

INCH-POUND

MIL-DTL-10057J

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SUPERSEDING

MIL-S-10057H (AR)

6 January 1982

DETAIL SPECIFICATION

SIMULATOR, HAND GRENADE- M116A1

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

1. SCOPE

1.1 Scope. This specification describes the parts, assembly and verification methods for the Simulator, Hand Grenade: M116A1.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in section 3 or 4 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, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 or 4 of this specification whether or not they are listed.

Comments, suggestions, or questions on this document should be addressed to the Commander, U.S. Army ARDEC, ATTN: RDAR-QES-E, Picatinny Arsenal, NJ 07806-5000 or emailed to ardecstdzn@conus.army.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online at <https://assist.daps.dla.mil>.

AMSC N/A

FSC 1370

DISTRIBUTION STATEMENT A. Approved for public release; Distribution is unlimited.

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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-I-12597	-	Igniter, Blasting fuze, friction type, M3A1 Loading, Assembly and Packing
MIL-P-48239	-	Powder, Flash

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-286	-	Propellants, Solid: Sampling, Examination and Testing
MIL-STD-331	-	Fuze & Fuze Components, Environmental and Performance Tests for
MIL-STD-1168	-	Ammunition Lot Numbering and Ammunition Data Card
MIL-STD-1916	-	DOD Preferred Methods for Acceptance of Product

(Copies of these documents are available online at <https://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 of these documents are those cited in the solicitation.

U.S. ARMY ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER (ARDEC) DRAWINGS

8833721	-	Igniter, Blasting Fuze, friction Type, M3A1 Assembly
9200454	-	Launcher
9256461	-	Disc
9256462	-	Upper disc
9256463	-	Disc & Fuze Assembly
9256464	-	Inner tube
9256465	-	Outer tube
9256466	-	Cover & Body Assembly
9256467	-	Simulator, Hand Grenade, M116A1, Assembly
9257901	-	Cover & Body Loading Assembly

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9345134	-	Safety fuze cord
12912921	-	Priming paste support
12972326	-	Flash Composition
13013011	-	Spacer tube
13019988	-	Cover and Body Loading Assembly
13019989	-	Flash Composition

(Copies of these drawings may be requested online at pica.drawing.request@conus.army.mil or from U.S Army ARDEC, ATTN: RDAR-AIS-TD, Picatinny, NJ 07806-5000.)

2.3 Non-Government publications. The following documents 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.

NON-GOVERNMENT STANDARDS

ISO 10070	-	Determination of envelope-specific surface area from Measurements of the permeability to air of a powder bed Under steady-state flow conditions
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(Copies of this document are available from www.iso.org or International Organization for Standardization Case Postale 56, CH-1211 Geneve 20, Switzerland)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the even of a conflict between the text of this document and the references cited herein (except for related specification sheets), 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 Requirement inspections.

3.1.1 First article. When specified, a sample shall be subjected to first article inspection in accordance with 4.2.

3.1.2 Conformance. A sample shall be subjected to conformance inspection in accordance with 4.3.

3.2 Components and assemblies. All materials, components and assemblies shall be in accordance with the requirements on the drawing listed in paragraphs 4.3.2.1 – 4.3.2.11.

3.2.1 Disc. The disc material and dimensions shall be in accordance with 9256461.

3.2.2 Upper disc. The upper disc material and dimensions shall be in accordance with 9256462

3.2.3 Inner tube. The inner tube material and dimensions shall be in accordance with 9256464.

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3.2.4 Outer tube. The outer tube material and dimensions shall be in accordance with 9256465.

3.2.5 Disc and fuze cord assembly. The disc and fuze cord assembly material and dimensions shall be in accordance with 9256463.

3.2.6 Priming paste support. The priming paste support material and dimensions shall be in accordance with 12912921.

3.2.7 Spacer tube. The spacer tube material and dimensions shall be in accordance with 13013011.

3.2.8 Cover and body assembly. The cover and body assembly shall be in accordance with 9256466.

3.2.9 Cover and body loading assembly (BP-A1). The cover and body loading assembly for part number 9256467-1, NSN 1370-01-557-8640 shall be in accordance with 9257901.

3.2.10 Cover and body loading assembly (A1-KP). The cover and body loading assembly for part number 9256467-2, NSN 1370-00-752-8124 shall be in accordance with 13019988.

3.2.11 Hand grenade simulator. The simulator assemblies shall be in accordance with 9256467.

3.2.11.1 Outer tube wrinkles. The outer tube shall be free of cuts, holes, tears or wrinkles with the exception that wrinkles in the outer tube within one-half (0.5) inch of the crimp shall be acceptable provided there are no cuts, holes or tears to the tube.

