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MIL-DTL-32411
w/AMENDMENT 2
05 December 2013
SUPERSEDING
MIL-DTL-32411
w/AMENDMENT 1
17 August 2012

DETAIL SPECIFICATION

IGNITER, TIME BLASTING FUSE: WITH SHOCK TUBE CAPABILITY - M81

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 requirements and verification methods for the following item: IGNITER, TIME BLASTING FUSE: with shock tube capability, M81.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents 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 requirements documents cited in sections 3 and 4 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 specification 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-DTL-45144 - Fuse, Blasting, Time- M700, and Dummy Fuse, Blasting, Time: Inert Loading, Assembly and Packing
MIL-P-20444 - Primer, Percussion, M42 Parts for and Loading, Assembling and Packing

Comments, suggestions, or questions on this document should be addressed to: Commander, US Army ARDEC, Attn: RDAR-QES-E, Picatinny Arsenal, New Jersey 07806-5000 or emailed to usarmy.picatinny.ardec.list.ardec-stdzn-branch@mail.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.dla.mil.

AMSC N/A FSC: 1375

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DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-1168 - Ammunition Lot Numbering
MIL-STD-1916 - DOD Preferred Methods for Acceptance of Products

(Copies of these documents are available online at http://quicksearch.dla.mil/ 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.

US ARMY ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER (ARDEC) DRAWINGS

8822498 - Cap, fuse, holder
8822499 - Collet
8822500 - Grommet
8822502 - Washer, large
8822503 - Washer, small
8822504 - Firing assembly
8822505 - Cap, top
8822506 - Housing
8822507 - Ring, pull
8822508 - Rod, pull
8822509 - Spring, firing pin
8822510 - Washer, friction seal
8822511 - Washer, release
8822512 - Striker assembly
8822513 - Housing, firing pin
8822514 - Pin, firing
9345327 - Primer, alternative
12972588 - Base, primer
12972589 - Plug, weatherproofing
12972590 - Plug, shipping
12972591 - Primer, base igniter
12972620 - Igniter, time, blasting fuse: with shock tube capability, M81
13026126 - Shock tube
13051505 - Cotter pin

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(Copies of the above drawings are available from U.S. Army RDECOM-ARDEC, ATTN: RDAR-EIS-PE, Bldg. 12, Picatinny Arsenal, NJ 07806-5000 or by email at usarmy.picatinny.ardec.list.drawing-request-help-desk@mail.mil.)

INTERNATIONAL TEST OPERATING PROCEDURES

ITOP 1-2-601 - Laboratory Vibration Schedules, International Test Operations Procedure

(Copies of the above international test procedures are available from US Army Developmental Test Command, Cameron Station, Alexandria, VA 22304-6145 or online at http://www.atec.army.mil/publications/topsindex.aspx.)

2.3 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

ASTM INTERNATIONAL

ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM F519 - Standard Test Method for Mechanical Hydrogen Embrittlement Evaluation of Coating Processes and Service Environments

(Copies of the above document can be obtained from the ASTM International headquarters, 100 Barr Harbor Drive, West Conshohocken, PA 19428 or online at www.astm.org.)

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 Required inspections.

3.1.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2.

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

3.2 Materials, components, and assemblies. All materials, components and assemblies shall comply with the requirements of 12972620 and its subsidiary drawings.

3.2.1 Hydrogen embrittlement. The firing pin spring and pull ring shall be baked to remove embrittlement.

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3.2.2 Corrosion. The firing pin spring, pull ring, and cotter pin shall be subjected to the required salt spray test as specified on the applicable drawing to determine compliance. Except at the edge of an unprotected area, the salt spray tested samples shall show no evidence of corrosion products (white zinc or red base metal) at the end of the 96 hour test.

3.3 Deleted.

3.4 Deleted.

3.5 Time fuse initiation. The igniter shall ignite M700 Time Blasting Fuse conforming to MIL-DTL-45144.

3.6 Time fuse attachment integrity. The igniter shall not separate from M700 Time Blasting Fuse, conforming to MIL-DTL-45144, and shall initiate the time fuse after exposure to not less than 25 pounds (lbs) of axial force for not less than 10 seconds.

3.7 Shock tube initiation. The igniter shall initiate the shock tube conforming to 13026126.

3.8 Shock tube attachment integrity. The igniter shall not separate from shock tube, conforming to 13026126, and shall initiate the shock tube after exposure to not less than 5 lbs of axial force for not less than 10 seconds.

