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8 September 1964

Superseding
MIL-J-7093 (Aer)
9 August 1955

MILITARY SPECIFICATION

JATO MARK 6 MOD 1

This specification has been approved by
Bureau of Naval Weapons, Department of the Navy

1. SCOPE

1.1 This specification covers the solid propellant rocket motor JATO Mark 6 Mod 1, 15KS-1000, referred to herein as rocket motor or unit.

2. APPLICABLE DOCUMENTS

2.1 Government Furnished 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-Q-9858	Quality Control System Requirements

STANDARDS

Military

MIL-STD-105	Sampling Procedures and Tables far Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-292	Ballistic Nomenclature, Rocket Static Tests

FSC 1340

MIL-STD-414	Sampling Procedures and Tables for Inspection by Variables for Percent Defective
ASTM-STP-15	Manual on Quality Control of Materials

(When requesting any of the applicable documents, refer to both title and number requests should be made via the cognizant Government Inspector. Copies of this specification and other unclassified specifications and drawings required by contractors in connection with specific procurement functions should be obtained upon application to the Commanding officer, Naval Supply Depot (Code 105), 5801 Tabor Avenue, Philadelphia 20, Pennsylvania. All other documents should be obtained from the procuring activity or as directed by the contracting officer.) (ASTM Specification maybe obtained from American Society for Testing Materials1916 Race St. Philadelphia, Pa.)

DRAWINGS

Bureau of Naval Weapons

LD 419664	JATO Mk 6 Mod 1,Igniter Mk 165 Mod 0, Carloading, Packaging, Palletizing and Shipping Assemblies
LD 515662	JATO Mk 6 Mod 1, Loaded Assembly
CD 2000087	JATO Mk 6 Mod 1

(Requests for the drawings, list of drawings, and Classification of Defects (CD's) should be addressed to the Commanding Officer, Central Technical Documents Office, Louisville, Kentucky.)

2.2 Other Publications. - The following document of the issue in effect on date of invitation for bids or request for proposal, forms a part of this specification to the extent specified herein.

CODE OF FEDERAL REGULATIONS

Title 49 CFR Parts 71-90	Interstate Commerce Commission Rules and Regulations for the Transportation of Explosives and Other Dangerous Articles

(The Interstate Commerce Commission regulations are a part of the Code of Federal Regulations (1949 Edition - Revised 1963) available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Orders for the above publication should cite 49 CFR 71-90(Rev. 1963).)

3. REQUIREMENTS

3.1 Preproduction Requirements. - Unless otherwise specified by the procuring activity, each contractor shall before beginning large score production under any contract or order, submit for testing a preproduction lot manufactured by proposed production methods. The preproduction lot shall consist of twenty-eight (28) loaded motors representing four (4) propellant batches. The motors shall be tested as specified in section 4 of this specification and figure 1 at an activity designated by the procuring activity to confirm that production equipment, methods, and criteria proposed are suitable for mass production and will yield rocket motors meeting the requirements of this specification. At the discretion of the procuring activity, these tests may be repeated under any of the following conditions:

(a) The supplier has instituted a change in the material or the process.

(b) Specification requirements have been amended or revised sufficiently to affect the character a performance of the product.

(c) It is deemed necessary to determine that the quality of the product has not changed.

Any production by the contractor prior to approval (in writing by the procuring activity) of the preproduction lot shall be at the contractor's risk.

3.2 Production Requirements.

3.2.1 Conformance with Documents. - Unless otherwise specified, the loaded motor shall conform to the requirements specified herein and with drawings listed on LD 515662.

3.2.2 Material. - All materials, processes, and parts used in the manufacture of the rocket motor or components shall be functionally suitable for the application and shall conform strictly to the requirements specified on applicable drawings and specificaitons. When drawings or specifications permit the use of equivalent items or materials, authorization to use a specific alternate shall be obtained from the procuring activity.

3.2.3 Finish. - All components and assemblies shall be free from bum, sharp edges, contamination, or foreign material which could result in malfunction of the rocket motor or components, or be a safety hazard in handling.

3.2.4 Life. - All "O" rings and explosive ordnance components used in this Jato unit such as propel lant grains and igniters shall be manufactured after the date of issuance of the procurement contract.

3.2.5 Dimensions. - Unless otherwise specified, all dimensions shall apply after all manufacturing processes (machining, sizing, etc.), process treatments (plating, anodizing, heat treating, etc.), and testing have been completed, but prior to the application of paint, decals, etc.

