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MILITARY STANDARD
METHODS FOR SELECTION
OF INDUSTRIAL ENGINES FOR
END ITEM APPLICATION



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MIL-STD-1410

DEPARTMENT OF DEFENSE

WASHINGTON, DC 20301

Methods for Selection of Industrial Engines for End Item Application.

MIL-STD-1410

1. This Military Standard is approved for use by all Departments and Agencies of the Department of Defense.
2. Recommended corrections, additions, or deletions should be addressed to Commander, U.S. Army Mobility Equipment Research and Development Center, ATTN: AMXFB-DS, Fort Belvoir, VA 22060.

MIL-STD-1410

CONTENTS

| <u>Paragraph</u> | | <u>Page</u> |
|------------------|---|-------------|
| 1. | SCOPE | 1 |
| 1.1 | Scope | 1 |
| 1.2 | End item classification | 1 |
| 1.2.1 | Engine selection | 1 |
| 1.2.1.1 | Class I, standard commercial end item | 1 and 2 |
| 1.2.1.2 | Class II, modified commercial end item | 2 |
| 1.2.1.3 | Class III, noncommercial counterpart end item | 2 and 3 |
| 1.2.1.4 | Class IV, military design end item | 3 |
| 2. | REFERENCED DOCUMENTS | 3 |
| 2.1 | Specifications and standards | 3 and 4 |
| 2.2 | Other publications | 4 |
| 3. | DEFINITIONS | 4 |
| 3.1 | Industrial-type engine | 5 |
| 3.2 | Engine accessory | 5 |
| 3.3 | Engine component | 5 |
| 4. | REQUIREMENTS | 5 |
| 4.1 | General requirements | 5 |
| 4.1.1 | Engine | 5 |
| 4.1.2 | Engine components and accessories | 5 |
| 4.1.3 | Ease of maintenance | 5 |
| 4.1.4 | Threaded parts and common parts | 5 |
| 4.1.5 | Identification marking | 5 |
| 4.1.6 | Emission control | 5 |
| 4.1.7 | Engine rotation | 5 |
| 4.1.8 | Belts and pulleys | 5 |
| 4.1.9 | Lubrication system | 6 |
| 4.2 | Special characteristics and features | 6 |
| 4.2.1 | Operational requirements | 6 |
| 4.2.1.1 | Maximum engine operating limits. | 7 |
| 4.2.1.2 | Elevation conditions | 7 |
| 4.2.1.3 | Temperature conditions | 7 |
| 4.2.1.4 | Tilt conditions | 7 |
| 4.2.2 | Average oil consumption | 7 |
| 4.2.3 | Lifting provisions | 7 |
| 4.2.4 | Manual throttle control | 7 |
| 4.2.5 | Control systems | 7 |
| 4.2.5.1 | High-temperature control | 7 |
| 4.2.5.1.1 | Liquid-cooled engines | 7 |
| 4.2.5.1.2 | Air-cooled engines | 8 |
| 4.2.6 | Lubricating oil control | 8 |
| 4.2.7 | Overspeed control | 8 |
| 4.2.8 | Cooling systems | 8 |

MIL-STD-1410

CONTENTS (Cont'd)

| <u>Paragraph</u> | | <u>Page</u> |
|------------------|---|-------------|
| 4.2.8.1 | Liquid-cooled engines | 8 |
| 4.2.8.2 | Air-cooled engines | 8 |
| 4.2.9 | Exhaust system | 8 |
| 4.2.10 | Governing system | 8 |
| 4.2.11 | Air-induction system | 8 |
| 4.2.12 | Cranking system | 9 |
| 4.2.12.1 | Electric-cranking system | 9 |
| 4.2.12.2 | Cranking motors | 9 |
| 4.2.12.3 | Storage batteries | 9 |
| 4.2.12.4 | Battery cables and terminals | 9 |
| 4.2.12.5 | Starting priming systems | 9 |
| 4.2.12.6 | Charging generator/alternator | 10 |
| 4.2.12.7 | Charging receptacles | 10 |
| 4.3 | Peculiar requirements | 10 |
| 4.3.1 | Gasoline engines | 10 |
| 4.3.1.1 | Valve mechanism (4-stroke cycle engines) | 10 |
| 4.3.1.2 | Two-stroke cycle engines | 10 |
| 4.3.1.3 | Four-stroke cycle engines | 10 |
| 4.3.1.4 | Fuel system | 10 |
| 4.3.1.5 | Cranking system | 10 |
| 4.3.1.6 | Ignition system | 11 |
| 4.3.2 | Diesel engines | 11 |
| 4.3.2.1 | Cylinder blocks | 11 |
| 5. | TEST | 11 |
| 5.1 | Preproduction tests | 11 |
| 5.1.1 | Classes I and II end item classifications | 11 |
| 5.1.2 | Classes III and IV end item classifications | 11 |
| 5.2 | Production engine tests | 11 |
| 5.3 | Production control tests | 111 |
| 6. | NOTES | 11 |
| 6.1 | First article baseline | 11 |
| 6.2 | Options | 12 |
| 6.3 | Special clauses | 12 |
| 6.3.1 | Required data | 12 and 13 |
| 6.3.2 | Warranty clause | 14 |

TABLES

| | | |
|-----------|--|----|
| Table I | Maximum Engine Operating Limits | 6 |
| Table II | Required Data | 13 |
| Figure 1. | Engine Description and Performance History | |

MIL-STD-1410

Purpose. This standard is to facilitate the selection of industrial type diesel and gasoline engines for application in military end item equipments. Use of this standard will assure that clear instructions are provided to suppliers for preparation and submission of engine data criteria.

