propellant, the assessed charge shall be poured a minimum of three times to determine the MPD and the resultant PPD.

4.6.6 Ballistic testing.

4.6.6.1 Warming or conditioning rounds. Warming or conditioning rounds shall be fired to stabilize gun temperature and eliminate the biasing effects of firing the propellant at various charge levels or temperatures. The first round fired in a gun during a test is the warming round. The round fired as part of a temperature conditioning group or charge level group wherein the velocity is expected to differ from the

previous group by approximately 100 ft/s or more is a conditioning round. Warming and conditioning rounds may have unusual ballistics and the results, therefore, should be disregarded. These rounds are in addition to those specified in subsequent paragraphs.

4.6.6.2 Gun performance tests. All ballistic testing shall be conducted using fleet-released 5-inch, 54-caliber gun barrels which have met the acceptance criteria during proofing and which have a velocity loss of 50 ft/s or less. The MK 45 Mod 1/2 gun system shall be used except for the charge weight probe and validity tests. The non-test components (e.g.; case, primer, etc.) of the complete round of ammunition shall be from one acceptable lot per component and the cartridge shall be assembled in accordance with the applicable Naval Sea Systems Command propelling charge assembly drawing, 3208375 Charge, Propelling, 5-inch MK 67 Mod 3 (See 2.2.2). Allowable deviations in propelling charge assembly may include adjustment of charge weight/(PPD) as required to vary ballistic performance. The projectiles shall be inert loaded and their weight shall be 70.0±0.1 pounds mass. The chamber volume resulting from the projectile and propelling charge combination shall be representative of that of the fleet use projectile/propelling charge combination. The ballistic test shall be performed on the preproduction and production lot except that:

a. For the production sample, the test of 6.5 herein is mandatory.
b. For the production lot, the test of 6.5 herein shall be performed at the discretion of the government when (1) the government deems the test necessary or (2) when the test results of other parameters are marginal.

4.6.6.3 Charge assessment. Charge assessment shall be conducted using the firing programs described below. Only one gun shall be fired each day and the velocities shall be corrected to the muzzle. The cases, primers, and propellant for all propelling charges shall be conditioned at 90 ± 3° F for a minimum of four (4) days immediately prior to assembly and shall be fired at 90 ± 3° F. Charges shall be loaded to yield the packing depth within 0.4 inches of that determined in 4.6.5 for the charge weight to be fired. The charges should be crimped, though the use of adhesive is not necessary. For the charge weight validity firing program, the cartridges shall be reconditioned after assembly for a minimum of 48 hours at 90 ± 3° F prior to firing. For all tests, the cartridges shall be fired within five (5) minutes of removal from temperature conditioning.

4.6.6.3.1 Charge weight probe. A probing round firing program shall be conducted in an instrumented test mount to determine the estimated charge weight of the TP needed to match the projectile muzzle velocity of the RP. The test shall consist of firing a series of RP and a series of TP rounds wherein the TP charge and PPD are adjusted to vary projectile muzzle velocity and chamber pressure. Sufficient rounds should be fired to obtain at least two rounds below and two rounds at or above the RP projectile muzzle velocity. An estimate shall be made from the TP velocity-charge data of the TP charge weight required to match the mean RP projectile muzzle velocity (3.8.1). If the estimated chamber pressure for the estimated TP charge, as determined from the pressure-charge data, exceeds the maximum chamber pressure limit of 3.8.2 by more than 1,350psi, the probing program shall be repeated. If the estimated TP charge again has an estimated chamber pressure which exceeds the maximum chamber pressure by more than 1,350psi, the lot of propellant shall be rejected without further testing.

4.6.6.3.2 Powder proof firings. A firing program shall be conducted in each of four gun barrels in the automatic MK 45 Mod 1/2 gun system to determine the TP charge weight required to match the projectile muzzle velocity for the RP. Three (3) charges at each of four (4) charge levels shall be fired in each gun barrel. The first TP charge (C_1) shall be that which was determined during the charge weight probe round test to match the mean RP projectile muzzle velocity. The second charge (C_2) shall be approximately 0.5 pounds mass less than C_1 and the third charge (C_3) shall be approximately 0.5 pounds mass greater than C_1. The fourth charge, or matching charge (MC), is that charge of the TP which is predicted to match the RP projectile muzzle velocity in that gun on that day.

4.6.6.3.3 Matching Charge Evaluation. A linear, least squares equation shall be calculated for the velocity-charge data for each gun. The MC is determined by substituting the required velocity in the linear least squares equation and solving for the charge weight. Three (3) MC rounds are fired in each of the four (4) guns to determine the MC projectile muzzle velocity.

4.6.6.3.4 Assessed Charges. The assessed charge (AC) shall be determined by using the formula:

$$AC = \frac{\sum_{i=1}^{4}\left(\frac{MC_i}{\Delta_i^{\,2}}\right)}{\sum_{i=1}^{4}\left(\frac{1}{\Delta_i^{\,2}}\right)}$$

where: MC_i = charge weight of the test propellant estimated to match the mean RP projectile velocity in the i^{th} gun.

