DEPARTMENT OF THE ARMY SUPPLY BULLETIN

GRENADE, HAND: FRAGMENTATION, M61, M67, M33, M26 and M26A1, W/FUZE, DELAY, M204A1/A2 or M213 AMMUNITION SURVEILLANCE PROCEDURES

HEADQUARTERS, DEPARTMENT OF THE ARMY, WASHINGTON, DC
16 November 1987

The proponent agency of this supply bulletin is the Commander, AMCCOM. Direct reporting of errors, omissions, and recommendations for improving this bulletin is authorized and encouraged. Comments should pertain to suggested procedural changes, functioning characteristics, defects, cause of failures, remedial action, etc. A DA Form 2028 (Recommended Changes to Publications and Blank Forms) may be completed and forwarded to Commander, AMCCOM, ATTN: AMSMC-QAS-P, Rock Island, IL 61299-6000.

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1. Purpose and scope. This bulletin, when used in conjunction with SB 742-1, provides a method for determining the serviceability of fragmentation grenades with delay (not impact sensitive) fuzes. The visual inspections and surveillance function testing in this procedure will be accomplished under a centralized control program managed by the U.S. Army Armament Munitions and Chemical Command (AMCCOM), AMSMC-QAS-P (R), Rock Island, IL 61299-6000. This bulletin is to be used in the serviceability assess ment of grenade lots based on the inspection and test of individual grenades. The provisions of this bulletin are mandatory for all Department of the Army organizations within CONUS and OCONUS with an ammunition receipt, storage, and/or distribution mission. This bulletin is not intended for use by organizations with stocks in basic loads. SB 742-1 contains additional information pertaining to frequency of test, sample selection, defect standards, reports and records.

*This bulletin supersedes SB 742-13394-435, dated 26 January 1973.

2. Item description. a. This bulletin pertains to the following items:

(1) Grenade, Hand-Fragmentation, Delay, M61, w/Fuze, M204A1/A2, w/Safety Clip, 1330-G880.
(2) Grenade, Hand-Fragmentation, Delay, M67, w/Fuze M213, w/Safety Clip 1330-G881.
(3) Grenade, Hand-Fragmentation, Delay, M33, w/Fuze, M213, 1330-G888.
(4) Grenade, Hand-Fragmentation, Delay, M26 and M26A1 w/Fuze, M204A1/A2, 1330-G890.

b. Fragmentation hand grenades are used against enemy in close combat. Fragmentation grenades produce casualties by high velocity projection of fragments. The grenade fuze contains a primer and a pyrotechnic delay column. Assembled to the fuze are a striker, striker spring, safety lever, safety pin with pull ring, and a detonator assembly. The split end of the safety pin has an angular spread or diamond crimp. The M61 and the M67 grenades are equipped with a safety clip as an additional safety device used in conjunction with the safety pin. The safety clip (spring steel wire) consists of a loop which fits around the fuze body and a clamp which fits over the safety lever. It is designed to keep the lever in place should the safety pin be unintentionally removed from the grenade.

c. Release of the safety clip (if installed) and removal of the safety pin will release the safety lever which will then be forced away from the grenade body by a striker powered by the striker spring. The striker rotates on its axis and strikes the percussion primer which emits a small intense spit of flame igniting the delay element. After burning four to six seconds, the delay element functions the detonator which then sets off the main explosive charge. The main charge explodes rupturing the body and projecting fragments at high velocity.

3. References. a. The following publications will provide more information on the surveillance of the subject grenades. This list is not to be considered all inclusive.

