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AUTHORITY

USNWC ltr, 30 Aug 1974

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FORM 12-11-62

Q4183

SPECIFICATION

1 of 1

1. COMPONENT/PART NAME PER GENERIC CODE Ignition
Parts and Explosives, Rocket Ignition -
Solid Explosive Charge, NOC, Electrical

2. PROGRAM OR WEAPON SYSTEM
Multiple

3. DATE OF:
ISSUE 29 10 62
REVISION 25 2 63

4. ORIGINATOR'S SPECIFICATION TITLE
Purchase Description Igniter, Rocket
Motor, Mark 264 Mod 0

5. ORIGINATOR'S SPEC. NO.
WS 1616

6. SPECIFICATION IS:
☐ DRAFT ☐ PRELIMINARY ☒ FINAL

7. THIS SPECIFICATION COMPLEMENTS REPORT NO:
None

8. TYPE OF SPECIFICATION

- ☐ (A) GENERAL PRODUCT REQUIREMENTS FOR A FAMILY OF PARTS - PROCUREMENT DOCUMENT
☒ (B) INDIVIDUAL DETAIL PARTS DOCUMENT; STDS BOOK PAGES - FOR PROCUREMENT
☐ (C) DETAIL INSPECTION, PROCESS CONTROL, AND/OR TEST PROCEDURES FOR SPECIFIC PARTS
☐ (D) PROCESS (PAINTING, WELDING, FINISHING, HEAT TREATING ETC.) APPLICABLE TO MANY PARTS

- ☐ (E) SPEC. FOR PERFORMANCE, RELIABILITY, AND/OR ENVIRONMENT FOR ASSEMBLIES, EQUIPMENTS, SUBSYSTEMS AND SYSTEMS
☐ (F) PERFORMANCE AND APPLICATION DATA FOR DESIGN ENG. USE ON PARTS - NOT FOR PROCUREMENT
☐ (G) OTHER (DETAIL IN 10.)

NOTE: WHEN MULTIPLE FUNCTIONS ARE COMBINED IN ONE DOCUMENT, CHECK ALL APPLICABLE SQUARES.

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ENCL. AVAIL. ON REQ. NOT AVAIL. PREVIOUSLY SUBMITTED AND FILED AS IDEP REPORT OR SPEC. NUMBER

10. ADDITIONAL DESCRIPTION OF IMPORTANT DOCUMENT CONTENTS, SIGNIFICANT FEATURES, OR SPECIAL PURPOSE, NOT COVERED BY "TITLE":

This document describes the requirements for Igniter, Mk 264, Mod 0 intended for use in rocket motors.

STATEMENT #3 UNCLASSIFIED

Each transmittal of this document outside the agencies of U.S. Government, must have prior approval of *Officer in Charge Code E6*

*Naval Fleet Missile Systems
Analysis and Evaluation Group
Carona, Calif 91720
DDSP office*

4 NOV 1968

Signed *J. P. Higgins*
J. P. Higgins

12. CONTRACTOR
NWC/CL

SUBCONTRACTOR

11. SPEC. NO. 415.20.40.40.X7.015

NOTICES PAGE

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WS 1616
AMENDMENT 1
25 February 1963

BUREAU OF NAVAL WEAPONS

DEPARTMENT OF THE NAVY

PURCHASE DESCRIPTION

415.20.40.40

IGNITER, ROCKET MOTOR, MARK 264 MOD 0

This amendment forms a part of Publication
WS 1616, Code Ident 10001 of 29 October 1962.

Page 5, paragraph 3.5: Add the following sentences after "..... publication." "In addition to the examination and test performed on the preproduction samples, the workmanship exhibited therein will be evaluated to determine acceptability. The approved standard of workmanship will thereby become a minimum production requirement for all units offered for acceptance."

Page 5, paragraph 4.1: Delete the third sentence "Inspection records or order."