3.2.12 M3A1 igniter assembly. The M3A1 igniter assembly shall be in accordance with 8833721.

3.2.13 Safety fuze cord. The fuze assembly material and dimensions shall be in accordance with 9345134.

3.2.13.1 Burning time of safety fuze. Each safety fuze, prepared for assembly to the simulator, shall be cut perpendicular to its axis without fraying or damaging the safety fuze. It shall burn within the time limits specified on the applicable drawing following bending to simulate the bend from the lasting fuze igniter to the whistle loading assembly of the simulator. The length of the fuze cord shall be cut to determine a burn time of the safety fuze to be greater than or equal to six (6) and less than or equal to twelve (12) seconds.

3.3 Moisture content.

3.3.1 Flash composition moisture content. The moisture content for the flash composition for part number 9256467-1, (NSN 1370-01-557-8460) shall be in accordance with 9257901 and shall be in accordance with 13019988 for part number 9256467-2 (NSN 1370-00-752-8124).

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3.3.2 Flash composition formulation. The formulation for the flash composition for part number 9256467-1, (NSN-1370-01-557-8460) shall be in accordance with 12972326 and shall be in accordance with 13019989 for part number 9256467-2 (NSN 1370-00-752-8124).

3.3.3 Flash composition granulation. The granulation for the flash composition for part number 9256467-1, (NSN 1370-01-557-8460) shall be in accordance with 12972326 and shall be in accordance with 13019989 for part number 9256467-2 (NSN 1370-00-752-8124).

3.4 Jumble. When subjected to a jumble environment, the simulator shall comply with the following requirements:

- a. The simulator shall not function during test.
- b. There shall be no loose pyrotechnic powder on the simulator or in the test box after jumbling.
- c. The simulator components shall not separate during the test.

3.5 Functioning requirements. The simulators shall function at ambient ($70^{\circ} \pm 5^{\circ}$ F) and cold temperatures (minus $65 \pm 5^{\circ}$ F) and shall comply with the following requirements:

3.5.1 Premature delay. The simulator shall not function prematurely (less than five (5) seconds delay) and the delay time shall be greater or equal to six (6) seconds and less than or equal to twelve (12) seconds. The average of all delay times for the complete acceptance test shall not be more than 8.5 seconds.

3.5.2 Sound level. The sound level intensity shall be not less than 125 decibels at a distance of 75 ± 0.5 feet from the simulator.

3.5.3 Pull cord. The pull cord shall not break or otherwise separate from the pull wire when used to function the simulator.

3.6 Ammunition lot numbering. Ammunition lot numbers shall be assigned in accordance with MIL-STD-1168.

3.7 Workmanship. All parts and assemblies shall be free of burrs, chips, sharp edges, cracks, crazes, unblended radii, porosity, warpage, burn marks, checks, chipped edges, blisters, excess flash, dirt, and other defects and foreign matter which would affect their serviceability. The cleaning method used shall not be injurious to any part nor shall the cleaning agent contaminate parts.

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4. VERIFICATION

TABLE I. Requirements/verification cross-reference matrix.

METHOD OF VERIFICATION 1 – ANALYSIS 2 – DEMONSTRATION (end item test) 3 – EXAMINATION 4 – TEST					CLASSES OF VERIFICATION A – FIRST ARTICLE B – CONFORMANCE INSPECTION			
SECTION 3 REQUIREMENT	DESCRIPTION	Verification Method				Verification Class		SECTION 4 VERIFICATION
		1	2	3	4	A	B	
3.1.1	First article inspection	X		X	X	X		4.2 and TABLE II
3.1.2	Conformance	X		X	X		X	4.3 and 4.3.2
3.2.1	Disc			X	X	X	X	4.3.2.1
3.2.2	Upper disc			X	X	X	X	4.3.2.2
3.2.3	Inner tube			X	X	X	X	4.3.2.3
3.2.4	Outer tube			X	X	X	X	4.3.2.4
3.2.5	Disc and fuze cord assembly			X	X	X	X	4.3.2.5
3.2.6	Priming paste support			X	X	X	X	4.3.2.6
3.2.7	Spacer tube			X	X	X	X	4.3.2.7
3.2.8	Cover and body assembly			X	X	X	X	4.3.2.8
3.2.9	Cover and body loading assembly (BP-A1)			X	X	X	X	4.3.2.9
3.2.10	Cover and body loading assembly (A1-KP)			X	X	X	X	4.3.2.10
3.2.11	Hand grenade simulator			X	X	X	X	4.3.2.11
3.2.12	M3A1 igniter assembly			X	X	X	X	
3.2.13	Safety fuze cord			X	X	X	X	4.3.2.5
3.2.13.1	Burning time of safety fuze			X	X	X	X	4.3.2.5
3.3	Moisture content	X		X	X	X	X	4.7.1
3.3.1	Flash composition moisture content	X		X	X	X	X	4.7.1
3.3.2	Flash composition formulation	X		X	X	X	X	4.7.2
3.3.3	Flash composition granulation	X		X	X	X	X	4.7.2
3.4	Jumble			X	X	X		4.7.3
3.5	Functioning requirements			X	X	X	X	4.5.3
3.5.1	Premature delay			X	X	X	X	4.5.3
3.5.2	Sound level			X	X	X	X	4.5.3
3.5.3	Pull cord			X	X	X	X	4.5.3
3.6	Lot numbering			X		X	X	4.8
3.7	Workmanship			X		X	X	4.3.2