(1) AR 75-1-Malfunctions Involving Ammunition and Explosives.
(2) DARCOM-R (AMC) 385-25-Radiation Protection.
(3) DARCOM-R (AMC) 702-22-Qualification and Certification of DARCOM NDT (nondestructive test) Personnel.
(4) SB 742-1-Ammunition Surveillance Procedures.
(5) SB 742-1330-94-371-Fuze, Hand Grenade: M6 Series, M204 Series, M206 Series, M213, and M215, Ammunition Surveillance Procedures.
(6) TM 9-1330-200-12-Operator's and Organizational Maintenance Manual for Grenades.
(7) TM 9-1330-200-34-Direct Support and General Support Maintenance Manual for Grenades.
(8) TM 9-1375-213-12 Operator's and Organizational Maintenance Manual (Including Repair Parts and Special Tools List) Demolition Materials.
(9) TM 43-0001-29-Army Ammunition Data Sheets for Grenades.

b. Each item of ammunition peculiar equipment (APE) has an operational manual which should be consulted prior to and during the use of that item. The manual is titled with the APE number and nomenclature of the APE item (para 9 below).

4. Safety.

a. These fragmentation hand grenades are hazard class 1.1 and require the observance of all precautions applicable to high explosive ammunition. Fragments can be dangerous up to a distance of 230 meters (252 yards). All visual inspections and surveillance function testing must be conducted according to the provisions covered in appropriate safety regulations and implementing instructions with special attention devoted to technical manuals describing the item. A standard operating procedure (SOP) is also required for this operation and will specify safety requirements. The absence of a safety requirement in this or any other publication is not to be construed as meaning that precaution is unnecessary.

b. Work benches, test equipment, fixtures, and personnel should be properly grounded to protect operations from electrostatic charges. The grenade pitch-in barricade, APE 1213M1, must be in place any time fragmentation grenades are handled. The use of APE 1213 (unimproved design) should be avoided if possible. Operators using this older barricade must wear ear plugs, ear muffs, and a full face shield. Castor wheels are not authorized with either model pitch-in barricade.

c. Before any grenade is removed from its fiber container, it must be thoroughly inspected to see that the safety pin is in place and undamaged and that the prongs of the safety pin are spread approximately 45 degrees or diamond crimped. This inspection must also ensure that the fuze lugs are not cracked or broken and the safety lever ears are properly assembled under the lugs. If the grenade is upside down in the fiber container (fuze is not visible), or if any of the above discrepancies are noted, it should remain inside the container and action taken to dispose of it safely.

d. Grenades should never be lifted or handled by the safety clip or the safety pin pull ring.

e. Personnel involved in an x-ray examination must be properly trained, certified (to include NDT certification), and familiar with all radiation safety requirements. Such requirements are covered specifically in AR 385-30 and DARCOMR 385-25.

f. A grenade that fails to function after release of the safety lever must not be approached for at least 60 minutes and then must be destroyed in place according to proper demolition procedures.

5. Personnel. Visual examination and function testing will be conducted under direct control of a Quality Assurance Specialist (Ammunition Surveillance) hereinafter referred to as a QASAS.

6. Sample Size. Unless otherwise directed, a sample size of thirty (30) grenades is required for a representative sample from each lot for a visual examination and surveillance function test. To satisfy the requirements of the periodic inspection prescribed in conjunction with the surveillance function test, additional sampling and inspection of inner and outer packing may be required in accordance with SB 742-1.

7. Sample selection. Sample grenades will be selected in accordance with provisions of SB 742-1 except that no more than five grenades may be selected from any one box. If the samples are to be function tested at an installation other than the one at which the parent lot is stored, the packing boxes and containers which are not shipped will be inspected and appropriate part of DA Form 984 will be completed prior to shipment. Samples which are shipped must be packed and marked in accordance with SB 742-1. During sample selection number the grenades 1-30.

8. Surveillance test equipment.

a. The inspection and test preparation procedures require the following items of APE:

(1) Pitch-in barricade, hand grenade, delay type, APE 1213M1.

(2) Tank, immersion, APE 1901 (or equivalent).

(3) Thermometer, cup cased, APE 1912 (or equivalent),

(4) Oven, preconditioning, APE 1916M1, or chamber, low temperature, APE 1938, as applicable.

b. The x-ray examination requires the following APE or comparable commercial equipment:

(1) Holding fixture, shell, or grenade x-ray, APE 1288 (or equivalent).