3.9 Operating temperatures. The igniter shall operate throughout the temperature range of -50ºF to 125ºF.

3.10 Immersion. The igniter shall operate after immersion in water at a depth not less than 30 inches for not less than 6 hours.

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

3.12 Workmanship. All parts, sub-assemblies, and assemblies shall be clean and free of burrs, chips, sharp edges, cracks, unblended radii, burn marks, checks, sinks, crazes, blisters, excess flash, dirt, grease, oil, rust, corrosion, and other foreign matter.

3.13 Markings. All markings shall be smooth, uniform, unsmeared in appearance and free of conspicuously ragged edges. There shall be no bleeding of color markings or the plastic exterior to the extent that there is a mottled or streaky appearance. The markings shall show no lifting, wrinkling, or other visible effect on the plastic's surface. The markings shall be applied on clean, dry surfaces that shall be free of dirt, oil, grease, water, corrosion, or other foreign matter. All required markings shall be present, neat, legible, only where specified, and sharply defined.

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4. VERIFICATION

TABLE I. Requirement/verification cross reference matrix.

Method of verification 1 - Analysis 3 - Examination 2 - Demonstration 4 - Test		Classes of verification A – First article B – Conformance						
Section 3	Description	Verification Methods				Verification Class		Section 4
		1	2	3	4	A	B	
3.1	Required inspections			X	X	X	X	4.1 through 4.3
3.1.1	First article			X	X	X		4.2
3.1.2	Conformance inspection			X	X		X	4.3
3.2	Materials, components, and assemblies			X	X	X	X	4.3.4.1 through 4.3.4.20
3.2.1	Hydrogen embrittlement				X	X	X	4.5.2
3.2.2	Corrosion				X	X	X	4.5.1
3.5	Time fuse initiation				X	X	X	4.5.4, 4.5.5, 4.5.6
3.6	Time fuse attachment integrity				X	X	X	4.5.6
3.7	Shock tube initiation				X	X	X	4.5.4, 4.5.5, 4.5.6
3.8	Shock tube attachment integrity				X	X	X	4.5.6
3.9	Operating temperatures				X	X	X	4.5.4
3.10	Immersion				X	X	X	4.5.5
3.11	Ammunition lot numbering			X		X	X	4.3.3
3.12	Workmanship			X		X	X	4.5.9
3.13	Markings			X		X	X	4.6

4.1 Classification of inspections. 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 inspection. When specified, a sample shall be subjected to first article inspection in accordance with Table II.

4.2.1 First article rejection. If one (1) or more assemblies, subassemblies, materials, or components fail to comply with the first article requirements of 4.3, the sample(s) and first article shall be rejected.

TABLE II. First article tests and inspections.

Examination or test	Drawing(s)	Sample size	Requirement paragraph	Verification
Ring, pull	8822507			
Examination for defects		25	3.2	4.3.4.1
Hydrogen embrittlement test		4.5.2	3.2.1	4.5.2
Salt spray test		4.5.1	3.2.2	4.5.1
Rod, pull	8822508	25	3.2	4.3.4.2
Spring, firing pin	8822509			
Examination for defects		25	3.2	4.3.4.3
Hydrogen embrittlement test		4.5.2	3.2.1	4.5.2
Salt spray test		4.5.1	3.2.2	4.5.1

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TABLE II. First article tests and inspections (continued).

Housing, firing pin	8822513	25	3.2	4.3.4.4
Pin, firing	8822514	25	3.2	4.3.4.5
Striker assembly	8822512	25	3.2	4.3.4.6
Housing	8822506	5 1/	3.2	4.3.4.7
Cap, top	8822505	5 1/	3.2	4.3.4.8
Pull rod and striker assembly	8822508 & 8822512	80	3.2	4.3.4.9
Firing assembly	8822504	25	3.2	4.3.4.10
Washer, friction seal	8822510	25 1/	3.2	4/
Washer, release	8822511	25 1/	3.2	4/
Cap, fuse holder	8822498	5 1/	3.2	4.3.4.11
Collet	8822499	5 1/	3.2	4.3.4.12
Plug, weatherproof	12972589	25 1/	3.2	4.3.4.13
Plug, shipping	12972590	5 1/	3.2	4.3.4.14
Base, primer	12972588	25 1/	3.2	4.3.4.15
Primer, alternative	9345327			
Examination for defects		25	3.2	4.3.4.16
Sensitivity test		4.3.4.16	3.2	4.3.4.16
Dud test		4.3.4.16	3.2	4.3.4.16
Primer, base igniter	12972591	25 1/	3.2	4.3.4.17
Grommet	8822500	5 1/	3.2	4/
Washer, large	8822502	5 1/	3.2	4/
Washer, small	8822503	5 1/	3.2	4/
Pin, cotter	13051505			
Examination for defects		25	3.2	4.3.4.18
Salt spray test		4.5.1	3.2.2	4.5.1
M81 Igniter	12972620			
Examination for defects		100 2/	3.2	4.3.4.19
Immersion		80	3.10	4.5.5
Operating temperatures		160	3.9	4.5.4
Attachment integrities		40	3.6, 3.8	4.5.6
Sequential testing				
Cotter pin extraction		20 3/	3.2	4.5.7
Pull ring force limits		20 3/	3.2	4.5.8