Page 5, paragraph 4.3.1: Delete and substitute the following: "Sampling for product verification tests. Product verification tests (figure 2) shall be conducted on samples randomly selected from each lot submitted for acceptance. Following the satisfactory compliance of three consecutive production lots, intermittent testing of one lot in five may be introduced. The lot immediately following a rejected lot shall be considered a first lot. Acceptance shall be based on no defect in a sample."

WS 1616
AMENDMENT 1
25 February 1963

Page 6, paragraph 4.5: Delete "Prior to submission for Government acceptance inspection."

Page 7, paragraph 4.6.3: Change the first sentence to read "The sample for this test shall be a minimum of 25 igniters selected in accordance with standard MIL-STD-414."

Code Ident.
10001

WS 1616

BUREAU OF NAVAL WEAPONS
DEPARTMENT OF THE NAVY
PURCHASE DESCRIPTION

IGNITER, ROCKET MOTOR, MARK 264 MOD 0

Approved: 29 Oct 62

John W. Holke
By direction

RECORD OF REVISIONS		
Revision Letter	Date	Changes

This document consists of pages 1 to 11
and 1 to 15 inclusive.

WS 1616

BUREAU OF NAVAL WEAPONS
DEPARTMENT OF THE NAVY
WASHINGTON 25, D. C.

EXAMINED BY: U.S. NAVAL ORDNANCE TEST STATION
CHINA LAKE, CALIFORNIA

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BUREAU OF NAVAL WEAPONS
DEPARTMENT OF THE NAVY
PURCHASE DESCRIPTION
IGNITER, ROCKET MOTOR, MK 264 MOD 0

1. SCOPE.

1.1 This purchase description covers Igniter, Rocket Motor, Mk 264 Mod 0, referred to herein as the igniter.

2. APPLICABLE DOCUMENTS.

2.1 The following documents of the issue in effect on date of invitation for bid form a part of this publication to the extent specified herein.

SPECIFICATIONS

Military

MIL-E-5272

Environmental Testing, Aeronautical and Associated Equipment, General Specification for.

STANDARDS

Military

MIL-STD-105

Sampling Procedures and Tables for Inspection by Attributes.

MIL-STD-129

Marking for Shipment and Storage.

MIL-STD-292

Ballistic Nomenclature Rocket Static Tests.

WS 1616

MIL-STD-350

Jolt Test for Use in Production of Fuzes.

MIL-STD-354

Temperature and Humidity Test for Use in Production of Fuzes.

MIL-STD-414

Sampling Procedures and Tables for Inspection by Variables for Percent Defective.

DRAWINGS

Bureau of Naval Weapons
(Code Ident 10001)

LD 269548

List of Drawings, Assemblies, Parts, Specifications, etc., for Igniter, Rocket Motor, Mk 264 Mod 0 Assembly.

LD 270032

List of Drawings, Assemblies, Parts, Specifications, etc., for Container, Shipping and Storage, for 64 Igniters Mk 264 Mod 0.

SA 492744

Igniter Pressure Test Fixture for Rocket Motor Igniter Mk 264 Mod 0.

(Copies of documents 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 publication to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply:

Code of Federal Regulations

49 CFR 71-78

Interstate Commerce Commission
Rules and Regulations for the
Transportation of Explosives
and Other Dangerous Articles.

(The Interstate Commerce Commission regulations are now a part of the Code of Federal Regulations and are available from the Superintendent of Documents, Government Printing Office, Washington 25, D.C. Orders for the above publication should cite "the latest issue and supplements thereto.")

3. REQUIREMENTS.

3.1 Preproduction sample. Unless otherwise specified, there shall be a preproduction sample consisting of 101 igniters and 10 igniter tube assemblies (drawing 1555639 listed in LD 269548). The preproduction sample shall be manufactured using the methods proposed for production. The preproduction sample shall be delivered to the activity designated in the contract or order for preproduction testing in accordance with this publication. Any production by the supplier prior to acceptance of the preproduction sample will be at the supplier's risk. (See figure 2.)