3.3 Performance and Product Characteristics.

3.3.1 Performance Parameters. - The rocket motor shall meet the following performance parameters:

TABLE I

PERFORMANCE REQUIREMENTS

REQUIREMENTS	TEMPERATURE			
	-75°F		150°F	
	Minimum	Maximum	Minimum	Maximum
Action Time (sec)	16.6	20.3	10.0	12.5
Total Impulse (lb-sec)	13200	14600	14150	15650
Ignition Delay (sec)	———	.5	———	.5
Peak Chamber Pressure (psig)	———	620	———	1100

3.4 Workmanship. - The loaded motors shall be free from explosive materials on all external surfaces. They shall be uniform in quality and free from foreign material. They shall be manufactured in a manner to assure compliance with the requirements of this specification.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. - The supplier is responsible for the performance of all inspection requirements as specified herein. Inspection as used herein includes 100% inspection of each component part for conformance to drawings and specifications, and sample testing of all explosive components such as igniters and initiators. Except as otherwise specified, the supplier may use his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examinations and tests shall be kept complete and available to the Government as specified in the contract or ordeer. The Government reserves the right to perform any of the inspections set forth in this publication where such inspections are necessary to assure that supplies and services conform to the prescribed requirements.

4.2 Quality Control. - The contractor's quality control system shall conform to the requirements of MIL-Q-9858. The contractor shall maintain average and range statistical control charts for each of the ballistic parameters outlined in 3.3.1 for all production units.

4.3 Classificaiton of Inspections. - Inspection of the rocket motors shall be classified as follows:

(a) Preproduction evaluation (4.7)

(b) Production acceptance testing (4.8)

4.4 Lot. - The lot shall consist of motors made from a single batch of propellant including no more than 30 motors.

4.5 Sampling for Production Acceptance.

4.5.7 Responsibility for Tests. - Unless otherwise specified, all tests specified herein shall be conducted by the supplier under cognizance of the customer or his duly authorized Government representative.

4.5.2 Sampling and Tests.

(a) Initial sampling - First 1,000 motors

(b) Intermediate sampling - Next 2,000 motors

(c) Normal sampling - Balance of production

4.5.2.1 Initial Sampling Schedule. - From the first 1,000 motors produced, two motors of each lot shall be selected at random. The motors are to be conditioned and static fired (in accordance with 4.8.3); one at -75°F and one at 150°F.

4.5.2.1.1 Requirements. - Ballistic data obtained from the test firings shall meet the requirements of 3.3.1.

4.5.2.1.2 Nozzle Resizing. - When the results of the above test (4.5.2.1) do not meet the requirements (3.3.1) and it appears that the performance of the propellant batch can be brought within limits by changing the nozzle throat diameter, one (1) additional lot test sample shall be fired with the revised nozzle throat diameter and at a temperature to be specified by the procuring agency. Satisfactory performance of this test shall qualify the lot for acceptance with the revised nozzle size.

4.5.2.1.3 Test Results. - Prior to the initiation of the Intermediate Sampling Schedule (4.5.2.2) the contractor shall furnish the procuring agency, for review

and acceptance, the results of test firings (4.5.2.1) including pressure and thrust time curves. Abnormal performance, blow-ups or rejection of propellant batches or motors for defects may be cause for continuation of initial sampling plan, until adequate verification cation of unit is approved in writing to justify reduction of sampling. Any revision to test plan is at contractors risk if approval is not granted.

4.5.2.2 Intermediate Sampling Schedule. - One motor shall be selected at random from each lot, conditioned and test fired (in accordance with 4.8.3) alternately at -75°F and 150°F.

4.5.2.2.1 Requirements. - Ballistic data obtained from test firings shall meet the requirements of 3.3.1.

4.5.2.2.2 Selection of Units. - The test motor shall be selected at random from all the assembled motors of the lot. By specific agreement between the contractor and the customer, it will be permissible to select the test motor prior to assembly of the entire lot.

4.5.2.2.3 Nozzle Resizing. - When the results of the above test (4.5.2.2) do not meet the requirements (3.3.1) and it appears that the performance of the propellant batch can be brought within limits by changing the nozzle throat diameter, one (1) additional lot test sample shall be fired with the revised nozzle throa diameter and at a temperature to be specified by the procuring agency. Satisfactory performance of this test shall qualify the lot for acceptance with the revised nozzle size.

4.5.2.2.4 Test Results. - After production of at least 3,000 motors and prior to the initiation of the Normal Sampling Schedule (4.5.2.3) the contractor shall furnish the procuring agency the results of test firings (4.5.2.2) including pressure and thrust time curves. Abnormal performance, blow-ups or rejection of propellant batches or motors for defects may be cause for continuation of initial sampling plan, until adequate verification of unit is approved in writing to justify reduction of sampling. Any revision to test plan is at contractor's risk if approval is not granted.

4.5.2.2.5 Review. - The test data shall be submitted to the procuring activity for review for the purpose of reducing sampling in accordance with the Normal Sampling Schedule (4.5.2.3).

4.5.2.3 Normal Sampling Schedule. - After the production of the 2,000 motors under the Intermediate Sampling Schedule (4.5.2.2) and upon approval by the procuring activity in writing, the Normal Sampling Schedule shall form the basis for acceptance of the assembled motors.

4.5.2.3.1 Selection of Units. - One (1) motor shall be selected at random from each of four (4) randomly selected lots represented in sixteen (16) lots assembled in sequence. For eighty percent (80%) of the lots, samples may be selected after grain assembly of the entire lot; and for twenty percent (20%) of the lots, samples may be selected after motor assembly of entire lot. All tests shall be in new inert

parts. Each group of four (4) motors shall be conditioned and test fired (in accordance with 4.8.3) alternately at -75°F and at 150°F.