(2) Baltograph (x-ray) machine, APE 2068M1 (or equivalent).

(3) Inspection facility, radiographic, APE 2074 (or equivalent).

c. The preliminary test of the fuze requires:

(1) Fixture, holding, hand grenade, non-standard APE 0604 (or equivalent).

(2) Tension scale or gauge, accurate at least to one half pound (quarter kilogram), if the grenade has a safety clip.

(3) Torque wrench (50 inch/pound or equivalent), direct reading, with dial indicator and memory, with holding vise and adapter (Fuze, hand grenade, NSN 4925-01-033-4451).

d. The actual test of the grenade requires the launcher, pneumatic, APE 1922 or APE 1922M1, with the following items installed:

(1) Kit, support bracket, APE 1922-E003.

(2) Gage, pull tension, with maximum pointer (stop indicator).

(3) Kit, function test, APE 1922-E002/E005.

e. The test must be done from within the shelter, personnel protection, APE 1937, with the following items installed:

(1) Shield, operational, APE 1920.

(2) Kit, periscope and step stool, APE 1937EOO1.

f. The test also requires at least two (2) stopwatches, each accurate to one-tenth (1/10) of a second.

9. Preparation for test.

a. X-ray examination.

(1) Unless higher authority directs otherwise, an x-ray examination will be conducted by the testing installation to supplement the visual inspection. Qualified personnel who are properly certified (to include NDT certification) must conduct this x-ray examination using all required equipment and procedures to ensure safety and quality. Operating personnel should follow instructions in applicable technical manuals, equipment manuals, and depot maintenance work requirement (DMWR) documents. Target distances, penetration meter settings, and exposure times must be adjusted and monitored to assure that the best quality x-rays are produced. The identity of each grenade by sample number must be preserved during this operation.

(2) The x-ray view, or views, of each grenade should clearly reveal whether or not there are cracks or voids in the explosive charge, variations in explosive density, cracks or porosity in metal parts (particularly in the safety lever ears, fuze lugs, and delay assembly), foreign materials inside, or any other irregularities. A delay column that is missing or too short, (see applicable DMWR) or other defect that will affect function test safety, will be considered critical defect. Test personnel should dispose of such a grenade without further testing. Grenades with non-critical or non-safety related defects should be tested as directed below but all discrepancies and irregularities revealed by x-ray must be reported by sample number.

b. Safety clip test (if applicable).

(1) If the grenade is equipped with a safety clip, the testing installation will measure the pull tension required to release the safety clip. Check to ensure that the safety pin is properly spread (approximately 45 degrees or diamond crimped), and in good condition, correctly inserted in the fuze, and that the fuze safety lever is properly secured. Position the grenade in a suitable fixture such as the grenade holding fixture, (nonstandard APE 0604) which will firmly hold the grenade and safety lever so that neither can be moved. Although this fixture must positively prevent the safety lever or spoon from being released, it

should apply no pressure on the lever (luring the test since such pressure could cause a false measurement of safety clip tension. The grenade holding fixture (for safety clip test APE, 0604) fits these requirements and should be used for this test.

(2) Attach the pull tension scale to the safety clip, and apply tension slowly and steadily in the clip releasing direction until the clip disengages from its assembled position. Note and record the tension required to disengage the clip. The safety clip is considered disengaged if' it does not return to its original assembled position over the fuze lever when the tension is removed.

c Fuze torque rest.

(1) The testing installation will ensure that the fuze of every sample grenade is leak-proof and tight by means of a torque test. All samples must be torque tested prior to preparation for function test (para d below).

(2) The torque test will be accomplished as follows:

(a) Set up the torque wrench adapter in the vise as described in TM 9-1M3]0-200-34, paragraph 52g and figure 5-6. With a marking pen, put an alignment mark **on** the fuze and grenade body; then apply a maximum of' 28 inch-pounds (3.16 newton-meters) disassembly torque to the grenade. No movement of the grenade fuze should occur.