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

- a. First article inspection (see 4.2)
- b. Conformance inspection (see 4.3)

4.2 First article. When specified, a sample shall be subjected to first article inspection in accordance with Table II.

4.2.1 First article rejection. If any assembly, component or test specimen fails to comply with any of the applicable requirements, the first article sample shall be rejected.

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TABLE II. First article inspection

Examination or Test	Drawing number	No. of samples	Requirement Paragraph	Inspection Method/ Reference
<u>Disc</u> Examination for defects	9252461	25	3.2.1	4.3.2.1
<u>Upper disc</u> Examination for defects	9256462	25	3.2.2	4.3.2.2
<u>Inner tube</u> Examination for defects	9256464	25	3.2.3	4.3.2.3
<u>Outer tube</u> Examination for defects	9256465	25	3.2.4	4.3.2.4
<u>Disc and fuze cord assembly</u> Examination for defects	9256463	25	3.2.5	4.3.2.5
<u>Priming paste support</u> Examination for defects	12912921	25	3.2.6	4.3.2.6
<u>Spacer tube</u> Examination for defects	13013011	25	3.2.7	4.3.2.7
<u>Cover and body assembly</u> Examination for defects	9256466	25	3.2.8	4.3.2.8
<u>Cover and body loading assembly (BP-AI)</u> Examination for defects	9257901	25	3.2.9	4.3.2.9
<u>Cover and body loading assembly (AI-KP)</u> Examination for defects	13019988	25	3.2.10	4.3.2.10
<u>M3A1 igniter assembly</u> Examination for defects	8833721	Note a.	3.2.12	Note a.
<u>Safety fuze cord</u> Examination for defects	9345134	25	3.2.13	4.3.2.5
<u>Moisture content (9256467-1)</u> Flash composition	9257901	Note d.	3.3.1	4.7.1
Flash composition formulation	12972326	Note e.	3.3.2	4.7.2
Flash composition granulation	12972326	Note e.	3.3.3	4.7.2
<u>Moisture content (9256467-2)</u> Flash composition	13019988	Note d.	3.3.1	4.7.1
Flash composition formulation	13019989	Note e.	3.3.2	4.7.2
Flash composition granulation	13019989	Note e.	3.3.3	4.7.2
<u>Hand grenade simulator M116A1 assembly</u> Examination for defects	9256467	50	3.2.11	4.3.2.11
Jumble		10	3.4	4.7.3
Functioning – ambient @ 65°F to 75°F		20 (Note b)	3.5	4.5.3
Functioning – cold @ -70°F to -60°F		10 (Note c)	3.5	4.5.3

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TABLE II. First article inspection (cont.)**Notes:**

- a. Test and acceptance in accordance with first article requirements of MIL-I-12597.
- b. Ten assemblies functioned in static (4.7.4.1.1) and non- static phase (4.7.4.1.2).
- c. Ten assemblies functioned in the non- static phase (4.7.4.1.2).
- d. Test and acceptance in accordance with first article requirements from paragraphs 4.5.1 and 4.7.1.
- e. Test and acceptance in accordance with first article requirements from paragraphs 4.5.2 and 4.7.2.

4.3 Conformance inspection.

4.3.1 Inspection lot formation. Inspection lot is defined as a homogeneous collection of units of product from which a representative sample is drawn or which is inspected 100 percent to determine conformance of applicable requirements. Units of product selected for inspection shall represent only the inspection lot from which drawn and shall not be construed to represent any prior or subsequent quantities presented for inspection. Homogeneity shall be considered to exist provided the inspection lot has been produced by one manufacturer, in one unchanged process, using the same materials and methods, in accordance with the same drawings, same drawing revision, same specifications and same specification revisions and complies with the provisions for submission of product as specified in MIL-STD-1916, paragraph “Acceptance by tables.”

4.3.1.1 Lot numbering. All material submitted for inspection in accordance with this specification shall comply with the homogeneity criteria specified herein, regardless of the type of inspection procedure which is being applied to determine conformance with requirements. In addition, inspection lots of loaded simulators shall contain:

- a. Parts from one lot interfix from one manufacturer.
- b. Safety fuze from no more than one lot interfix number from one manufacturer.
- c. Each ingredient of the flash composition of one lot interfix number from not more than one manufacturer.
- d. M3A1 fuze igniters from not more than one interfix number from one manufacturer.