Notes:

1/ If a multiple cavity mold is used, then not less than five (5) samples from each cavity shall be taken. The sample size of the total multiple cavity quantities shall be not less than the quantity specified In Table II. Cavity identification shall be maintained so as to permit tracing each part to the cavity in which it was molded.

2/ After examination for defects, reuse and subject the igniters to FAT tests.

3/ The same twenty (20) igniters shall undergo cotter pin extraction testing followed by pull ring force limits testing.

4/ Verify all dimensions on the drawing.

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4.3 Conformance inspection.

4.3.1 Conformance rejection. If any assembly, subassembly, material, or component fails to comply with the conformance inspection requirements of 4.3 and its subparagraphs, the lot from which the sample was taken shall be rejected.

4.3.2 Inspection lot formation. Inspection lots shall conform to the requirements of MIL-STD-1916. In addition each lot shall contain materials from not more than of one lot interfix number from one manufacturer except the following:

a. Primers from not more than one lot from one manufacturer.

4.3.3 Ammunition lot number. Visually verify that a unique ammunition lot number has been assigned to each lot as described in MIL-STD-1168.

4.3.4 Inspection requirements by classification of characteristics.

a. For the conformance inspection paragraphs 4.3.4.1 through 4.3.4.20, the definitions of critical, major and minor defects are provided in paragraph "Definitions" of MIL-STD-1916.

b. The acceptance criteria for sampling inspection shall be in accordance with the levels provided in conformance examination/test paragraph and MIL-STD-1916.

c. For the functional testing, the criteria for switching from normal to reduced sampling shall be the following: reduced sampling within an inspection lot size shall be authorized only when not less than ten (10) consecutive lots of the same inspection lot size have met the acceptance criteria for all inspections and tests. Compliance with the criteria in any one test alone will not result in reduced sampling of only that test; compliance with all the tests shall be necessary for reduced sampling to occur. Revert to normal sampling upon failure of the lot, continue at normal sampling until the criteria is met again.

d. Alternative conformance acceptance. Alternate conformance procedures may be proposed (see paragraph "Acceptance by contractor-proposed provisions" of MIL-STD-1916).

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4.3.4.1 Ring, pull.				Drawing Number 8822507 Next Higher Assembly 8822504
	Examination	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Salt spray test	4.5.1	3.2.2	4.5.1
102	Hydrogen embrittlement test	4.5.2	3.2.1	4.5.2
Minor				
201	Protective finish damaged, missing, or incomplete	Level II	3.2	Visual
202	Poor workmanship	Level II	3.12	4.5.9

4.3.4.2 Rod, pull.				Drawing Number 8822508 Next Higher Assembly 8822504
	Examination	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Diameter at front end (.149 +.000/-.003)	Level IV	3.2	Gage
102	Perpendicularity of shoulder with diameter at rear end (+/-.002)	Level IV	3.2	Gage
103	Radius of shoulder (.002 max)	Level IV	3.2	Gage
104	Pressure relief cavity or hole incomplete or blocked	Level IV	3.2	Visual
105	Distance from flange to safety pin hole (1.365 +/-.005)	Level IV	3.2	Gage
106	Distance from flange to pull ring hole (1.865 +/-.005)	Level IV	3.2	Gage
107	Diameter of relief cavity (.078 +.004/-.001)	Level IV	3.2	Gage
108	Depth of relief cavity(1.000 +/-.010)	Level IV	3.2	Gage
109	Diameter of relief hole (.078 +.004/-.001)	Level IV	3.2	Gage
110	Distance from flange to relief hole (.700 +/-.010)	Level IV	3.2	Gage
Minor				
201	Total length (2.17 +.00/-.02)	Level II	3.2	Gage
202	Finish damaged, missing, or incomplete	Level II	3.2	Visual
203	Poor workmanship	Level II	3.12	4.5.9