3.2 Conformance to documents. Unless otherwise specified, the igniter and the igniter components shall conform to the requirements specified herein and to the applicable documents listed in LD 269548.

3.3 Performance and product characteristics.

3.3.1 Igniter tube assembly.

3.3.1.1 Airtightness. The igniter tube assembly shall show no evidence of leakage or separation of insulation sleeving from the tube when subjected to an internal air pressure of 35 plus 0 minus 5 pounds per square inch gage (psig).

3.3.1.2 Rupture. The insulation sleeving shall rupture at one or more of the 0.101 inch diameter holes when tested in accordance with 4.7.6.

3.3.2 Igniter.

3.3.2.1 Ignition circuit resistance. The igniter squib bridge resistance shall be 0.7 ohm plus or minus 0.2 ohm.

3.3.2.2 Leakage. The igniter shall show no evidence of leakage when subjected to a chamber pressure of 59 psig plus 0 minus 5 psig.

3.3.2.3 Delay time (200 psig). The 200 psig delay time shall be not greater than 25 milliseconds when the igniter is initiated by a firing current of 3.0 amperes dc plus 0.3 minus 0 amperes dc. Delay time shall be defined in accordance with Standard MIL-STD-292 (see figure 1).

3.3.2.4 Action time (200 psig). The 200 psig action time shall be not less than 175 milliseconds and not more than 350 milliseconds. See Standard MIL-STD-292.

3.3.2.5 Minimum pressure. Minimum pressure shall be not less than 75 psig. See Standard MIL-STD-292.

3.3.2.6 Pressure-time integral. The pressure-time integral shall be not less than 50 psi-second when measured between the limits specified in 3.3.2.4.

3.4 Environmental.

3.4.1 Jolt. The igniter shall be safe to handle and dispose of and no explosive element shall initiate during or as a result of the jolt test specified in Standard MIL-STD-350.

3.4.2 Vibration. The igniter shall be subjected to the vibration test of Specification MIL-E-5272, Procedure XII, and thereafter shall meet the requirements of 3.3.2.

3.4.3 Temperature and humidity. The igniter shall be subjected to the temperature and humidity test of Standard MIL-STD-354 and thereafter shall meet the requirements of 3.3.2.

3.5 Workmanship. The igniter shall be a uniform product free of explosive materials on all external surfaces. It shall be uniform in quality, free from foreign material and manufactured in a manner to assure compliance with the requirements of this publication.

4. QUALITY ASSURANCE PROVISIONS.

4.1 The supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examination and tests shall be kept complete and available to the Government as specified in the contract or order. The Government reserves the right to perform any of the inspections set forth in this publication where such inspections are deemed necessary to assure that supplies and services conform to the prescribed requirements.

4.1.1 Acceptance. Authority and responsibility for acceptance shall rest with the cognizant Government representative.

4.2 Lot. Except as otherwise specified herein, lot definition, formation and size shall be in accordance with Standard MIL-STD-105.

4.3 Sampling. Unless otherwise specified herein, provisions set forth by Standard MIL-STD-105 shall govern the establishment of sampling plans and procedures for inspection by attributes.

4.3.1 Sampling for product verification. At any time during production that a lot is rejected, the Government representative may recommend to the procuring activity that the preproduction tests be repeated. If the procuring activity deems it necessary to reconduct the preproduction test, samples may be randomly selected from the rejected lot, the subsequent lot, or both, and delivered to the designated testing activity. The acceptance criteria of the preproduction sample shall apply (see figure 2).

4.4 Test equipment.

4.4.1 Pressure recording system having capabilities of measuring:

- (a) Pressure of 3000 psig (see 6.3).
- (b) Response of 75 psi/ms minimum.
- (c) Time graduations of 40 ms/inch maximum.