4.3.2 Classification of characteristics. For the conformance inspection paragraphs of 4.3.2.1 to 4.3.2.11, the definitions of critical, major and minor defects are in accordance with MIL-STD-1916 (also see 6.5 for critical characteristic justification). Unless otherwise specified, sampling plans and acceptance criteria for critical, major and minor characteristics shall be in accordance with MIL-STD-1916.

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4.3.2.1	<u>Disc.</u>			DRAWING NUMBER 9256461
				NEXT HIGHER ASSEMBLY 9257901 or 13019988
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD
<u>Critical</u>	None defined			
<u>Major</u>	None defined			
<u>Minor</u> 201 202	Diameter Poor workmanship	VL-II VL-II	3.2.1 3.7	Gage Visual
NOTES:				

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4.3.2.2	<u>Upper disc.</u>			DRAWING NUMBER 9256462
				NEXT HIGHER ASSEMBLY 9256463
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD
<u>Critical</u>	None defined			
<u>Major</u>	None defined			
<u>Minor</u>				
201	Outer diameter	VL-II	3.2.2	Gage
202	Hole diameter	VL-II	3.2.2	Gage
202	Poor workmanship	VL-II	3.7	Visual
NOTES:				

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4.3.2.3	<u>Inner tube.</u>			DRAWING NUMBER 9256464
				NEXT HIGHER ASSEMBLY 9256466
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD
<u>Critical</u>	None defined			
<u>Major</u>	None defined			
<u>Minor</u>				
201	Length	VL-II	3.2.3	Gage
202	Outside diameter	VL-II	3.2.3	Gage
203	Poor workmanship	VL-II	3.7	Visual
NOTES:				

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4.3.2.4	<u>Outer tube.</u>			DRAWING NUMBER 9256465
				NEXT HIGHER ASSEMBLY 9256466, 9257901, and 13019988
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD
<u>Critical</u>	None defined			
<u>Major</u>				
101	Length	VL-IV	3.2.4	Gage
102	Wall thickness (Note a)	VL-IV	3.2.4	Gage
<u>Minor</u>				
201	Inside diameter	VL-II	3.2.4	Gage
202	Poor workmanship	VL-II	3.7	Visual
NOTES: a. Wall thickness shall be gaged in non-overlap regions only				

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4.3.2.5	<u>Disc and fuze cord assembly.</u>			DRAWING NUMBER 9256463
				NEXT HIGHER ASSEMBLY 9256466
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD
<u>Critical</u> 1	Short fuze delay (less than five (5) seconds)	100%	3.2.5	4.6
<u>Major</u> 101	Length from disc to end of fuze, prior to assembly to priming paste support	VL-IV	3.2.5	Gage
102	Disc damaged (puncture or cut)	VL-IV	3.2.5	Visual
103	Disc and fuze not secure (inadequate adhesive)	VL-IV	3.2.5	Visual & Manual
104	Adhesive applied where not required	VL-IV	3.2.5	Visual
105	Priming paste or ignition composition missing from priming paste support	VL-IV	3.2.5	Visual
106	Hot melt glue fillet inadequate or less than 360°			
107	Safety fuze frayed or damaged	VL-IV	3.2.13.1	Visual
<u>Minor</u> 201	Safety fuze frayed	VL-II	3.2.5	Visual
202	Poor workmanship	VL-II	3.7	Visual
Notes:				

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4.3.2.6	<u>Priming paste support.</u>			DRAWING NUMBER 12912921
				NEXT HIGHER ASSEMBLY 9256463
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD
<u>Critical</u>	None defined	VL-II	3.7	Visual
<u>Major</u>	None defined			
<u>Minor</u> 201	Poor workmanship			
NOTES:				

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4.3.2.7	<u>Spacer tube.</u>			DRAWING NUMBER 13013011
				NEXT HIGHER ASSEMBLY 9256466
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD
<u>Critical</u>	None defined			
<u>Major</u>	None defined			
<u>Minor</u> 201	Poor workmanship	VL-II	3.7	Visual
NOTES:				

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4.3.2.8	<u>Cover and body assembly.</u>			DRAWING NUMBER 9256466
				NEXT HIGHER ASSEMBLY 9257901 and 13019988
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD
<u>Critical</u>	None defined			
<u>Major</u>				
101	Disc and fuze assembly loose or not properly seated	VL-IV	3.2.8	Visual & Manual
102	Either tube wrinkled, deformed, puncture or torn	VL-IV	3.2.8	Visual
103	Tube layers (either tube) unwinding or separating	VL-IV	3.2.8	Visual
104	Priming paste or ignition composition missing from or damaged in priming paste support	VL-IV	3.2.8	Visual
<u>Minor</u>				
201	Poor workmanship	VL-II	3.7	Visual
NOTES:				