4.5.2.3.2 Acceptance. - Acceptance of the sixteen (16) lots from which the sample of four (4) was withdrawn shall be based on the ballistic performance of the test motors selected therefrom.

4.5.2.4 Control Charts. - The contractor shall maintain statistical control charts for each of the five (5) basic ballistic parameters (paragraph 3.3.1) for all motors submitted for acceptance under the Normal Sampling Schedule at each of the temperatures -75°F and 150°F.

4.5.2.5 Range Charts. - A "statistical control index rating", Q_R, for each of the range charts shall be computed according to the formula:

$$Q_R = 100 - a$$

Where

a is the percent of values on the range chart outside of the 3 σ limit, (paragraph 4.6).

4.5.2.6 Data and Calculations. - Prior to initiation of the Normal Sampling Schedule, the contractor shall submit data and necessary calculations to demonstrate that the statistical control index rating for each of the range charts is at least 85% for 200 consecutive firings.

4.5.2.7 Range Chart Index Rating. - As part of the requirements for continued application of the Normal Sampling Schedule, the statistical control index rating for the range charts (4.5.2.5) shall be computed continuously. The computation shall include data from 50 sub-groups accumulated prior to the time of calculating statistical control index ratings. Continuance of the Normal Sampling Schedule requires, in part, that the statistical control index rating for the range charts shall be at least 85%. If the computed value is less than 85%, the Normal Sampling Schedule shall be discontinued immediately, and the Intermediate Production Schedule shall be applied. A value of less than 85% for the index rating shall not be cause for rejection of units accepted under the Normal Sampling Schedule (paragraph 4.5.2.3). In order to resume the Normal Sampling Schedule, the contractor shall submit data and necessary calculations to demonstrate that the statistical control index rating for each of the range charts is at least 85% for 200 consecutive firings, or that the factor responsible for the low Q_R rating has been found and corrected.

4.5.2.8 Mean Value. - A "statistical control index rating", Q_x, for each of the mean value charts (4.5.2.4) shall be computed according to the formula:

$$Q_x = 100 - b$$

Where:

b is the percent of values outside of the $\bar{\bar{X}} \pm \frac{3s_x}{2}$ limits (paragraph 4.6).

4.5.2.9 Mean Value Index Rating. - The statistical control index rating, Q_x, for the mean values (4.5.2.8) shall be computed after each 200 firings. While the reduced normal sampling schedule is in effect, the contractor shall furnish the customer with copies of statistical control charts (4.5.2.4) along with computed Q_R values (4.5.2.5) and Q_x values (4.5.2.8) at least after each 200 firings. The computation shall include data from 50 sub-groups accumulated prior to the time of calculating statistical control index ratings. Action based on Q_R values has been previously specified in paragraph 4.5.2.7. Action based on Q_x values is as follows:

4.5.2.9.1 Q_x has been greater than 85% for 200 consecutive firings;

(a) The value of S_u must be greater than $\bar{\bar{X}}$.

(b) The assembled units represented by each group of four (4) test units shall be accepted if the average value, X, of all the ballistic properties specified (3.3.1) lies within the limits S_u and S_L, (paragraph 4.6), and if all of the ballistic data for each of the test units are individually within the acceptance limits.

(c) If the average value requirement is not met, the assembled units represented by the four (4) test samples shall be tested in accordance with the Intermediate Production Schedule of one (1) firing per batch of propellant. If an individual value is outside of the acceptance limits of 3.3.1,the lot shall be rejected. Failure to meet the condition (4.5.2.9.1(b) shall not be cause for discontinuance of the Normal Sampling Schedule.

4.5.2.9.2 Q_x has not been greater than 85% for 200 consecutive firings;

(a) The value of S_u must be greater than $\bar{\bar{X}}$.

(b) The assembled units represented by each group of four (4) test units shall be accepted if the average value, $\bar{X}$,, of all the ballistic properties specified (3.3.1) lies within the limits S_U and S_L, and if all the ballistic data for each of the test units are individually within the acceptance limits (3.3.1).

(c) If the average value requirement is not met, the assembled units represented by the four (4) test samples shall be tested in accordance with the Intermediate Production Schedule of one (1) firing per batch of propellant. Botches from which test units have been selected under the Normal Sampling Schedule shall

Normal Sampling Schedule is outside of the acceptance limits, the lot shall be rejected.

4.6 Procedure for Calculating Statistical Control Charts for Ballistic Data.

4.6.1 Test data for each basic ballistic parameter to be analyzed shall be divided in chronological order with respect to firing date into sub-groups of four samples each, from the series of data being used os the base period. When the Normal Sampling Schedule is in effect, the first four firings from units selected from each day's assemblies shall constitute a sub-group. Additional firings from the same group of units shall not be recorded by the procedures of this paragraph.

