

MIL-M-60079C(MU)
9 May 1973

SUPERSEDING
MIL-M-60079B(MU)
23 April 1969

MILITARY SPECIFICATION

MOTOR ASSEMBLY, BELLOWS

1. SCOPE

1.1 This specification covers one type of electrically-initiated, wire bridge motor assembly.

2. APPLICABLE DOCUMENTS

2.1 Government documents. The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

SPECIFICATIONS

MILITARY

MIL-A-148 - Aluminum Foil.

STANDARDS

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129 - Marking for Shipment and Storage.
MIL-STD-810 - Environmental Test Methods.
MIL-STD-1168 - Lot Numbering of Ammunition.

DRAWINGS

US ARMY MUNITIONS COMMAND

EDGEWOOD ARSENAL

DL14-15-965 - Motor Assembly, Bellows.
IDL14-15-965 - Motor Assembly, Bellows - Inspection Data List.
DLB136-13-920 - Test Fixture, Bellows Motor, Expansion.

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(Copies of specifications, standards, drawings and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

UNIFORM CLASSIFICATION COMMITTEE

Uniform Freight Classification

(Application for copies of these ratings, rules and regulations should be addressed to Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, Illinois 60606.)

CODE OF FEDERAL REGULATIONS

49 CFR 171-179 - Department of Transportation Rules and Regulations for the Transportation of Explosives and Other Dangerous Articles.

(The Department of Transportation regulations are a part of the Code of Federal Regulations available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Orders for the above publication should cite "49 CFR 171-179").

3. REQUIREMENTS

3.1 Materials and components.

3.1.1 Materials. All materials cited on Drawing DL14-15-965 or on the subsidiary drawings shall conform to the specifications listed thereon, or to the specific characteristics set forth on the drawings.

3.1.2 Components. All components of the motor assembly shall conform to the specifications and drawings listed on Drawing DL14-15-965 and subsidiary drawings.

3.2 Assembly. The motor assembly shall be assembled as shown on Drawing B14-15-965. The ingredients specified on Drawing C14-15-966 shall be suitably blended to meet the functioning requirements of the motor assembly. The per-

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centages of charge ingredients shall be provided to the contracting officer prior to the start of regular production for informational purposes only (see 6.3).

3.3 Bridge resistance. The bridge resistance of the bridge assembly shall be 5 ± 2 ohms when tested in accordance with 4.4.4.1 (Dwg C14-15-967).

3.4 Insulation resistance between lead wires. The resistance between the lead wires (Dwg C14-15-968) of the motor assembly shall not be less than 50 megohms when 1000 ± 5 volts DC are applied to the lead wires in accordance with 4.4.4.2.

3.5 Plug and lead wire assembly. There shall not be any movement of the wire relative to plastic plug (Dwg C14-15-968) when tested in accordance with 4.4.4.3.

3.6 Vibration. The motor assembly (Dwg B14-15-965) shall comply with 3.8 subsequent to the vibration test specified in 4.4.4.4 in each of the following positions:

- (a) Longitudinal axis perpendicular to vibration direction.
- (b) Longitudinal axis parallel to vibration direction.

3.7 Temperature.

3.7.1 Temperature cycling. The motor assembly assembled with retainer as shown on Drawing B14-15-965 shall comply with 3.6 and 3.8 after being subjected to a minimum of 3 complete cycles. Each cycle shall consist of subjecting the motor assembly to -65° F for 3 hours followed by subjecting it to $+160^{\circ}$ F for 3 hours. The changes between temperatures shall be accomplished within a 5 minute interval. After completion of cycling, the motor assembly shall be returned to ambient temperature in accordance with 4.4.4.5.

3.7.2 Extreme low temperature. The motor assembly assembled with retainer as shown on Drawing B14-15-965 shall comply with 3.8 after being subjected to an ambient temperature of -65° F for no less than 2 hours in accordance with 4.3.4. A maximum delay of 3 minutes is permitted between removal from the cold environment and functioning.

3.7.3 Extreme high temperature. The motor assembly assembled with retainer as shown on Drawing B14-15-965 shall comply with 3.8 after being subjected to an ambient temperature of 160° F for no less than 2 hours in accordance with 4.3.4. A maximum delay of 3 minutes is permitted between removal from the hot environment and functioning.

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3.8 Functioning. The motor assembly bellows shall expand longitudinally $0.375 + .005$ inch within 15 ± 10 milliseconds when tested in accordance with 4.4.4.6. The motor assembly bellows shall be initiated by a constant 1.3 volts DC power supply.

3.9 Preproduction. Prior to the start of regular production, a preproduction lot of motor assemblies shall be produced in accordance with this specification for examination and tests (see 4.3).

3.10 Workmanship. The motor assembly shall be free from oil, grease, soldering flux, dents, cracks and deformation which would adversely affect its functioning.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection.

4.1.1 Supplier's responsibility. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to specified requirements.

4.1.2 Objective evidence. The supplier shall provide objective evidence acceptable to the contracting officer that the requirements of 3.1 and section 5 for which specific inspection has not been provided in this specification have been satisfied.

4.2 Classification of inspections.

- (a) Preproduction inspection (see 4.3)
- (b) Quality conformance inspection (see 4.4)

4.3 Preproduction inspection.

4.3.1 Lot. A preproduction lot of 1201 motor assemblies or 8 hours production, whichever is greater shall be manufactured using the same methods, materials, equipment and processes as will be used during regular production.

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4.3.2 Sampling.

4.3.2.1 For examination and nondestructive tests. Sampling shall be conducted in accordance with MIL-STD-105.

4.3.2.2 For destructive test. Sampling shall be conducted in accordance with table I.

4.3.3 Inspection procedure.

4.3.3.1 For examination and nondestructive tests. Sample motor assemblies shall be examined and tested in accordance with the classification of defects and with MIL-STD-105.