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4.3.2.9	<u>Cover and body loading assembly (BP-AI) NSN 1370-01-557-8460.</u>			DRAWING NUMBER 9257901
				NEXT HIGHER ASSEMBLY 9256467-1
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD
<u>Critical</u>	None defined			
<u>Major</u>				
101	Lower disc loose or not properly seated	VL-IV	3.2.9	Visual & Manual
102	Evidence of loose powder on exterior	VL-IV	3.2.9	Visual
103	Assembly damaged to extent that powder may leak	VL-IV	3.2.9	Visual
104	Charge missing	VL-IV	3.2.9	Visual & Manual
105	Adhesive missing, excessive or inadequate	VL-IV	3.2.9	Visual
<u>Minor</u>				
201	Poor workmanship	VL-II	3.7	Visual
NOTES:				

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4.3.2.10	<u>Cover and body loading assembly (AI-KP) NSN 1370-00-752-8124.</u>			DRAWING NUMBER 13019988
				NEXT HIGHER ASSEMBLY 9256467-2
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD
<u>Critical</u>	None defined			
<u>Major</u>				
101	Lower disc loose or not properly seated	VL-IV	3.2.10	Visual & Manual
102	Evidence of loose powder on exterior	VL-IV	3.2.10	Visual
103	Assembly damaged to extent that powder may leak	VL-IV	3.2.10	Visual
104	Charge missing	VL-IV	3.2.10	Visual & Manual
105	Adhesive missing, excessive or inadequate	VL-IV	3.2.10	Visual
<u>Minor</u>				
201	Poor workmanship	VL-II	3.7	Visual
NOTES:				

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4.3.2.11	<u>Hand grenade simulator M116A1.</u>			DRAWING NUMBER 9256467
				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD
<u>Critical</u>				
1	Charge on exterior of assembly	100%	3.2.11	Visual
2	Any opening in assembly through which powder may leak	100%	3.2.11	Visual
3	Safety clip missing not fully engaged or incorrectly located.	100%	3.2.11	Visual
4	Safety fuze loose at junction with top disc (can be moved by light finger pressure).	100%	3.2.11	Visual & Manual
5	Premature function (time for initiation to detonation less than 5 seconds)	100%	3.2.11	4.6
<u>Major</u>				
101	Fuze tape or sealing tape missing, peeling or incorrectly positioned.	VL-IV	3.2.11	Visual
102	Vent holes missing from fuze tape.	VL-IV	3.2.11	Visual
103	Disc or tube puncture, cut or torn.	VL-IV	3.2.11	Visual
104	Assembly dented, or deformed.			
105	Sealant cover on disc missing, excessive or inadequate.	VL-IV	3.2.11	Visual
NOTES:				

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4.3.2.11	<u>Hand grenade simulator M116A1 (continued).</u>			DRAWING NUMBER 9256467
				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD
<u>Major</u>				
106	Label missing or incorrect color	100%	3.2.11	Visual
107	Label missing, peeling, misleading or unidentifiable	VL-IV	3.2.11	Visual
108	Igniter damaged (punctured, torn, and dented)	VL-IV	3.2.11	Visual
109	Evidence of poor workmanship on safety fuze or igniter	VL-IV	3.2.11	Visual
110	Any component loose			
111	Ferrule missing from safety fuze prior to assembly into igniter	VL-IV	3.2.11	Visual
112	Delay time (between five (5) to six (6) sec)	VL-IV	3.2.11	Visual
113	Delay time (over twelve (12) seconds)	VL-IV	3.5.1	4.5.3
114	Sound level (less than minimum)	VL-IV	3.5.2	4.5.3
115	Pull cord failure (pull cord breaks or separates)	VL-IV	3.5.3	4.5.3
116	Dud (assembly does not function – “dud”)	VL-IV	3.5	4.5.3
<u>Minor</u>				
201	Protective coating damaged (bare spots)	VL-II	3.2.11	Visual
202	Tube wrinkled	VL-II	3.2.11.1	Visual
203	Poor workmanship	VL-II	3.7	Visual
NOTES:				

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4.5 Testing. Unless otherwise specified herein, the following test shall be performed using MIL-STD-1916.

4.5.1 Moisture content. Major defect.

TABLE III. Major defects for moisture content.

Material	Drawing	Inspection Method Paragraph
Flash composition	12972326 or 13019989	4.7.1.1

4.5.1.1 Material samples moisture content. For verification, one sample of each material as representative of eight (8) hours of production of simulators shall be selected and subject to test. Composite samples shall not be used. If the moisture content of the sample exceeds the requirement, that quantity or sub-lot of material represented by the sample shall not be used in production. If the quantity of material or sub-lot with excessive moisture has been used in loading and packing, the remaining unloaded and unpacked material shall not be used in production, and the loaded and packed simulators shall be rejected.