Δ_i = difference between the mean muzzle velocity obtained for the matching charge in the i^{th} gun (MC_i) and the mean RP projectile muzzle velocity in the i^{th} gun. Note: If Δ_i is zero, replace the zero with 1.

4.6.6.3.5 Charge Weight Validity. The validity of the assessed charge shall be determined by a firing program in any of the gun barrels used in the powder proof firings from the instrumented test mount using cases instrumented with piezoelectric gauges to obtain breech pressure measurements. The program shall consist of ten (10) RP rounds and ten (10) TP rounds which have been assembled and preconditioned as noted 4.6.6.3 except that adhesive, in accordance with drawing 3208375, shall be used on the closure plug and allowed to cure. The rounds shall be randomized to eliminate any gun erosion or hot gun effect. Velocity measured in this test is for information only. The mean chamber pressure and chamber pressure standard deviation shall meet the requirements of 3.8.2 and 3.8.4 respectively or the lot shall be rejected.

4.7.6.4 Velocity Uniformity. The velocity standard deviation shall be determined from the matching charge data obtained from each gun barrel. The velocity standard deviation shall meet the requirements of 3.8.3 or the lot shall be rejected. To calculate the velocity standard deviation, perform the calculations described in a though d.

a. Calculate the sum of the squares of the deviations from the mean for each gun barrel.
b. Sum across the gun barrels.
c. Divide by the quantity of the sum of the total number of rounds minus the number of guns.
d. Take square root to nearest unit of acceptance criteria.

4.6.7 Examination of packaging. Each unit of packaging shall be visually examined for conformance to the requirements of Section 5.

4.6.8 Relative quickness. Relative quickness of the propellant shall be conducted via closed bomb test as specified in MIL-STD-286, Method 801.1.2. The closed bomb reference propellant shall be representative of the nominal composition of the propellant type to be tested (preferably the RP used for ballistic acceptance testing). The “hot-wire” method of ignition may be used as an alternative to the “squib” method.

4.6.9 Interface tests. The procedure is described in the note (see 6.5). For the first article lot the test is mandatory. For production lot, the test shall be performed at the discretion of the Government: (1)

when the Government deems the test necessary or (2) when the test results for other parameters are marginal.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements will be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. 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 my be helpful, but is not mandatory.)

6.1 Intended use. The propellant covered by this specification is intended for use in the MK 65 clearing charge and MK 67 propelling charge. These charges are used in the MK 42 and MK 45 gun mounts. The propellant was designed for military use and has no commercial application.

6.1.1 "NACO". "NACO" is the designation for Navy "cool" single-base propellant types which contain low-nitration nitrocellulose (12.0 percent nitrogen, nominal). The type covered by this specification also contains n-butyl stearate as a coolant and potassium sulfate as a flash suppressant.

6.2 Acquisition requirements. Acquisition documents should 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 2.2.1, and 2.2.2)
c. If first article is required and, if so, relevant information including sample size (see 3.1, 4.4.1, and 6.3)
d. Lot size if other than 4.4.1
e. Activity to conduct gun performance test (see 4.6.6)
f. Special markings, if required (see 5.1, and 6.7.2.)
g. Data required (see 6.4)
h. Activity to receive surveillance sample (see 4.4.2.3)
i. Address and contact information for the US Navy Gun Ammunition Propelling Charge Design Agent and the US Navy Major Caliber Propelling Charge Acquisition Engineering Agent (AEA)
j. Adress and contact information for US Navy Propellant Surveillance Activity.

6.3 First article. When a first article inspection is required, the contracting officer should provide offerors specific guidance as to whether the propellant to be used for first article inspection sample should come from a dedicated first article production lot, or selected from the first propellant production lot (see 3.1), and the quantity of propellant required for testing as specified in 4.4. The contracting officer should also include specific instructions in the acquisition documents regarding arrangements for examination, approval of first article tests results, and disposition of first article samples. The Government reserves the right to waive the requirement of first article inspection samples for those bidders offering a product which has been previously acquired or tested by the Government. 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 on the solicitation.

6.4 Description sheets and test reports.

6.4.1 Propellant description sheets. The propellant manufacturer should furnish a propellant description sheet in accordance with MIL-STD-1171 giving a complete history of the manufacture of each propellant lot and the results of all tests performed on it. Unless otherwise specified, copies of each description sheet should be submitted to each of the following: Department of the Navy, Naval Surface Warfare Center, Indian Head Division, ATTN: Gun Propelling Charge Design Agent (Code E14), 3767 Strauss Avenue, Suite 201, Indian Head, MD 20640-51505, the US Navy Major Caliber Propelling Charge AEA, Naval Surface Warfare Center Indian Head Division Picatinny Detachment, Attn: G2, Picatinny, NJ 07806-5000, and to the activity designated to perform the gun performance tests.