4.3.3.2 For destructive test. Sample motor assemblies shall be tested in accordance with table I. The acceptance number is zero.

Table I. Preproduction sampling and testing

: Quantity :	Test	:	:
:	Temperature cycling,	:	4.4.4.5
20	Vibration	:	4.4.4.4
:	Function	:	4.4.4.6
:	Low temperature	:	4.3.4
10	Function	:	4.4.4.6
:	High temperature	:	4.3.4
10	Function	:	4.4.4.6
:	Vibration	:	4.4.4.4
20	Function	:	4.4.4.6

4.3.4 Extreme low and high temperature test. Cold or hot soak the motor assemblies as required, at the specified temperatures for the required period of time and then function within the required period of time.

4.3.5 Acceptance/rejection criteria. The preproduction sample motor assemblies shall comply with the examinations and tests specified in 4.3.3 to be acceptable. The supplier shall obtain written approval from the contracting officer prior to proceeding with regular production.

4.4 Quality conformance inspection.

4.4.1 Lotting. Each lot shall be identified and controlled in accordance with MIL-STD-1168. However, no more than one lot number of ignition charge shall be contained in any one lot of motor assemblies.

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4.4.2 Sampling.

4.4.2.1 For examination and nondestructive tests. Sampling shall be conducted in accordance with MIL-STD-105.

4.4.2.2 For destructive tests. Sampling for each test shall be conducted in accordance with MIL-STD-105, inspection level S-4.

4.4.3 Inspection procedure.

4.4.3.1 For examination and nondestructive tests. The samples shall be examined and tested in accordance with the classification of defects and with MIL-STD-105.

4.4.3.2 For destructive tests. The samples shall be tested in accordance with 4.4.4.3, 4.4.4.4 and 4.4.4.6, using an AQL of 1.0 percent defective. Tests 4.4.4.4 and 4.4.4.6 shall be conducted sequentially.

4.4.3.3 Classification of defects. (See inspection data list IDL14-15-965 for inspection equipment required to perform the examinations specified in this section.)

(a) Motor assembly, bellows (B14-15-965).

<u>Categories</u>	<u>Defects</u>	<u>Acceptance standards</u>
<u>Critical:</u>	None defined	
<u>Major:</u>	AQL 0.65 percent defective	
101	Insulation resistance failure	4.4.4.2
	AQL 1.0 percent defective	
102	Bridge resistance failure	4.4.4.1
103	Length incorrect (.665 max)	
104	Wire not shunted (see section 5)	
105	Workmanship (3.10)	

4.4.4 Tests. Test shall be conducted as follows: (See inspection data list IDL14-15-965 for inspection equipment required to perform the tests specified in this section.)

4.4.4.1 Bridge resistance. Measure the resistance of the bridge between the load wires using a current not to exceed 10 millamperes.

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4.4.4.2 Insulation resistance. Attach the lead wires to a suitable measuring device and apply the specified voltage.

4.4.4.3 Plug and lead wire assembly. Secure the plastic plug and gradually apply a tensile load of $8 + 1/2$ lb. to each lead in the longitudinal axis of the systems. Apply this load for a period of 30 seconds and the 8 pound limit shall be reached after a period of gradual application in excess of 1 second.

4.4.4.4 Vibration. The motor assembly shall be tested in accordance with method 514.1, table 514.1-V II, equipment category g, (shipment by common carrier), procedure X, and curve AW of MIL-STD-810.

4.4.4.5 Temperature cycling. Condition the motor assembly at the specified temperatures for the required period of time. Stabilize the motor assembly to ambient temperature.

4.4.4.6 Functioning. Place the motor assembly in the test fixture (Dwg DLB136-13-920). Initiate the motor assembly at the required voltage and record functioning time for expansion. The time shall be recorded to nearest 0.01 millisecond.

5. PREPARATION FOR DELIVERY

5.1 Packaging, (interplant shipment). Motor assemblies shall be bundled together, 25 per bundle and secured with tape, wire or string. Each bundle shall be completely wrapped in aluminum foil having a minimum thickness of .001 inch and conforming to MIL-A-148. The foil shall be applied so that the contents will not spill out during handling.

5.2 Packing, (interplant shipment). The motor assemblies packed as specified in 5.1, shall be packed to insure carrier acceptance and safe delivery to the first domestic destination. Containers shall comply with Uniform Freight Classification or regulations of common carriers applicable to the mode of transportation. Packing shall comply with Department of Transportation requirements.

5.3 Marking. In addition to any special marking specified, shipping containers shall be marked in accordance with Drawing D14-15-1001. Packages (5.1) shall be provided with identification marking consisting of nomenclature, quantity and unit of issue and lot number, applied in accordance with MIL-STD-129. The following marking shall be applied to all unit packages.

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"CAUTION - Electrically ground each bundle before opening. Extremely sensitive to static electricity. Handle only under fully grounded conditions and in approved locations."

6. NOTES

6.1 Intended use. This item is intended for use as a component of a bomb fuze set.

6.2 Ordering data. Procurement documents should specify the following:

- (a) Title, number and date of this specification.
- (b) Preproduction.

(1) Time allowed for supplier submission of samples for Government test and evaluation after award of contract.

(2) Name and address of test facility and shipping instructions when testing is performed by the Government.

(3) Time required for the Government to notify the supplier whether to proceed with production.

6.3 Caution. Suppliers are hereby notified to take all necessary precautions to protect personnel while preparing mixture and during assembly operations.

Custodian:

Army - MU

Preparing activity:

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Project No. 1390-A110

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