4.6.2 From each sub-group of samples, the mean, $\bar{X}$, and the range, R, shall be computed by the formulas:

$$\bar{X} = \frac{\Sigma X_i}{4}$$

$$R = X_{max} - X_{min}$$

Where X_i = individual value for each sample.

4.6.3 The grand mean value, $\bar{\bar{X}}$, and the estimated standard deviation, s_x, of X in the base period shall be computed by the formulas:

$$\bar{\bar{X}} = \frac{\bar{X}}{m}$$

Where m = number of sub-groups of four in the base period.

Where $\bar{R}$ is the average range, $\frac{\Sigma R}{m}$, of the sub-groups in the base period.

4.6.4 For each parameter to be analyzed, the average value of each sub-group X, and the range, R, of each sub-group shall be plotted on appropriate graph paper in chronological order with respect to firing date.

4.6.5 On each range chart, the location of the 3 σ control limit (4.6.8) shall be appropriately indicated.

4.6.6 On each average value chart, the location of the following values shall be appropriately indicated:

(a) Grand production mean, $\bar{\bar{X}}$.

(b) Specification limits.

(c) The term S_u where S_u is the upper specification limit minus $3s_x$ for the property under consideration.

(d) The term S_L where S_L is the lower specification limit plus $3s_x$ for the property under consideration.

(e) The term t_u where:

$$t_U = \bar{\bar{X}} + \frac{3 s_x}{2}$$

(f) The term t_L where:

$$t_L = \bar{\bar{X}} - \frac{3 s_x}{2}$$

(g) The term S'_u where:

$$S'_U = S_U - \frac{s_x}{2}$$

(h) The term S'_L where:

$$S'_L = S_L + \frac{s_x}{2}$$

4.6.7 Control chart values and limits (4.6.1 thru 4.6.6) shall be computed when sufficient data have been accumulated to provide a base period of at least twenty-five (25) sub-groups at each temperature. Values and limits shall be recomputed at least each time the number of observations has doubled.

4.6.8 Factors. -Useful factors in the construction of Control Charts on observations (4) samples (N) may be obtained from Table B2, page 115, ASTM manual on Quality Control of Materials.

4.7 Preproduction Evaluation of 28 Loaded Motors (See Figure 1, Page 18 Preproduction Test Schedule).

4.7.1 Inspeciton Requirements. - All preproduction motors shall be inspected to the drawing and specification requirements listed on LD 515662.

4.7.2 Vibration, Temperature Cycling, and Shock Tests. -Four (4) rocket 4 units motors representing four (4) propellant batches shall be conditioned at -75° F and 150°F and maintained at the specified temperature within 10°F during the tests. The motors shall be supported from the lugs. The specified accelerations shall be

applied to the chamber and the output measured at the propellant grain. All the vibration shall be along the longitudinal axis and perpendicular to longitudinal axis. The specified time shall be divided equally among the two directions. The test motors shall be sub jetted to a resonant frequency survey by applying a 1g input and slowly varying the frequency from 5 to 500 cps. The units shall be tested after the resonance survey as follows:

(a) Two (2) units shall be conditioned at -75°F and vibrated at -75°F with a nominal frequency of 30 cps and a nominal acceleration of 1g for 24 hours. The units shall then be conditioned at 150°F and vibrated at 150°F at the most significant resonant frequency determined for 24 hours at a nominal acceleration of 5g. The units shall then be temperature cycled from -75°F to 150°F (three complete cycles) and subjected to a temperature gradient by placing the units in a temperature conditioning room at 150°F for 2 hours. The units shall then be subjected to 129 acceleration normal to longitudinal axis and 30g longitudinal acceleration. Duration of acceleration shall be 10 ± 2 milliseconds. After the shock test, the motors shall be static test fired at 150°F. Elapsed time between removal from the temperature conditioning room and test firing shall not exceed 20 minutes. The requirements of Table I (3.3.1) shall be met.

(b) The other two (2) units shall be conditioned at 150°F and vibrated at 150°F with a nominal frequency of 30 cps and a nominal acceleration of 1g for 24 hours. The units shall then be conditioned at -75°F and vibrated at -75°F at the most significant resonant frequency for 24 hours at a nominal acceleration of 5g. The units shall then be temperature cycled from 150°F to -75°F (three complete cycles) and subjected to a temperature gradient by placing the unit in a temperature conditioning room at -75°F for 2 hours. The units shall then be subjected to 12g acceleration normal to longitudinal axis and 30g longitudinal acceleration. Duration of acceleration shall be 10 ± 2 milliseconds. After the shock test, the motors shall be static test fired at -75°F. Elapsed time between removal from the last temperature conditioning roam and test firing shall not exceed 20 minutes. The requirements of Table I (3.3.1) shall be met.

4.7.3 Age Tests. - Two (2) motors shall be temperature conditioned at -75°F 4 units and two (2) motors shall be temperature conditioned at 170°F, each group for 30 days. At the end of the storage time, the cold units shall be fired at -75°F and the hot units shall be fired at 150°F. The requirements of Table I (3.3.1) shall be met.