4.5.1.1.1 Simulator ingredients moisture content. A sample of sufficient size (see paragraph 4.7.1.1) from each lot of each ingredient at the time of inserting the ingredient to the simulator for determination of moisture content shall be selected. Controls shall be provided so that the moisture content is maintained under constant temperature and humidity by a graphic recorder up to and at the time of sealing and blending the charge in the simulators. If the sample fails to meet the requirements, or if the simulators have been loaded with ingredients containing excessive moisture, the remainder of the ingredient lot shall not be used in further production, and the lot of loaded simulators shall be rejected.

4.5.2 Determination of granulation and composition of flash powder – Major defect.

TABLE IV. Major defects for granulation and composition of flash powder.

Material	Drawing	Inspection Method Paragraph
Composition	12972326 or 13019989	4.7.2.2
Granulation	12972326 or 13019989	4.7.2.1

4.5.2.1 Flash composition samples. Adequate controls to insure that the flash composition complies with the requirements shall be provided. Test for verification at least, one sample of the composition of sufficient size (see paragraph 4.7.2) as representative of each eight (8) hours production of simulators shall be provided. A composite sample shall not be used. If the sample fails to meet the requirements for granulation or composition, or if the simulator has been loaded and packed with non-conforming composition, the remaining unloaded composition shall not be used in production and the lot of loaded simulators shall be rejected.

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4.5.2.2 Granulation test. A sample of sufficient size (see paragraph 4.7.2) of each ingredient shall be selected for the granulation test at the time of loading the ingredient. A sample of sufficient size shall be taken from a “dummy” body used in conjunction with the loading of the simulators for determination of composition.

4.5.3 Functioning verifications. The simulator assemblies shall be observed for any evidence of failure to comply with the requirements, as classified in Table V.

TABLE V

<u>Defects</u>	<u>Classification</u>
Premature (See 3.5.1)	Critical
Delay time (See 3.5.1)	Major
Sound level (See 3.5.2)	Major
Pull cord failure (See 3.5.3)	Major
Dud (See 3.5)	Major

4.5.3.1 Functional test for defects at ambient temperature ($70^{\circ} \pm 5^{\circ} \text{F}$) (See Table V)

4.5.3.1.1 First three lots. Beginning with the first lot produced and continuing until three (3) consecutive lots have complied with the requirements, 125 simulators shall be selected for this test. 75 simulator assemblies shall be functioned in the static phase and 50 simulators shall be functioned in the non-static phase. The lot shall be rejected if, during the test, any of the following are exhibited in the combined two phases.

- a. One or more critical defects.
- b. Six or more assemblies having major defects listed in Table V.
- c. Average of all delay times for the combined phases of 4.5.3.1.1 and 4.5.3.2.1 is less than 8.5 seconds.

4.5.3.1.2 Successive lot test. After three consecutive lots have complied with the criteria of 4.5.3.1.1, fifty (50) simulators shall be selected from each lot for this test. 25 simulators shall be functioned in the static phase and 25 simulators in the non-static phase (see 4.7.4.1.2). The lot shall be rejected if, during the test, any of the below are exhibited.

- a. One or more critical defects.
- b. Three or more assemblies having major defects listed in Table V.
- c. Average of all delay times for the combined phases of 4.5.3.1.2 and 4.5.3.2.2 is less than 8.5 seconds.

If the lot is rejected, the next lot produced will proceed as if it is the first lot being produced, and shall follow the requirements of 4.5.3.1.1 and 4.5.3.2.1 until 3 consecutive lots are accepted.

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4.5.3.2 Inspection for defects at cold temperature (minus 65 + 5° F) (See Table V).

4.5.3.2.1 First three lots. Beginning with the first lot produced and continuing until 3 consecutive lots have complied with the acceptance criteria, 80 simulators shall be selected from each lot for test. All assemblies shall be functioned in the non-static phase. The lot shall be rejected if, during the test, any of the following is exhibited.

- a. One or more critical defects.
- b. Four (4) or more assemblies having major defects listed in Table V.
- c. Average of all delay times for the combined phases of 4.5.3.2.1 and 4.5.3.1.1 is less than 8.5 seconds.

4.5.3.2.2 Successive lot test. After three consecutive lots have complied with the criteria of 4.5.3.2.1, 50 simulators shall be selected from each lot for this test. All assemblies shall be functioned in the non-static phase. The lot shall be rejected if, during the test, any of the following are exhibited.

- a. One or more critical defects.
- b. Three or more assemblies having major defects listed in Table V.
- c. Average of all delay times for the combined phases of 4.5.3.1.2 and 4.5.3.2.2 is less than 8.5 seconds.