4.4.2 Ignition test fixture meeting the requirements of drawing SA 492744.

4.5 Screening tests. Prior to submission for Government acceptance inspection, all igniter tube assemblies shall be subjected to the test of 4.5.1. All igniters shall be subjected to the test of 4.5.2.

4.5.1 Airtightness test. Air under pressure of 35 plus 0 minus 5 psig shall be supplied to the igniter tube assembly while it is submerged in water for a period of not less than 60 seconds. Any igniter tube assembly failing to meet the requirements of 3.3.1.1 is defective and shall be removed from the lot.

4.5.2 Ignition circuit resistance. The igniter shall be temperature conditioned for not less than one hour at 70 degrees plus or minus 2 degrees Fahrenheit (F). Using a resistance measuring instrument having a direct current output not greater than 10 milliamperes, measure the squib bridge resistance. Any igniter failing to meet the requirements of 3.3.2.1 is defective and shall be removed from the lot.

4.6 Acceptance tests.

4.6.1 Examination. Prior to assembly of the igniter, examination shall be made to ascertain that all components procured under separate documents have been inspected, tested and accepted in accordance with their respective documents.

4.6.2 Leakage test. The igniter shall be subjected to 59 plus 0 minus 5 psig air pressure in an enclosed chamber for not less than five minutes. Within 15 seconds after removal from the chamber, the igniter shall be submerged under water for not less than 60 seconds at a pressure of 2.7 pounds per square inch absolute. Samples shall be selected in accordance with Standard MIL-STD-105, Inspection Level L5. Any igniter failing to meet the requirements of 3.3.2.2 is defective and the lot represented shall be rejected. Following the leakage test, the igniter shall be subjected to the function test of 4.6.3.

4.6.3 Function test. Regardless of lot size, the sample for this test shall be 25 igniters selected in accordance with Standard MIL-STD-414. The igniter shall be temperature conditioned for not less than four hours at plus 70 degrees, plus or minus 2 degrees F. The igniter shall be assembled to the ignition test fixture shown in drawing SA 492744 or acceptable equivalent thereof, and fired with a firing current of 3.5 plus 0.2 minus 0.5 amperes dc within two minutes after removal from the conditioning chamber. During the test, recordings shall be made of the following:

- (a) Delay time (see 3.3.2.3).
- (b) Action time (see 3.3.2.4).
- (c) Minimum pressure (see 3.3.2.5).
- (d) Pressure-time integral (see 3.3.2.6).

Test equipment recordings for igniter function time and peak pressure shall be utilized to determine igniter function performance. Any igniter which fails to meet the requirements of 3.3.2.3 through 3.3.2.6 is defective. The lot represented shall be judged in accordance with Standard MIL-STD-414, Acceptable Quality Level (AQL) 0.65 percent defective.

4.7 Preproduction and product verification. Preproduction and product verification tests are conducted on the preproduction sample (3.1) and product verification samples (4.3.1). Testing shall be in the sequence shown in figure 2 and shall include the tests of 4.5.1, 4.5.2 and 4.6.

4.7.1 Acceptance criteria. Any igniter failing to meet the applicable requirements of section 3 is defective and shall be cause for rejection of the preproduction sample or the lot represented.

4.7.2 Preliminary function tests. After the ignition circuit resistance test of 4.5.2, 60 igniter samples shall be divided into three groups. Each group shall be temperature conditioned for not less than four hours. Group one shall be conditioned at minus 65 degrees F, group two at plus 70 degrees F and group three at plus 200 degrees F. Each igniter shall be fired as specified in 4.6.3. The acceptance criteria of 4.7.1 shall apply.

4.7.3 Jolt. Subject 12 igniters to the jolt test of Standard MIL-STD-350. The igniter shall meet the requirements of 3.4.1.

4.7.4 Vibration. Subject 12 igniters to the vibration test in accordance with Specification MIL-E-5272, Procedure XII. Thereafter the igniter shall meet the requirements of 3.3.2.