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4.3.4.3 Spring, firing pin.				Drawing Number 8822509 Next Higher Assembly 8822504
	Examination	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Hydrogen embrittlement test	4.5.2	3.2.1	4.5.2
102	Solid height (.84 max)	Level IV	3.2	Gage
103	Load at .89" height (4.2 +/-.4 lbs)	Level IV	3.2	Gage
104	Protective finish damaged, missing, or incomplete	Level IV	3.2	Visual
105	End not squared or ground	Level IV	3.2	Visual
106	Salt spray test	4.5.1	3.2.2	4.5.1
Minor				
201	Poor workmanship	Level II	3.12	4.5.9

4.3.4.4 Housing, firing pin.				Drawing Number 8822513 Next Higher Assembly 8822512
	Examination	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Perpendicularity of cavity base with inside diameter at front end (+/-.001)	Level IV	3.2	Gage
102	Outside diameter (.219+.000/-.003)	Level IV	3.2	Gage
103	Inside diameter at front end (.187 +.002/-.000)	Level IV	3.2	Gage
104	Total length (.89 +.00/-.01)	Level IV	3.2	Gage
Minor				
201	Finish damaged, missing, or incomplete	Level II	3.2	Visual
202	Poor workmanship	Level II	3.12	4.5.9

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4.3.4.5 Pin, firing.			Drawing Number 8822514	
			Next Higher Assembly 8822512	
	Examination	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Total length (.45 +.00/-.01)	Level IV	3.2	Gage
102	Length of point (.100 +.015/-.000)	Level IV	3.2	Gage
103	Profile of point (spherical .08 +.00/-.01)	Level IV	3.2	Gage
104	Location of crimp groove (.13 +00/-.01)	Level IV	3.2	Gage
105	Number of holes or slots	Level IV	3.2	Gage
106	Hole diameter or slot width (.054 +.005/-.000)	Level IV	3.2	Gage
107	Distance from center to center of hole or slot	Level IV	3.2	Gage
108	Outside diameter not breached	Level IV	3.2	Visual
Minor				
201	Distance from base to flange (.25 +.01/-.00)	Level II	3.2	Gage
202	Poor workmanship	Level II	3.12	4.5.9

4.3.4.6 Striker assembly.			Drawing Number 8822512	
			Next Higher Assembly 8822504	
	Examination	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Perpendicularity of forward face of flange with outside diameter of firing pin housing (.003)	Level IV	3.2	Gage
102	Total length (1.10 max)	Level IV	3.2	Gage
103	Slot missing from firing pin housing	Level IV	3.2	Visual
Minor				
201	Crimp improper (shallow or less than 360°)	Level II	3.2	Visual
202	Poor workmanship	Level II	3.12	4.5.9

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4.3.4.7 Housing.				Drawing Number 8822506 Next Higher Assembly 8822504
	Examination	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Outside diameter (.627 +.000/-.010)	Level IV	3.2	Gage
102	Major diameter of thread (5/8 UN-2A)	Level IV	3.2	Gage
103	Pitch diameter of thread (5/8 UN-2A)	Level IV	3.2	Gage
104	Inside diameter (.455 +.005/-.000)	Level IV	3.2	Gage
105	Total length (3.18 +.00/-.03)	Level IV	3.2	Gage
106	Threads improper or damaged	Level IV	3.2	Visual
Minor				
201	Poor workmanship	Level II	3.12	4.5.9

4.3.4.8 Cap, top.				Drawing Number 8822505 Next Higher Assembly 8822504
	Examination	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Distance from front end to bottom of thread (.56 +.05/-.00)	Level IV	3.2	Gage
102	Total length (.95 +.00/.02)	Level IV	3.2	Gage
103	Pitch diameter of thread (5/8 UN-2B)	Level IV	3.2	Gage
104	Minor diameter of thread (.64 +.01/-.00)	Level IV	3.2	Gage
105	Location of cotter pin hole (.80 +/-.01)	Level IV	3.2	Gage
106	Diameter over knurl (.75 +.00/-.01)	Level IV	3.2	Gage
107	Crack or split	Level IV	3.2	Gage
108	Surface in bottom not smooth or free of flash	Level IV	3.2	Visual
Minor				
201	Poor workmanship	Level II	3.12	4.5.9

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4.3.4.9 Subassembly of pull rod and striker assembly.				Drawing Number 8822508 & 8822512 Next Higher Assembly 8822504
	Examination	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Firing pin load test	1/	3.2	4.5.3
Minor				
201	Poor workmanship	1/	3.12	4.5.9
Notes: 1/ Test 80 subassemblies of the pull rods and striker assemblies per igniter lot. If two (2) or more subassemblies fail to comply with the specified requirement, the lot shall be rejected.				