If the lot is rejected, the next lot produced will proceed as if it is the first lot being produced, and shall follow the requirements of 4.5.3.1.1 and 4.5.3.2.1 until 3 consecutive lots are accepted.

4.6 Fuze length and delay.

4.6.1 Determination of critical fuze length. For each spool of fuze cord, a sample of 30 pieces of fuze nominally three (3) inches shall be cut. Fuze cords shall be cut (10 each) from the beginning, middle and end of the spool with respect to the lot size. Determine the average burn rate and standard deviation. After average burn time and standard deviation is determined, critical fuze length shall be set at an average minus standard deviation of four (4) sigma.

4.6.1.1 Inspection for critical fuze length. Cut fuzes shall be gaged and inspected 100% plus verification level VII for compliance to the determined critical fuze length. Any fuze less than critical fuze length shall be burned to determine the burn rate and if the burn rate is less than five (5) seconds then critical defect and the lot shall be rejected. If the length of the fuze cord is less than the determined critical length but not a short burn then it is a major defect.

4.7 Test methods and procedures.4.7.1 Moisture content.

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4.7.1.1 Flash composition. Determination of moisture content of the flash composition shall be performed by transferring a five (5) gram sample to a tared weighing dish. Weigh the dish and the contents and then place in an oven maintained at a 212°F for three (3) hours. Cool in a desiccator and weigh. Calculate the loss in weight of the dish and contents as percentage of moisture in the sample.

4.7.1.2 Moisture content of flash composition. Moisture content shall be controlled as specified in 4.5.1. For verification, a sample shall be taken from the contents of a “dummy” body used in conjunction with the loading of the simulators. Moisture content shall be determined as specified above.

4.7.1.3 Alternate Method (for flash composition). The moisture content shall be determined in accordance with Method T101.4 of MIL-STD-286. Timer shall be set to the minimum time required to obtain constant readings. Temperature settings shall be 212°F +/- 41°F.

4.7.2 Composition and granulation of flash powder.

4.7.2.1 Granulation. The particle size shall be determined in accordance with Method A3 of ISO 10070.

In order to reduce risk and potential hazard of screening the flash composition, this test may be performed by screening the individual ingredients prior to blending. Alternatively, particle size can be verified by using the individual specification which is specific to pyrotechnic powder.

4.7.2.2 Composition of flash powder.

4.7.2.2.1 Composition of KP/Al flash powder. The composition shall be determined in accordance with MIL-P-48239.

4.7.2.2.2 Composition of BP/Al flash powder. Transfer an accurately weighed portion of approximately 2 grams of the flash powder that was dried for the moisture determination to a tarred crucible. Wash the sample between 10 and 15 times with 5 milliliter (mL) portions of cold carbon disulfide and rinse with ether. Continue washing the sample with fifteen, 20 mL portions of cold distilled water, allowing each flash of the water to remain in contact with the sample approximately 1 minute before applying suction. Aspirate the crucible and contents thoroughly, and dried in an oven maintained at a temperature of $100 \pm 5^\circ \text{C}$. The crucible and contents shall be cooled in a desiccator and weighed. To the contents remaining in the crucible add several portions of hot, dilute hydrochloric acid until the reaction subsides. After all reaction has ceased, wash the residue with several portions of hot water. Dry the crucible and contents in the $100 \pm 5^\circ \text{C}$ oven and then cool in a desiccator and weigh. Calculate the percent of aluminum as follows:

$$\text{Percent aluminum} = \frac{(A - B) * 100}{W} \%$$

Where:

A= weight of crucible and contents after the carbon disulfide and water extraction, in grams.

B= weight of crucible and contents after the acid extraction, in grams.

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W= weight of the sample, in grams.

Determine the percentage of black powder by subtracting the percentage of aluminum from 100.0 percent.

When blending is accomplished in individual charge cases, the adequacy of the composition may be determined by emptying one or more of the partly missed charges from the charge cases before they have been closed, blending the ingredients and performing an analysis on the sample of the mixture.

In order to avoid the dangerous operation of screening the flash composition, this test may be performed by screening the individual ingredient prior to blending.

4.7.3 Jumble. The simulator assemblies shall be tested in accordance with procedures specified in MIL-STD-331, except that the duration of the test shall be limited to a minimum of 20 minutes. The assemblies and equipment shall be observed and inspected for compliance with paragraph 3.4.

4.7.4 Conditioning requirements.

4.7.4.1 Ambient temperature ($70^{\circ}\text{F} \pm 5^{\circ}$). The simulator assemblies shall be conditioned for not less than twenty-four (24) hours at the specified ambient temperatures. At the end of the conditioning period, the assemblies shall be tested in the following manner within 30 minutes after removal from the conditioning chamber. The functioning performance shall be observed for compliance with the requirements.