4.7.5 Temperature and humidity. Subject 12 igniters to the temperature and humidity test of Standard MIL-STD-354. Thereafter the igniter shall meet the requirements of 3.3.2.

4.7.6 Rupture test. Ten igniter tube assemblies shall be tested for rupture at plus 70 degrees F plus or minus 5 degrees F. The igniter tube assembly shall be subjected to an internal air pressure rise of 100 psi per millisecond until an internal pressure of 350 psig is attained. The pressure at which the insulation sleeving ruptures shall be recorded. Any igniter tube assembly which fails to meet the requirements of 3.3.1.2 is defective and the preproduction sample or lot represented shall be rejected.

4.8 Examination.

4.8.1 Workmanship. Visual examination shall be made to assure that all igniters are undamaged and free of explosive material on any external surface and free of any foreign material.

4.8.2 Packaging, packing, and markings. Examination shall be made to ascertain that the packaging, packing and igniter container markings conform to section 5 of this publication.

5. PREPARATION FOR DELIVERY.

5.1 Preservation and packaging.

5.1.1 Level A. In addition to detailed requirements herein and in applicable referenced documents, Level A preservation and packaging shall be in accordance with the Code of Federal Regulations 49 CFR 71-78.

5.1.1.1 Packaging of the igniters shall be in accordance with the drawings listed in LD 270032.

5.2 Packing.

5.2.1 Level A. In addition to detailed requirements herein and in applicable referenced documents, Level A packing shall be in accordance with the Code of Federal Regulations 49 CFR 71-78.

5.2.1.1 Exterior containers. Sixty-four igniters, packaged in accordance with 5.1.1.1, shall be packed in accordance with the drawings listed in LD 270032.

5.3 Marking.

5.3.1 Special markings. Marking for external containers shall be in accordance with the Code of Federal Regulations 49 CFR 71-78.

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

6. NOTES.

6.1 Intended use. Igniter, Mk 264 Mod 0, is intended for use in rocket motors.

6.2 Ordering data. Procurement documents should specify:

- (a) Number and date of this publication.**
- (b) Preproduction sample if different from 3.1.**
- (c) Name and location of testing activity designated to evaluate the preproduction sample (3.1).**
- (d) Invocation of Specification MIL-Q-9858.**

6.3 Pressure recording equipment. Equipment used in measuring igniter function under test (4.4.1) should be capable of measuring to 3000 psig and should be calibrated to 2000 psig. See figure 1.

6.4 General safety precautions. The loading, assembly and handling of the item covered by this publication, and the subassemblies thereof, involve hazardous operations and therefore require suitable explosives safety precautions. Use of this publication will not be construed as to relieve the supplier or manufacturer of responsibility for the safety of his operations. Listed below are certain minimum provisions which a supplier or manufacturer (which explosively loads the item covered) 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 technical requirements of the publication.

6.4.1 All loading operations should be conducted in a neat and orderly manner.

6.4.2 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.

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

6.4.4 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.

6.4.5 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 intraplant distances when outside of loading rooms. For Navy managed explosives loading plants, the provisions of the Armed Services Explosives Safety Board covering quantity-distance relations for explosives will apply.

6.4.6 Proper care must 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 precautionary measures in the following paragraphs should be observed.

6.4.6.1 Employ properly proportioned and properly located protective barricades, screens or shields at all required points.

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

6.4.6.3 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.

6.4.6.4 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 and nylon, which promote static 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 heat apparatus, etc. Where necessary for safety, humidity of work rooms should be appropriately increased, as required to lessen electrostatic effects but without inducing excessive moisture absorption by any of the components of the item being loaded.

6.4.6.5 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.

6.4.6.6 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.

6.4.6.7 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 where necessary.