4.3.4.10 Firing assembly.				Drawing Number 8822504 Next Higher Assembly 12972620
	Examination	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Pull rod not engaged with striker assembly	Level IV	3.2	Manual
102	Depth from fuse holder end to firing pin flange (1.12 +.06/-.00)	Level IV	3.2	Gage
103	External components missing or loose (top cap, cotter pin, pull rod, striker, etc…)	Level IV	3.2	Visual
Minor				
201	Cord improperly tied	Level II	3.2	Visual
202	Threads damaged	Level II	3.2	Visual
203	Poor workmanship	Level II	3.12	4.5.9

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4.3.4.11 Cap, fuse holder.				Drawing Number 8822498 Next Higher Assembly 12972620
	Examination	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Minor diameter of thread (.64 +.01/-.00)	Level IV	3.2	Gage
102	Pitch diameter of thread (5/8 UN-2B)	Level IV	3.2	Gage
103	Total length (1.10 +.00/-.03)	Level IV	3.2	Gage
104	Distance from rear end to cavity below thread (.78 +.02/-.00)	Level IV	3.2	Gage
105	Distance from rear end to bottom of thread (.63 +.05/-.00)	Level IV	3.2	Gage
106	Crack or split	Level IV	3.2	Visual
Minor				
201	Poor workmanship	Level II	3.12	4.5.9

4.3.4.12 Collet.				Drawing Number 8822499 Next Higher Assembly 12972620
	Examination	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Inside radius (.095 +.005/-.000)	Level IV	3.2	Gage
Minor				
201	Poor workmanship	Level II	3.12	4.5.9

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4.3.4.13 Plug, weatherproofing.				Drawing Number 12972589 Next Higher Assembly 12972620
	Examination	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Overall length (1.61 +.00/-.03)	Level IV	3.2	Gage
102	Outside diameter of smallest diameter (.118 +.000/-.005)	Level IV	3.2	Gage
103	Length of smallest diameter (1.00 +.00/-.03)	Level IV	3.2	Gage
Minor				
201	Poor workmanship	Level II	3.12	4.5.9

4.3.4.14 Plug, shipping.				Drawing Number 12972590 Next Higher Assembly 12972620
	Examination	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Inside diameter (.118 +.005/-.000)	Level IV	3.2	Gage
102	Outside diameter of knob (.625 +.000/-.020)	Level IV	3.2	Gage
103	Overall length (1.00 +.00/-.03)	Level IV	3.2	Gage
104	Outside diameter of small outside diameter (.212 +.000/-.005)	Level IV	3.2	Gage
Minor				
201	Poor workmanship	Level II	3.12	4.5.9

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4.3.4.15 Primer, base.				Drawing Number 12972588 Next Higher Assembly 12972591
	Examination	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Inside diameter (.118 +.005/-.000)	Level IV	3.2	Gage
102	Outside diameter of knob (.625 +.000/-.020)	Level IV	3.2	Gage
103	Overall length (1.00 +.00/-.03)	Level IV	3.2	Gage
104	Outside diameter of small outside diameter (.212 +.000/-.005)	Level IV	3.2	Gage
Minor				
201	Poor workmanship	Level II	3.12	4.5.9

4.3.4.16 Primer, alternative.				Drawing Number 9345327 Next Higher Assembly 12972591
	Examination and tests	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Height (.111 to .119)	Level IV	3.2	Gage
102	Diameter (.748 to .1756)	Level IV	3.2	Gage
103	Sensitivity testing	1/	3.2	1/
104	Dud testing	300	3.2	2/
Minor				
201	Poor workmanship	Level II	3.12	4.5.9

Notes:
1/ Sensitivity testing shall be in accordance with MIL-P-20444 paragraph 4.2.3.2.1 and 12972588.
2/ Dud testing shall be in accordance with MIL-P-20444 paragraph 4.2.3.2.2 and 12972588.