4.7.4 Acceleration Tests. - Four (4) units shall be placed on a dynamic 4 units facility (track or centrifuge and accelerated to 30 g in the longitudinal direction and fired while subjected to acceleration load at ambient temperature. Pressure-time curves shall be obtained.

4.7.5 Static Firing. -Eight (8) rocket motors shall be static test fired at -75°F and eight 8) units at 150°F Firings shall be in accordance with 4.8.3. Requirements of Table 1 shall be met.

	16 units
Total	28 units

4.8 Production Acceptance Testing.

4.8.1 Inspection Requirements. - The production motors shall be inspected in accordance with CD 2000087 and for drawing and specification requirements listed on LD 515662.

4.8.2 Static Firing. - Rocket motors selected in accordance with 4.5.1 shall be static fired in accordance with 4.8.3. Requirements of Table 1 (3.3.1) shall be met.

4.8.3 Static Firing Procedures.

4.8.3.1 Test Stand. - Rocket motors shall be mounted so that the thrust is applied on the attachment lugs.

4.8.3.2 Instrumentation. - Accuracy of instrumentation shall be as follows:

Pressure	±2 percent
Thrust	±3 percent
Weight	±0.2 lbs.

4.8.3.3 Conditioning. - The test motor shall be conditioned with shipping cap or other closure installed instead of igniter. The igniters shall be conditioned simultaneously wiht the motors. Conditioning time shall be 24 hours minimum. The conditioning temperature shall be within 5°F from the specified temperature. The motors shall be fired within 20 minutes after removal from conditioning.

4.8.3.4 Firing Current. - The test motors shall be fired by applying 28 ± 3 volts DC at 25 - 30 amperes to the igniter circuit.

4.8.3.5 Static Firing Records. - The following data shall be recorded in the static test firings:

(a) Firing date

(b) Propellant batch and lot number

(c) Weight loss before and after firing.

(d) Nozzel throat diameter
(e) Motor serial number
(f) Action time
(g) Thrust
(h) Pressure
(i) Ignition delay
(j) K value
(k) Total impulse
(l) Peak chamber pressure
(m) Average chamber pressure

4.8.4 Workmanship. - Visual examination shall be made for determination of conformance to the requirements of 3.4. Failure to conform shall be cause for rejection.

4.8.5 Packaging, Packing, and Marking. - Packaging, packing, and marking shall conform to the requirements of section 5.

5. PREPARATION FOR DELIVERY

5.1 Preservation and Packaging.

5.1.1 Level A. - In addition to the detailed requirements herein and in applicable referenced documents, Level A packaging shall be in accordance with the Code of Federal Regulations 49 CFR 71-90.

5.2 Packing.

5.2.1 Level A. - in addition to the detailed requirements herein and in applicable referenced documents, Level A pocking shall be in accordance with the Code of Federal Regulations 49 CFR 71-90.

5.2.1.1 Exterior Containers. - Loaded motors shall be packed in accordance with LD 419664.

5.3 Marking.

5.3.1 Special Markings. - Marking of exterior containers shall be in accordance with applicable drawings and with the Code of Federal Regulations 49 CFR 71-90.

5.3.2 Normal Markings. - In addition to the markings required by contract or order, unit packages and shipping containers shall be marked in accordance with the requirements of Standard MIL-STD-129.

6. NOTES

6.1 Intended Use. - The Jato Mk 6 Mod 1 is intended for use as a jet assisted take-off unit for piloted aircr

6.2 Ordering Data. - Procurement documents should specify, but not be limited to:

(a) Title, number, and date of this specification
(b) Testing activity designated to evaluate the preproduction sample.
(c) Invocation of specification MIL-Q-9858.

6.3 Definitions. - The definitions shall be in accordance with MIL-STD-292 and as specified herein.

6.3.1 Action Time. - Action time shall be measured on the thrust time curve (see sample, figure 2 between the point at which the initial rise of the curve crosses the 250 pound thrust ordinate and the point at which the final decline of the curve cresses the 250 pound thrust ordinate.

6.3.2 Total Impulse. - Total impulse is the integral of the time-thrust curve between the point used in 6.3.1 to establish thrust duration.

6.3.3 Ignition Delay. - Ignition delay is defined as the elapsed time between switch operation and the attainment of a thrust value of 250 pounds.

6.4 Value Engineering. - Manufacturers of material covered by this specification are encouraged to submit value engineering suggestions to the procuring activity in an effort to reduce cost.

6.5 Request for Waiver or Deviation. - Request for deviation from this specification, applicable drawings, specifications, materials, or processes shall be forwarded to the procuring activity prior to manufacture of the affected item or items. All deviations shall be limited to the contract under which they were granted. Request for waiver from this specification, applicable drawings, specifications, materials, or processes shall be forwarded to the procuring activity. All waivers shall be limited to the specific item for which they are granted. Waiver requests shall contain the following information:

(a) Nomenclature, part number, serial number, lot number, contract number.
(b) Exact nature of the defect invoved or proposed change and available documentation references.
(c) Reason for occurrence of defect or proposed change.
(d) Quantity of items involved.
(e) Remedial action taken to prevent recurrence of this defect.
(f) Urgency for action on request and effect on production.
(g) Cost reduction involved in approval of waiver or deviation.
(h) Otrher pertinent factors.