6.4.2 Gun performance test reports. The activity which performs the gun performance tests (4.6.6.2) should furnish a complete test report, including all test, gun, projectile, and cartridge components data. Unless otherwise specified, two (2) copies of each test report should be submitted to each of the following: Department of the Navy, Naval Surface Warfare Center, Indian Head Division, ATTN: Gun Propelling Charge Design Agent (Code E14), 3767 Strauss Avenue, Suite 201, Indian Head, MD 20640-5150, and the US Navy Major Caliber Propelling Charge AEA, Naval Surface Warfare Center Indian Head Division Picatinny Detachment, Attn: G2, Picatinny, NJ 07806-5000.

6.5 Propellant interface test. A test firing should be conducted in an instrumented mount (instrumentation location to be as specified in NSWC, Dahlgren Division – TOE Drawing 1002) on the first article lot to verify that there is no adverse primer-propellant relationship which could cause ballistic performance problems. The test should consist of three (3) round containing the RP and nine (9) rounds containing the TP loaded to the AC from 4.6.6.3, for a total of twelve (12) data rounds. Three (3) TP rounds should be conditioned, for a minimum of 72 hours, and fired at each of the following three (3) temperatures: 20 ± 3°F, 50 ±3°F, and 120 ±3°F. In addition, a minimum of one (1) data round per temperature of the applicable RP should be fired for comparison. The non test components (e.g., case, primer, etc.) of the propelling charge and the propelled mass of 70 ± 0.1 pounds should be from the same acceptable lots used for the ballistic tests (see 4.6.6.3). All rounds should be assembled in accordance with Drawing 3208375. The analyses of the pressure-time plots will be performed by the US Navy Gun Ammunition Propelling Charge Design Agent, Code E14, Indian Head Division, NSWC, Indian Head, MD. Upon completion of analyses, the propelling charge design agent will advise the Naval Sea Systems Command, Washington, D.C., in writing, relative to the results of these analyses.

6.6 Advisory

6.6.1 Relative Quickness. The average relative quickness value should be within 3.0 percent of the reference lot when measured in a closed bomb in order to be certain of meeting the ballistic requirements (see 4.6.8).

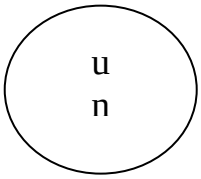
6.6.2 Projectile Muzzle Velocity. Charge weight is chosen to match performance of the RP but the nominal average projectile muzzle velocity for the MK 67 propelling charge is 2,650 ft/s in a 5”/54 caliber gun system and the results of testing obtained should anticipate this for in-service performance.

6.7 Packaging

6.7.1 Packing. Packing should be at Level A. The propellant should be packed in MK 7 packing box containers, drawing 138439, that are clean, dry and free from foreign material, conform to, and are in accordance with the requirements of MIL-P-270 and 49 CFR 100-185. Alternate packing containers are

the Army M2 steel box, Army drawing 76-4-53, or fiberboard drum, Army drawing 12972488. Containers should be sealed using a metallic seal conforming to drawing 8794342 (Aluminum Seal). Palletizing should be in accordance with WR/724-1 or drawing 7517077.

6.7.2 Marking. In addition to any special marking required by the contract or order, shipping containers should be marked in accordance with the requirements of MIL-STD-129 and 49 CFR 171-178. Proper shipping name and serial number in accordance with CFR 49 is “POWDER, SMOKELESS, UN 0161.” The following United Nations Performance Oriented Packaging marking as depicted below should be applied on side of container opposite the identification marking with letters 0.50 inches minimum height. Encirclement of U/N symbol should be sufficiently large to provide a minimum clear spacing around letters. The double asterisks (**) indicate the year packed, e.g., 09 for 2009.



3A1/Y70/S/**

USA/DOD/NAD

6.7.3 Lot numbering. Ammunition lot numbers should be in accordance with MIL-STD-1168.

6.8 Safety Precautions. Safety precaution requirements of DOD 4145.26M are applicable. Note: When this specification is used as part of work to be accomplished by a Government activity, the safety precaution requirements of OP 5 are applicable. For Army activities, the safety precautions of AMCR-385-1 00 are applicable.

6.9 Subject term (key word) listing.

Navy cool
5”/54-caliber propelling charge
MK 65, 5-inch, 54-caliber clearing charge
MK 67 Mod 3, 5-inch, 54-caliber propelling charge
MK 42 gun mount
MK 45 Mod 2/4 gun mount

6.10 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.

6.11 Supersesession information. This revision supersedes revision B dated 10 November 1993 and its associated Automated Data Lists.

Custodian:
Navy – OS

Preparing Activity
Navy – OS
(Project 1376-2010-002)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at http://assist.daps.dla.mil.