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4.3.4.17 Primer, base igniter subassembly.				Drawing Number 12972591 Next Higher Assembly 12972620
	Examination and tests	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Primer missing, inverted, or damaged.	Level IV	3.2	Visual
102	Primer not fully seated.	Level IV	3.2	Visual
Minor				
201	Poor workmanship	Level II	3.12	4.5.9

4.3.4.18 Pin, cotter.				Drawing Number 13051505 Next Higher Assembly 8822504
	Examination and tests	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Salt spray test	4.5.1	3.2.2	4.5.1
Minor				
201	Protective finish damaged, missing, or incomplete	Level II	3.2	Visual
202	Poor workmanship	Level II	3.12	4.5.9

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4.3.4.19 Igniter, time, blasting fuse/shock tube capability - examinations.				Drawing Number 12972620 Next Higher Assembly
	Examinations	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Total length (5.343 max.)	Level IV 1/	3.2	Gage
102	Length from top cap to end of fuse holder cap (4.00 max.)	Level IV 1/	3.2	Gage
103	External components missing or loose (top cap, pull rod, weather proof plug, shipping plug, fuse holder cap, cotter pin, pull ring, cord)	Level IV 1/	3.2	Visual/ manual
104	Top cap or fuse holder cap cracked or split	Level IV 1/	3.2	Visual
105	Markings missing, illegible or incorrect	Level IV 1/	3.13	4.6
106	Internal components missing or improperly assembled	Level IV 1/	3.2	Visual/Manual
Minor				
201	Cotter pin not spread properly	Level II 1/	3.2	Visual
202	Cotter pin cord missing or improperly tied	Level II 1/	3.2	Visual
203	Protective finish missing, or incomplete (pull ring and cotter pin)	Level II 1/	3.2	Visual
204	Marking color improper	Level II 1/	3.2	Visual
205	Knurl missing (where applicable)	Level II 1/	3.2	Visual
206	Poor workmanship	Level II 1/	3.12	4.5.9

Notes: 1/ Sample size shall be in accordance with the MIL-STD-1916 verification level, plus all the destructive test units of 4.3.4.20.

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4.3.4.20 Igniter, time, blasting fuse/shock tube capability–functional.				Drawing Number 12972620 Next Higher Assembly
	Examinations and Tests	Conformance Criteria	Requirement Paragraph	Paragraph Reference/ Inspection Method
Critical	None defined			
Major				
101	Operating temperatures	100/50 1/	3.9	4.5.4
102	Immersion	100/50 1/	3.10	4.5.5
103	Attachment integrities	80/40 1/	3.6	4.5.6
104	Cotter pin extraction	20 1& 2/	3.2	4.5.7
105	Pull ring force limits	20 1& 2/	3.2	4.5.8
Minor	None defined			

Notes: 1/ The functional test quantities are depicted as Normal/Reduced.

The total function test quantity is 300 for Normal sampling and 160 for Reduced sampling.

The criteria for switching between Normal to Reduced shall be in accordance with 4.3.4.c.

The functional tests results shall be summed together and the following rejection criteria used:

During Normal sampling, if two (2) or more assemblies fail to initiate after the third attempt, the lot shall be rejected.

During Reduced sampling, if one (1) or more assemblies fail to initiate after the third attempt, the lot shall be rejected.

Any test failure(s) caused by either improper assembly of the igniter or inability to be reset qualifies both as a test and lot failure.

2/ The same sample igniters shall undergo sequential cotter pin extraction testing followed by pull ring force limits testing.

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4.4 Test sub-procedures.

4.4.1 M700 insertion procedures. Loosen the fuse holder cap three revolutions. Loosen the plugs by pressing them into the igniter. Grip both the weatherproofing and shipping plugs and move them side to side while simultaneously pulling both plugs from the igniter. Cut a 24" ±1" length of fuse so its ends are clean and square. Insert the fuse into the igniter as far as it will go (to ensure complete and proper insertion of the fuse). Re-tighten the fuse holder cap to insure proper holding force; fingertight closures shall be used.

4.4.2 Shock tube insertion procedures. Loosen the fuse holder cap three revolutions. Loosen the weatherproofing plug (outermost plug) by pressing the plug into the igniter. Grip the weatherproofing plug and move it side to side while simultaneously pulling the weatherproofing plug out of the shipping plug and the igniter. Cut a 24" ±1" length of shock tube so its ends are clean and square. Seal one end of the shock tube (tape, ultrasonic, cap, etc.). Insert the shock tube into the shipping plug as far as it will go (to ensure complete and proper insertion of the shock tube). Re-tighten the fuse holder caps to insure proper holding force; fingertight closures shall be used.

4.4.3 Functioning procedures. Secure the igniter. Remove the cotter pin. Apply an axial force to the pull ring, within the limits specified on drawing 12972620. The M81 and lot shall be considered a failure if the attached time fuse or shock tube length does not initiate. If the M81 does not function, reset per 4.4.3.1.