6.6 Conflicting Requirements. - Conflicting requirements arising between this specification or any specification, publication or drawing listed herein shall be referred in writing to the procuring activity or appointed agent for interpretation and clarification.

6.7 Safety Precautions. -

6.7.1 General Safety Precautions. - The loading, assembly and handling of igniters, propellant, explosives, ammunition, ammunition components, fuzes, detonators, primers, tracers, boosters, pyrotechnics, etc., and sub-assemblies thereof, involve hazardous operations and therefore require suitable explosives safety precautions. Use of this specification shall not be construed as to relieve the contractor or manufacturer of responsibility for the safety of his operations. Listed below are the minimum provisions which a contractor or manufacturer (loader) of the above items should observe in order to fulfill his responsibility for safety. At Bureau of Naval Weapons, Navy Department, and other Government plants, these provisions are mandatory. Such other warnings and precautions, pertinent to the operational effectiveness or safety during use or loading of the specified item, are included in the detail provisions of the specification.

6.7.1.1 Loading. - All loading operations should be conducted in a neat and orderly manner.

6.7.1.2 Equipment. - Safe equipment and methods should be utilized for transporting and handling explosives and loaded parts. Where required, remote control barricaded handling equipment shall be used for explosives operations, such as mixing, pouring, weighing, charging, sifting, drying, pressing, casting, crimping, etc.

6.7.1.3 Handling. - Personnel handling detonators, primers, delay elements, lead-ins, boosters, and related parts which effect functioning, should in so far as practicable, avoid using bare fingers or improper equipment in order to prevent damage, corrosion, or deterioration from perspiration or other contaminating deposits.

6.7.1.4 Moisture. - The exposure of explosive materials and related parts should be so controlled as to minimize the absorption of moisture from the atmosphere or other sources during loading and handling operations.

6.7.1.5 Storage. - All explosives and completely or partially loaded items should be stored in suitable storage magazines located in accordance with the American Table of Distances (ATD) or other applicable safety standards; and, while in process, in safety lockers and chests if in loading rooms, or in adequate ready or service magazines located in accordance with Intra-plant distances when outside of loading rooms. For Navy explosives loading plants, the provisions of the Armed Services Explosives Safety Board covering quantity-distance relations for explosives, shall apply.

6.7.1.6 Precautions. - Proper care should be exercised at all times to protect personnel from accidents, fires or explosions, and to limit damage to equipment and loading areas. In this connection the following precautionary measures should be observed:

(a) Employ properly proportioned and properly located protective barricades, screens or shields at all required points:

(b) Keep only minimum limited quantities of explosives and completed or partially loaded parts present at each stage of operation.

(c) Keep explosives and explosive parts in approved covered receptacles with covers in place when material is not being taken out of or put into the receptacles. Where necessary, receptacles should be conductive to ground electrostatic charges.

(d) Protect operations from electrostatic charges by effectively grounding all machinery, equipment, and fixtures; and, where necessary, employ suitable grounded conductive coverings for floors, work benches and tables, and workers' conductive shoes. Workers' clothing of a type to minimize the accumulation of static charges should be employed. Fabrics such as silk, nylon and plastics which promote static charge generation should be avoided. Additional grounding devices such as grounded bracelets for workers should be employed where operations are conducted with items which are unusually sensitive to initiation by static electricity. Such items include initiating explosives, tracer mixtures, and low-energy type electric primers, detonators, and squibs. The latter types of items should have the free ends of lead wires bared and twisted together, and be packed in relatively small groups wrapped in bare non-insulated aluminum foil or other uncoated metal foil. During assembly and processing operations such sensitive electric items should be short circuited by clips or other devices until installed with safety shunt in the final device. Additional precautions for these items should include mechanical shielding to contain or deflect fragments and blast, also electrical shielding of these items from induced electric currents generated by sources such as lightning, static, radiations from communications apparatus, radar, or high frequency heating apparatus, etc. Where necessary for safety, humidity (see par. 6.7.1.4) for work rooms should be increased, as required to lessen electrostatic effects without excessive moisture absorption.

(e) Protect all explosive operations from effects of electric current originating from equipment such as soldering irons, heaters, switches, wiring, motors, lights, test instruments, etc., by suitable insulation, grounding, separation or shielding. Such electric sources may initiate explosives by heat, sparks, arcs, or due to completing an electric circuit through an electric primer, detonator, or squib. Circuits may be inadvertently completed, for example, from a defective electric soldering iron through a grounded contact. All electric type primers, detonators or squibs provided with wire leads should have the free ends of the wires bared and twisted together to short circuit each unit, except when in process of assembly into a finished item. Where practicable, removable short circuiting clips,

or other devices should be employed during manufacturing operations involving electric primers, detonators or squibs.