4.7.4.1.1 Static. The assemblies, conditioned at ambient temperature, shall be mounted horizontally on a rigid horizontal support and fired by means of a lanyard attached to the fuze igniter cord. The assembly shall not be shaken or agitated in any manner other than normal handling within two (2) hours prior to test. Measuring of sound level intensity shall be accomplished using sound Analyzers, microphone System and Sound Level Meters and the pick-up of the sound level shall be located 75 ± 0.5 feet from the simulator test fixture.

4.7.4.1.2 Non-static. The assemblies, conditioned at ambient temperature, shall be fired by placing the assembly in an ejection machine (DWG. 9200454). The fuze igniter cord shall be held in a fixed position. There shall be no slack evident in the igniter cord prior to initiation. Upon ejection of the assembly, the simulator shall be initiated. The throwing range of the ejection machine shall be not less than 45 feet and the ground shall be free of large rocks. The assembly shall be measured and observed for compliance with the requirements specified. Sound level intensity need not be measured during this test.

4.7.4.2 Cold temperature ($-65^{\circ}\text{F} \pm 5^{\circ}\text{F}$). The simulator assemblies shall be conditioned for 16 hours at the required cold temperature and fired within five (5) minutes after removal from the conditioning chamber by the same method specified in 4.7.4.1.2 (Non-static). The functioning shall be measured and observed for compliance with the requirements. If for any reason the units are not able to be functioned within five (5) minutes, a cooler that has a stabilized controlled temperature may be used to transport the units to the testing site for function test.

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4.8 Lot numbering. All samples shall be examined for compliance with the requirements specified in 3.6.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in contract or order (see 6.2). When packaging of materiel is to be performed by DOD or in-house 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 activity within the Military Service or Defense Agency, or within the military service'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 general or explanatory nature that may be helpful, but is not mandatory)

6.1 Intended use. The components covered in this specification are intended for use on the Hand Grenade Simulator, M116A1. The components and assemblies covered by this specification are military unique and have no commercial applications.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification, and of all reference documents cited in Section 2, and listed in Section 6 for information.
- b. Provisions for submission of first article samples.
- c. Provisions for submission of Conformance/Lot acceptance samples.
- d. Packaging requirements (see 5.1 and 6.6).
- e. Requirements for submission of acceptance inspection equipment (see 6.3).
- f. Provisions for critical characteristic contract clause.
- g. Statistical Process Control (SPC) clause.

6.3 Submission of acceptance inspection equipment. Acceptance inspection equipment designs should be submitted as required to Commander, U.S. Army Armament Research, Development and Engineering Center, Attn: RDAR-QEM-B, Picatinny Arsenal, NJ 07806-5000.

6.4 Distribution of ammunition data cards. Distribution of data cards should include the following: Commander, U.S. Army Armament Research, Development and Engineering Center, Attn: RDAR-QEM-B, Picatinny Arsenal, NJ 07806-5000.

6.5 Critical characteristics justification.

6.5.1 Short fuze delay. If the delay is short (less than five (5) seconds) then the end user may get seriously injured. Also, same possibility that can happen as described in paragraph 6.5.5.

6.5.2 Any opening in assembly which charge may leak, or presence of charge on exterior of assembly. If there are any leaks from the assembly or presence of charge on exterior of the assembly

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then that may result in accidental ignition or inadvertent functioning of the simulator. This will result in an unintentional function of the simulator during handling.

6.5.3 Safety clip missing, insecurely engaged or incorrectly positioned. If the safety clip is missing or not positioned correctly then the simulator is vulnerable for accidental ignition, since the safety clip acts as an assembly aid to help accidental ignition. The simulator will function prior to the operator being able to move to a safe operational distance.

6.5.4 Jumble (4.4.13 critical 1). If a simulator functions during the jumble test then it will be unsafe to handle also if powder leaks then it may cause unintentional functioning of the simulator.

6.5.5 Functioning (Time from initiation to detonation less than 5 seconds (4.4.13 critical 3). If the time from initiation to detonation is less than 5 seconds, the risk of detonating in the users hand is very high since the user has very little time to release and throw the simulator away of their hand or move to a safe distance.

6.5.6 Safety fuzes loose at junction with top disc (can be moved by light finger pressure). Fuze can also break off during transportation or handling of the simulator, which leads to powder leakage.

6.6 Packaging requirements and inspections. Because packaging requirements and inspections are not permitted in an item specification in accordance with MIL-STD-961, these requirements and inspections are in drawing 13026907. Requirements for First Article should include both this specification and drawing 13026907.

6.7 Subject term (key word) listings.

Tube

Disc

Flash composition

Flash

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

Custodian activity:

Army – AR

Navy – OS

Air Force – 11

Preparing activity:

Army-AR

(Project 1370-2009-002)

Review Activities:

Navy – AS, NP, MC

Air Force – 70, 99

GSA – FAS

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 <https://assist.daps.dla.mil>.