4.4.3.1 Quick reset procedures. If the igniter does not function on the first initiation attempt, reset the igniter. To reset the igniter, reengage the striker assembly by pushing the pull rod back into the end of the igniter. Verify the pull rod re-engages the striker by feeling the pull ring's increased resistance to withdrawal. After the pull rod re-engages the striker, apply an axial force to the pull ring, within the limits specified on drawing 12972620. If the igniter does not function after the first reset, it may be reset a second time. The M81 shall be rejected if the igniter is incapable of being reset or if it is reset twice and still does not function.

4.5 Tests.

4.5.1 Salt spray test. This test shall be conducted on the pull ring, firing pin spring, and cotter pin to determine compliance with the applicable drawings' requirements. The test shall be performed in accordance with ASTM B117 and the test duration shall be 96 hours, per the drawings and referenced specifications. The frequency of the test shall be once per week. If multiple parts use the same plating process, the test need not be performed specifically during a pull ring, firing pin spring, or cotter pin plating batch; rather vary the testing batch to check the plating process across all parts. If one (1) or more samples have corrosion products (visible to the unaided eye at normal reading distance) the parts produced using the plating/coating process since the last successful test shall be rejected.

4.5.2 Hydrogen embrittlement test. This test shall be performed initially and no less than every 120 days to assure quality and process control within the zinc/chromate plating process utilized during manufacture of the firing pin spring and pull ring. Perform the test in accordance with ASTM F519 using the specified number of Type 1a.1 Standard size test specimens. If one

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(1) or more test fails, the parts produced using the plating/coating process since the last successful test are considered embrittling and shall be rejected.

4.5.3 Firing pin load test. This test shall be performed on a subassembly consisting of the pull rod assembled to the striker assembly, conforming to drawings 8822508 and 8822512 respectively. Secure the pull ring end of the pull rod. Apply an axial load not less than 15 lbs to the firing pin flange in a direction away from the pull rod. The striker assembly and pull rod and their lots shall be rejected if the roll crimp fails or the pull rod disengages.

4.5.4 Operating temperatures. The test shall be conducted on the M81. Equally divide the igniters into the two temperature groups. The items tested at Hot shall be conditioned at 125ºF +10/-0 ºF. The items tested at Cold shall be conditioned at -50ºF +0/-10ºF. Each of the two groups shall be conditioned for a not less than of 24 hours at their respective temperature. Along with the igniters, condition time fuse and shock tube, conforming to MIL-DTL-45144 and 13026126 respectively. Inspect for deformation, changes in color, and cracks. From each temperature group, half of the samples shall be used to initiate time fuse and the other half shall initiate shock tube. Within 5 minutes after the removal from the chamber, the igniter shall be inspected and functioned. Insert similarly conditioned time fuse/shock tube per 4.4.1/4.4.2. Initiate the igniters per 4.4.3. Visually inspect the time fuse and shock tube for signs of initiation (venting, deformation, flame exiting the end, etc.). The M81 and lot shall be rejected if it does not initiate the time fuse /shock tube.

4.5.5 Immersion test. The test shall be conducted on the M81. Equally divide the M81 samples into the two groups, one for immersion with time fuse and one for immersion with shock tube. Cut 24” ±1” lengths of M700 and shock tube, conforming to MIL-DTL-45144 and 13026126 respectively. Within 30 minutes of cutting the lengths, insert igniters onto both ends of the lengths per 4.4.1/4.4.2. Then submerge the entire length and attached igniters into the specified depth of water for the specified length of time. Remove the lengths and igniters from the water and within 30 minutes of removal from the water, cut the lengths midway between the igniters. The M700 lengths may be cut to no less than a 3 inches protruding from the igniter. Seal the shock tube ends (tape, ultrasonic, cap, etc.). Initiate the igniters per 4.4.3. Visually inspect the M700 for signs of initiation (venting, deformation, flame exiting the end, etc.). Visually inspect the shock tube for breakage of the end seal (and lack of interior explosive powder if the end seal is not broken). The M81 and lot shall be rejected if it does not initiate the time fuse/shock tube.

4.5.6 Attachment integrity test. This test shall be conducted on the M81. Equally divide the M81 samples into the two groups, one for insertion with time fuse and one for insertion with shock tube. Obtain lengths of M700, conforming to MIL-DTL-45144 and shock tube, conforming to 13026126. Insert the lengths into M81s per 4.4.1/4.4.2. Secure the igniter and apply the specified axial force for the specified time to the junction of the M81 and length. The M81 shall be rejected if the length separates from the igniter. Carefully unsecure the igniter from the fixture. Seal the shock tube ends (tape, ultrasonic, cap, etc.). Initiate the igniters per 4.4.3. Visually inspect the M700 for signs of initiation (venting, deformation, flame exiting the end). Visually inspect the shock tube for breakage of the end seal (and lack of interior explosive powder if the end seal is not broken). The M81 and lot shall be rejected if it does not initiate the time fuse/shock tube.