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

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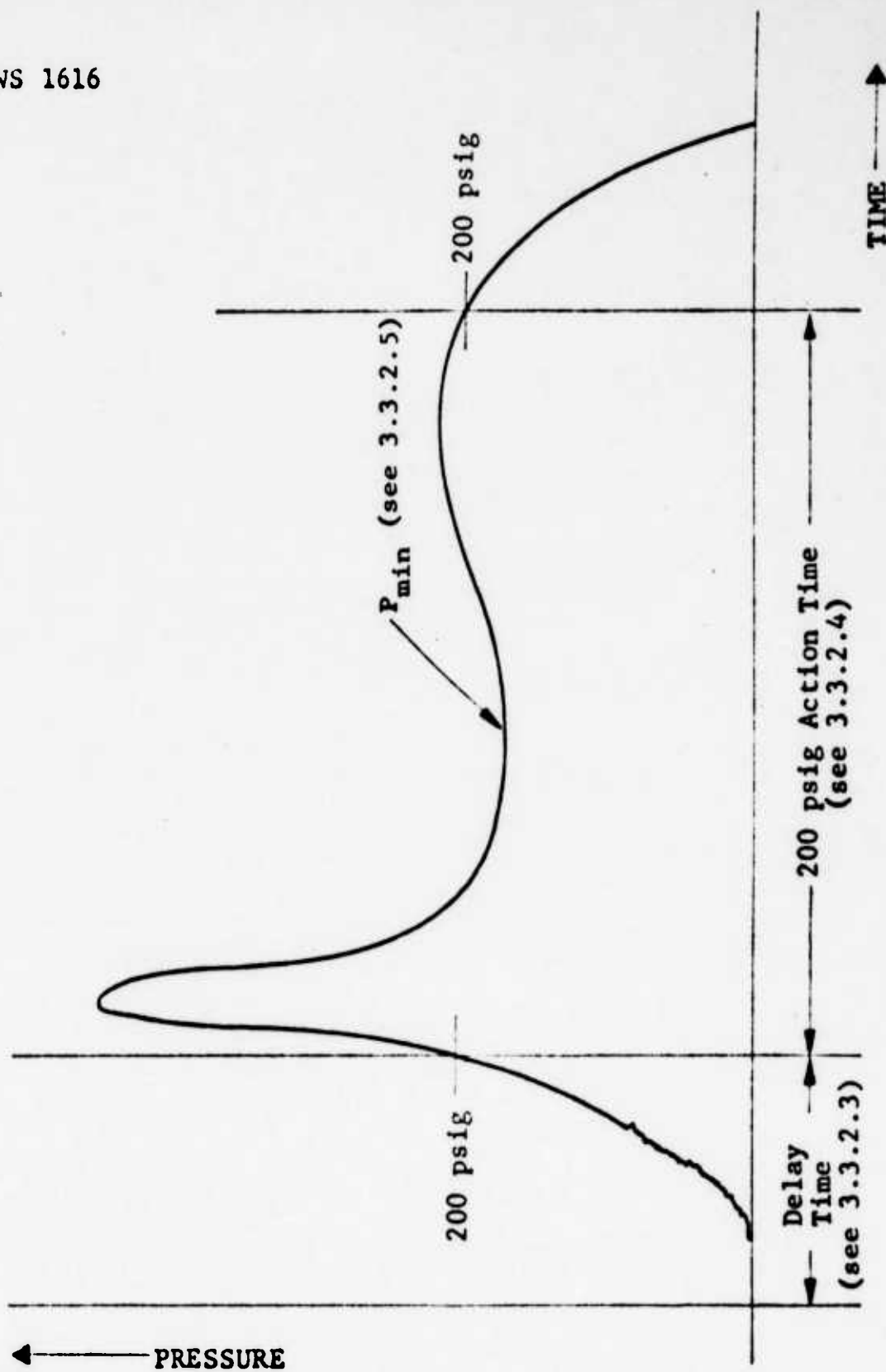