(b) This fuze torque test requires caution on the part of the operator to avoid exerting radial force on the fuze body, or physically contacting the fuze lever while torquing, since a false reading could result.

(c) After recording torque test results, ensure that all samples are properly torqued (32 to 70 inch-pounds) or 3.62 to 7.91 newton-meters) prior to the preparation for function test (para d below).

d. Preparation for function test.

(1) Temperature condition the sample grenades at 70 +10 degrees F (21.1 5.6 degrees C) for at least 12 hours. The preconditioning oven, APE 1916M1, or the low temperature chamber, APE 1938, should be used for this temperature conditioning.

(2) After temperature conditioning, immerse the grenades numbered 1-15 in water at 70 degrees It 10 degrees F (21 degrees + 5 C) for thirty minutes. Position them horizontally 6 to 9 inches (15 to 23 centimeters) below surface. Immersion tank, APE 1901, may be used for this purpose. Function test the grenades (as outlined below) within two hours after removal from the water.

(3) Grenades 16-30 will not be immersed in water.

(4) Set up the pneumatic grenade launcher in accordance with the APE 1922M1 Operation and Maintenance Manual, an(d assemble the other required 4 equipment. Regulate air pressure to obtain desired trajectory for grenades.

(5) The personnel protection shelter, APE 1937, with the shield and periscope installed, must be set up at least 40 feet (12 meters) from the grenade launcher. The lanyards to pull the grenade pin and to function the launcher must be properly positioned and locked inside the lanyard control box in the shelter. The operator who places the grenade in the launcher and attaches the lanyards will maintain possession of' the key at all times.

10. Test procedures. ***a.*** Place a sample grenade in the grenade launcher and attach the lanyards as shown in the APE 1922M1 Manual. Be sure that the pull tension scale is set on zero and that the grenade safety clip, if any, is disengaged so that it will allow the fuze to function when the grenade is launched.

b. Make sure all personnel are inside the shelter, then unlock the control box and pull on the lanyard attached to the pull scale (with a slow steady pull) until the grenade safety pin is withdrawn. Observe the grenade through the periscope to be sure that the safety pin has been withdrawn. Resume pulling on the lanyard to open the quick-release valve and launch the grenade. Observe the launch of the grenade through the periscope, and, using at least two stopwatches, record the time, to the nearest tenth of a second, from launching to grenade detonation. Relock the control box immediately after each grenade is launched.

c. In the event of a dud, remain inside the shelter for at least sixty minutes. Dispose of dud according to applicable regulations and procedures.

d. Record the reading to the nearest half pound (quarter kilogram) on the pull tension scale of the launcher, and reset the stop indicator to zero. Record all other appropriate observations described in paragraph 12 below.

11. Observations. *a.* All observations of nonstandard conditions and malfunctions, especially those not included among the defects listed in paragraphs 13 and 14 below or in SB 742-1, should be included whenever pertinent and practical. The following observations, as a minimum, must be reported.

(1) Report any nonstandard marking or any marking which is misleading, incomplete, or unidentifiable.

(2) Give the location and extent of any rust or corrosion.

(3) The results of the x-ray examination, especially any irregularities or nonstandard conditions revealed, should be reported in detail.

(4) If applicable, report the pull tension to the nearest half pound (quarter kilogram) at which the safety clip disengages.

(5) Report whether or not the grenade moves in

relation to the fuze during the fuze torque test, and if so, give the torque wrench reading to the nearest 2 inch-pounds (0.2 newton-meter).

(6) Report the delay time to the nearest tenth (1/10) of a second between grenade launch and detonation.

(7) Report the pull tension to the nearest half pound (quarter kilogram) required to extract the safety pin.

12. Definitions.

a. Delay time-time between withdrawal of safety pin and functioning of fuze (grenade).

b. Dud-grenade fails to function.

c. Low order detonation-a less than adequate detonation evidenced by incomplete breakage of grenade body, large fragments or pieces of unburned explosive.