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4.5.7 Cotter pin extraction test. This test shall be performed on the M81. Secure the igniter. Beginning at not greater than 9 lbs, apply the incremental axial force of to the eye of the cotter pin in the direction away from the igniter and cotter pin until it withdraws completely. The M81 and lot shall be rejected if the cotter pin is withdrawn from the igniter at less than 10 lbs or greater than 30 lbs is required for withdrawal.

4.5.8 Pull ring force limits test. This test shall be conducted on the M81. Secure the igniter. Remove the cotter pin. Beginning at not greater than 4 lbs, apply an incremental axial force to the pull ring in the direction away from the igniter until it functions (as evidenced by audible noise). The M81 and lot shall be rejected if it functions at less than 5 lbs or greater than 15 lbs is required for functioning.

4.5.9 Workmanship. Verify by visual inspection. The M81 and lot shall be rejected if it does not conform to the workmanship requirements.

4.6 Markings. Verify by visual inspection. The M81 and lot shall be rejected if it does not conform to the marking requirements.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of material 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 of 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 may be helpful, but is not mandatory.)

6.1 Intended use. The M81 is a weatherproof igniter intended to be used for the initiation of either time blasting fuse or shock tube. The M81 is part of the Modernized Demolition Initiators (MDI) family. The M81 is used to initiate all past and current fielded and developmental time blasting fuses and shock tubes. The M81, covered by this specification, is intended for use with military demolitions. These M81s, covered by this specification, are military unique as they must function under rough handling and extreme climatic and storage conditions as encountered by the United States Armed Forces.

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 applicable documents from Section 6.

b. Requirement/CDRL for Physical Configuration Audit (PCA).

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c. Requirement/CDRL for First Article inspection.

d. Requirement/CDRL for conformance inspection.

e. Requirement/CDRL for Ammunition Data Cards as specified in MIL-STD-1168.

f. Requirement/CDRL for Acceptance Inspection Equipment (AIE) and associated test procedures. M700 and shock tube used during LAT should be submitted as part of the AIE.

g. Requirement/CDRL for request to move from Normal to Reduced Sampling. Reduced sampling may be authorized only when the Government considers reduced inspection as desirable; steady, consistent production is demonstrated; and the minimum number of lots has meet the acceptance criteria for all inspections and tests. Normal sampling should be reinstated upon failure of any one examination/test, lapse in production or government request.

h. Requirement/CDRL for Alternate Acceptance Plans.

i. Packaging requirements. Special requirements exist for the packaging of this item. Detailed directions and additional information may be obtained from RDAR-EIL-P.

j. Packaging inspection requirements exist for the packaging of this item in accordance with drawing 13026892. Detailed directions and additional information may be obtained from RDAR-QEM-G.

k. Requirement for certificates of findings (certificates of analysis) on the primer lot(s) to be submitted with each igniter lot.

l. Requirement for evidence that the primer is manufactured by a qualified source and the total time between original acceptance of the primer lot and its assembly into the igniter should not be greater than 2 years.

6.3 Complete functioning. The functioning of the M81 can be evidenced by the propagation of the M81's primer to the inserted time fuse or shock tube. The time fuse can be verified for propagation by looking for a flaming exiting the time fuse end and/or by examining the exterior and interior, which changes in appearance when burned. The shock tube can be verified for propagation by looking for a flame exiting the shock tube and/or examining the interior walls for explosive material. If the shock tube's end is sealed (by tape, ultrasonic, cap, etc.) then a rupture of the shock tube or seal will typically occur during functioning. If the seal or shock tube does not rupture, the shock tube can be cut open and the interior walls inspected for the absence of explosive.

6.4 Document history. This document supersedes the purchase description QAA-1422E Item Specification; Igniter, Time Blasting Fuse with Shock Tube Capability: M81, Parts for, and Loading, Assembling and Packing; dated 25 April 2008.

6.4.1 Amendment overview of changes. The following approved Engineering Change Proposal (ECP) is being incorporated into this document: R13B2014.

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6.5 Subject term (key word) listing.
Friction seals
Modernized Demolition Initiators (MDI)
Pull ring

6.6 Amendment notations. The margins of this specification are marked with vertical lines to indicate modifications generated by this amendment. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations.

CONCLUDING MATERIAL

Custodian:
Army - AR
Navy – MC

Preparing activity:
Army-AR
(Project 1375-2014-001)

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.dla.mil.