Figure 1. Pressure-Time Curve

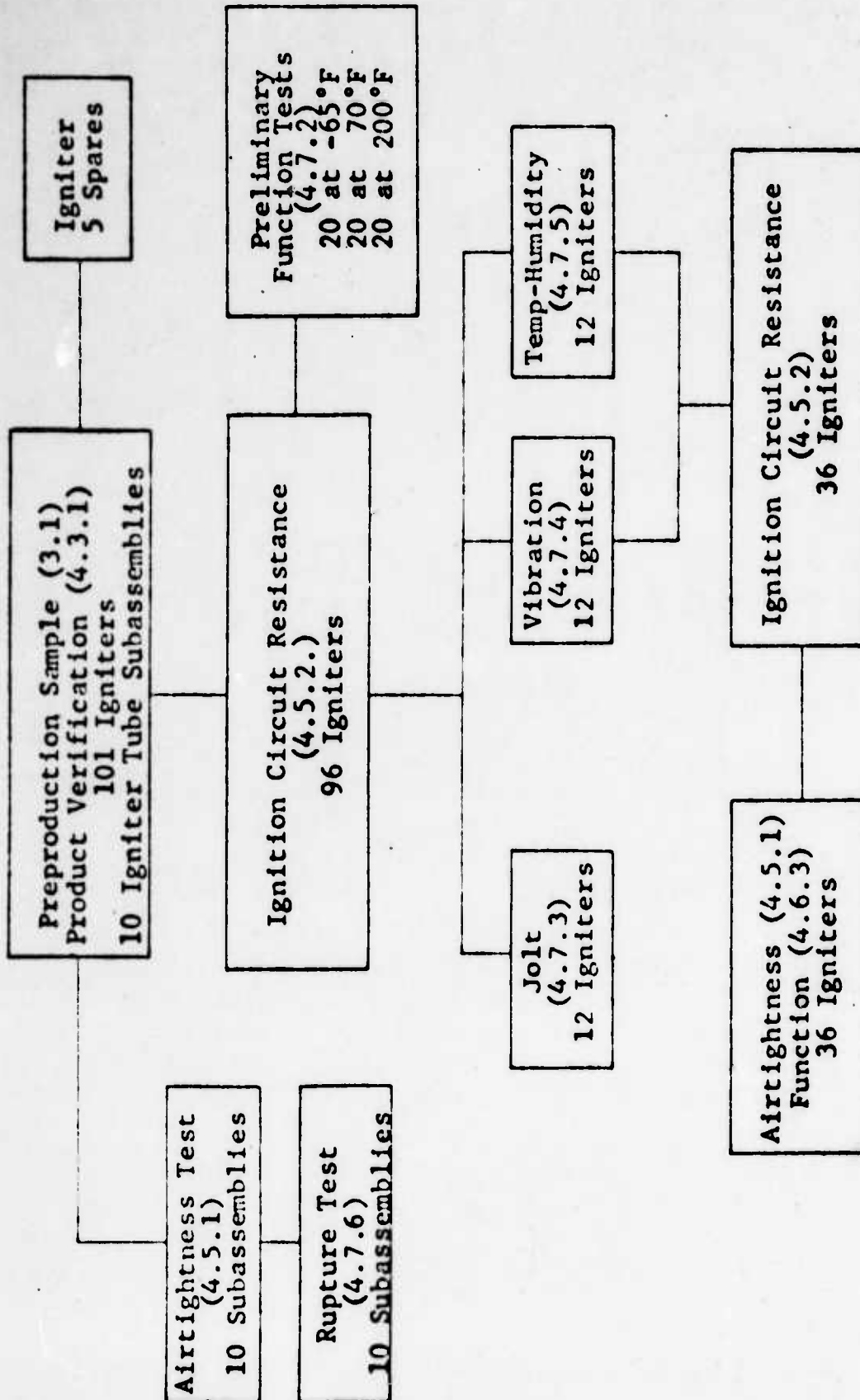


Figure 2. Flow Chart