13. Classification of defects. Defects observed during inspection and testing will be classified in accordance with paragraphs 15 and 16 below and with SB 742-1. Any defects, malfunctions, or nonstandard conditions observed which are not classified in this bulletin or other publications will be described fully and reported with the recommendation of the QASAS as to classification.

14. Nonfunctioning Defects. *a. Critical--*

(1) Safety pin is missing.

(2) Safety pin is insecurely assembled to an extent that it endangers the user.

(3) An incorrect model fuze is assembled to the grenade.

(4) X-ray reveals a delay column which is missing or too short.

b. Major--

(1) Marking is misleading as to type of grenade.

(2) Pull ring is missing (but safety pin is securely assembled).

(3) Pull ring is damaged to the extent that the safety pin cannot be easily extracted.

(4) Safety clip (if applicable) is missing or damaged to the extent that it is ineffective.

(5) The x-ray reveals voids or gaps in the explosive.

(6) The grenade moves in relation to the fuze during the fuze torque test at a torque value of 28 inch pounds (3.16 newton-meters) or less.

c. Minor--

(1) Marking is nonstandard or improper.

(2) Marking is illegible.

(3) The x-ray reveals a foreign object inside the grenade.

15. Functioning Defects. *NOTE:* The code following each functioning defect is for use by testing facility personnel only.

a. Critical--

(1) Pull tension required to remove the safety pin is less than 5 pounds (2.5 kilograms) (AA001).

(2) Delay time is less than 3 seconds (CA001).

b. Major-

(1) Delay time is greater than 6.5 seconds (CA023).

(2) Fuze fails to function (CA024).

(3) Fuze functions but grenade does not detonate (CL021).

(4) Grenade detonates low order (CL022).

(5) Tension required to remove the safety pin is less than 10 pounds (4.5 kilograms) but not less than 5 pounds (2.3 kilograms) (AA020).

c. Minor--

(1) Pull tension required to remove the safety pin is greater than 37 pounds (16.8 kilograms) (CL050).

(2) Tension of 1.5 pounds (0.7 kilogram) or less is applied when the safety clip disengages (if applicable) (CL051).

(3) More than 5 pounds (2.3 kilograms) of tension is required to disengage the safety clip (if applicable) (CL052).

16. Evaluation. *a.* Using the following criteria, and considering functional and nonfunctional characteristics separately, an interim condition code will be assigned in accordance with SB 742-1. A lot will be classified as Condition Code J and reported in accordance with SB 742-1 if any critical defect is observed.

b. Nonfunctional Characteristics.

(1) *Serviceable for Unrestricted Issue and Use*. A lot not Classified as code J shall qualify as serviceable for unrestricted issue and use if it meets the following requirements on inspection of 30 grenades by attribute:

(a) Not more than 1 major defective.

(b) Not more than 2 minor defectives.

(2) *Serviceable for Priority of Issue*. A lot not classified as Code J or as serviceable for unrestricted issue and use shall qualify as serviceable for priority of issue if it meets the following requirements on inspection of 30 grenades by attribute:

(a) Not more than 4 major defectives.

(b) Not more than 6 minor defectives.

(3) *Unserviceable*. A lot not classified as code J, or as serviceable for unrestricted issue and use or for priority of issue, shall be classified as unserviceable.

c. Functional codes.

(1) *Code* A. A lot not classified as code J shall qualify for code A if it meets the following requirements in the test of 30 grenades:

(a) Not more than 1 major defective.

(b) Not more than 2 minor defectives.

(2) *Code B*. A lot not classified as code J or code A will qualify for code B if it meets the following requirements in the test of 30 grenades:

(a) Not more than 3 major defectives.

(b) Not more than 6 minor defectives.

(3) *Code D*. A lot not classified as code J, code A, or code B, will be classified as code D.

17. Records and Reports. Inspection and function test results will be recorded and reported on DA Form 984 (Munitions Serviceability Report), and other appropriate forms, as outlined in SB 742-1.

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

OFFICIAL:
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Brigadier General, United States Army
The Adjutant General

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