(f) Enforce, where necessary, the wearing of suitable safety footwear, gloves, goggles, respirators and impregnated garments to protect personnel against burns, poisoning and associated industrial hazards.

(g) Allow no fires or exposed electrical or other sparking equipment, and little or no flammable material to be present in loading, handling and storage spaces. Enforce proper "Match" and "No Smoking" rules.

(h) Enforce good housekeeping and maintain effective policing, inspection and supervisory methods throughout the loading urea and surroundings. Employ effective cleaning methods periodically to minimize the accumulation of explosives or explosive dust and other contamination upon, and assure its removal from floors, walls, ceilings, ledges, tables, benches, piping, and equipment of the items loaded; also, clean up any spilled material immediately.

(i) Igniters and rocket motors shall be shipped and stored separately.

(j) Electrical equipment used shall be of the explosive resistant type.

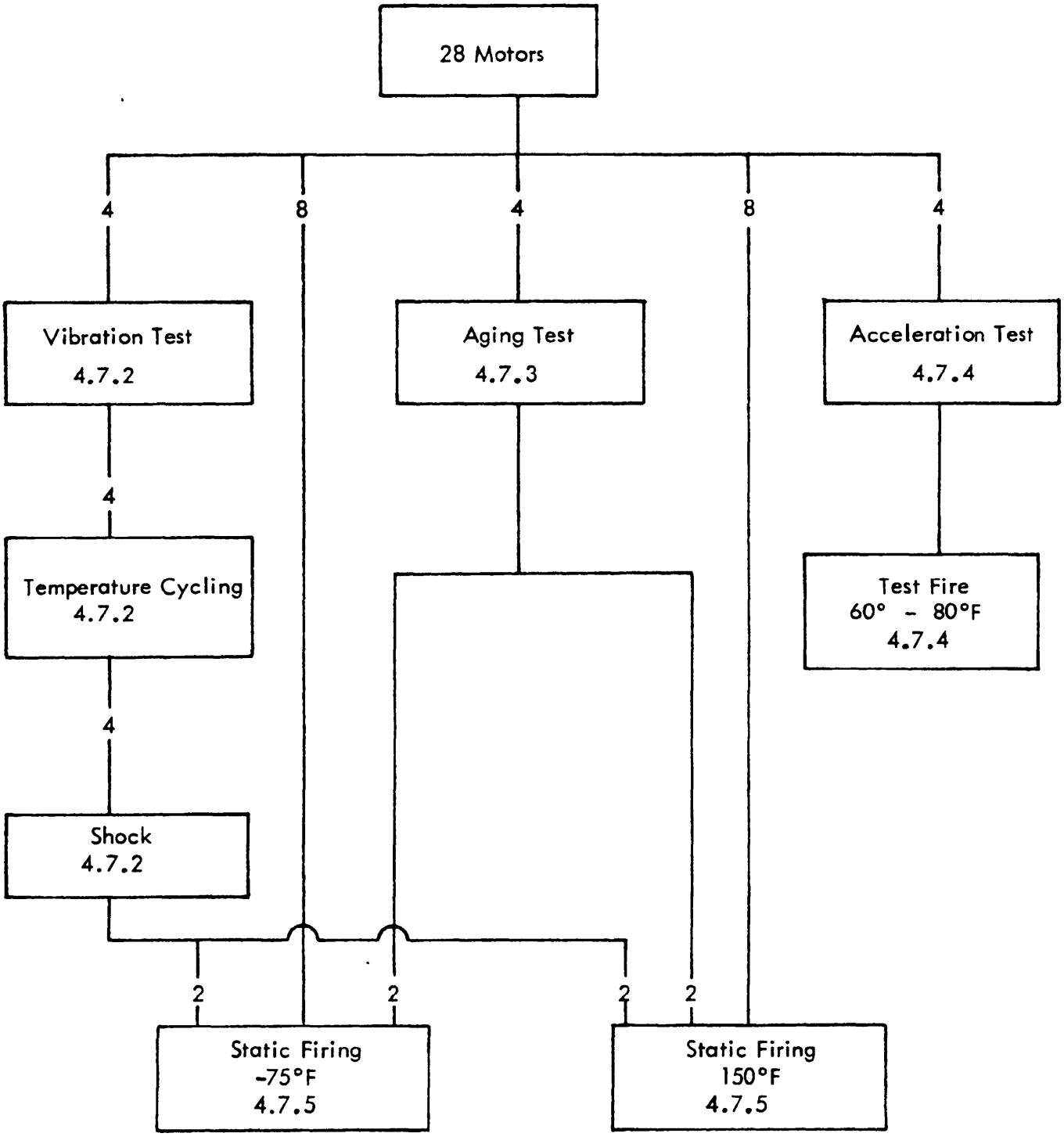

Figure 1
PREPRODUCTION TEST SCHEDULE

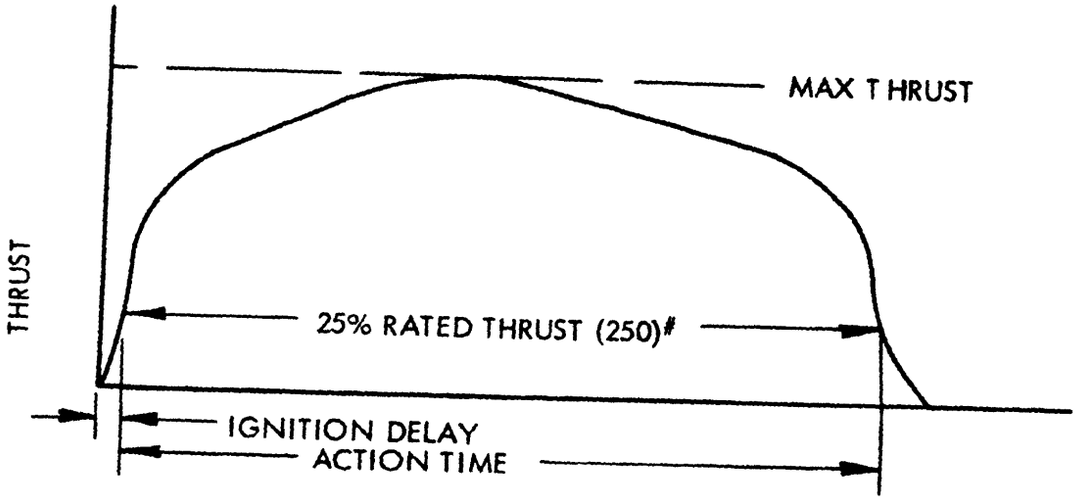

Figure 2

SAMPLE THRUST-TIME CURVE

SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No 119-R004

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity *(as indicated on reverse hereof)*

SPECIFICATION

MIL-J-7093A(Weps) JATO MARK 6 MOD 1

ORGANIZATION *(Of submitter)*	CITY AND STATE

CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT
		$

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES ☐ NO IF "YES", IN WHAT WAY?

REMARKS *(Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)*

SUBMITTED BY *(Printed or typed name and activity)*	DATE

DD FORM 1426
AP

C-8278

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Bureau of Naval Weapons
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MIL-J-7093A(AS)
AMENDMENT 2
3 June 1982
SUPERSEDING
AMENDMENT 1
25 March 1971

MILITARY SPECIFICATION

JATO MARK 6 MOD I

This amendment forms a part of Military Specification MIL-J-7093A (WEPS) dated 8 September 1964, and has been approved by the Naval Air Systems Command, Department of the Navy.

Throughtout this specification, reference except drawing references to Bureau of Naval Weapons or Bureau of Naval Ordnance shall be changed to Naval Air Systems Command.

PAGE 1

Para. 2.1 Delete:

MIL-STD-292 Ballistic Nomenclature, Rocket Static Tests

PAGE 2

Para. 2.1 Delete:

ASTM-STP-15-6 Manual on Quality Control of Materials.

(When requesting any of the applicable documents, refer to both title and number. All requests should be made via the cognizant Government Inspector. Copies of this specification and other classified specifications and drawings required by contractors in connection with specific procurement function should be obtained upon application to the Commanding Officer, Naval Supply Depot (Code 105), 5801 Tabor Avenue, Philadelphia 20, PA. All other documents should be obtained from the procuring activity or as directed by the contracting officer.) (ASTM Specification maybe obtained from American Society for Testing Material, 1916 Race St., Philadelphia, PA.)

DRAWINGS

Bureau of Naval Weapons

Para. 2.1 Add:

Naval Air Systems Command

Para. 2.1 Add:

(Requests for the drawings, list of drawings and classification of defects (CD's) should be addressed to the Commanding Officer, Central Technical Documents Office, Louisville, KY.)

FSC 1340

Para. 2.1 Add:

(Copies of specificaitons, standards, handbooks, drawings and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

Revise Para. 2.2 as follows:

2.2 Other publications. The following documents form a part of this standard to the extent specified herein:

CODE OF FEDERAL REGULATIONS (CFR)

Title 49 Parts 71-90 Department of Transportation

"DEPARTMENT OF DEFENSE MANUALS

DOD Manual 4145.26M — DOD Contractors' Safety Manual for Ammunition, Explosives and Related Dangerous Material."

Delete parenthetical source note and add following at end:

"(Application for copies should be addressed to the Superintendent of Documents Government Printing Office, Washington, DC 20402. Requests should cite applicable edition, revision, amendment, supplement or reprint of publication.)

PAGE 9

Para. 4.6.5:

Delete Ref (4.6.8)

PAGE 10

Delete Para. 4.6.8.

PAGE 14

Revise Para. 6.3 are follows:

6.3 Definitions. The definitions and ballistic nomenclature shall be as specified herein.

PAGE 15

Delete paragraphs 6.7.1.1 thru 6.7.1.6 inclusive and replace with:

"6.7.1.1 These items shall be loaded, assembled, handled, moved within plant or facility and stored in accordance with the provisions of DOD Manual 4145.26M."

Preparing activity:
Navy - AS
(Project No. 1340-N620)