1. SCOPE This standard is to be used as a guide in selecting the engine for inclusion in end item specifications.

1.1 Scope. The end item specification will establish the requirements for use in selecting a diesel or gasoline engine for that end item of equipment (see 6.2). Engines covered by this standard shall be of the commercial industrial type as follows:

Diesel: Medium- and high-speed engines, air- or liquid-cooled
2- or 4-stroke cycle.

Gasoline: Group I: Air-cooled, 2- or 4-stroke cycle, under 10 net continuous bhp.

Group II: Air- or liquid-cooled, 4-stroke cycle,
10 net continuous bhp and above.

1.2 End item classification. Classification of end items shall be as follows:

Class I: Standard commercial. An end item which is not modified for military use, i.e., tractor, crane, generator, which is offered to the public commercially.

Class II: Modified commercial. An end item which is a standard commercial end item modified to meet specific military requirements.

Class III: Noncommercial counterpart. An end item which is not the manufacturer's standard commercial or a modified commercial item but consists of commercially available components including engine assembled to meet specific military needs through a performance specification.

Class IV: Military design. An end item which is specifically intended for the military and is covered by a specification and a design drawing package suitable for manufacture of the end item.

1.2.1 Engine selection. The method of selecting an engine for the end item classifications described herein shall be as follows.

1.2.1.1 Class I, standard commercial end item. The engine shall meet one of the following requirements in the following order of preference:

MIL-STD-1410

- (a) Commercial experience. The engine shall have achieved a minimum of 1 year satisfactory operation in a similar defined commercial application. The supplier shall complete the engine description and performance history (see Figure 1). Engine acceptability will be determined by the procuring activity following review of engine performance history for the specifically defined application.
- (b) Environmental Protection Agency (EPA) tests. The engine or its EPA tested counterpart shall have successfully completed the EPA test 40 CFR, Part 85. Copies of the EPA certificate, certified maintenance records, and maximum certified brake horsepower rating achieved during the 1000 hour test shall be submitted for review. Evidence of major failures of high mortality engine parts or reoccurring minor failures of other engine parts during the 1000 hour test may preclude acceptability of the engine. Records submitted will be verified with the Environmental Protection Agency.
- (c) Manufacturer's certified test data. Certified test data by the engine manufacturer based on a minimum of 1000 hours previous endurance testing, including all essential data items as shown in Table I of Test Method 1000 of MIL-STD-1400 shall be submitted for review by the procuring activity prior to the application in the end item.

1.2.1.2 Class II, modified commercial end item. The engine shall meet one of the following requirements in the following order of preference:

- (a) Commercial experience: Same as 1.2.1.1(a).
- (b) Environmental Protection Agency (EPA) tests: Same as 1.2.1.1(b).
- (c) Manufacturer's certified test data: Same as 1.2.1.1(c).

1.2.1.3 Class III, noncommercial counterpart end item. The engine shall meet one of the following requirements in the following order of preference and are in addition to the requirements and tests specified in the end item specification:

- (a) Military or related commercial experience: The engine shall have achieved a minimum of 1 year satisfactory operation in a similar defined military or related commercial application defined in the end item procurement solicitation as comparable for evaluation to the intended military application. The supplier shall complete the engine description and performance history (see Figure 1). Engine acceptability will be determined by the procuring activity following review of the engine performance history for the specifically defined application.

MIL-STD-1410

- (b) Environmental Protection Agency (EPA) tests: Same as 1.2.1.1(b).
- (c) Manufacturer's certified test data: Same as 1.2.1.1(c).
- (d) Engine test: The engine shall successfully complete Test Method Series 1000 of MIL-STD-1400 with certified test data submitted for review prior to application in the end item.

1.2.1.4 Class IV, military design end item. The engine shall be in accordance with applicable military specifications and drawings.

2. REFERENCED DOCUMENTS

2.1 Specifications and standards. The issues of the following documents in effect on the date of invitation for bids form a part of this standard to the extent specified herein, and in the end item specification:

Federal Specifications:

- | | |
|-----------|---|
| O-F-1044 | - Fuel, Engine Primer: Cold Starting, in Pressurized and Nonpressurized Containers. |
| W-S-506 | - Spark Plug. |
| VV-F-800 | - Fuel Oil, Diesel. |
| VV-G-1690 | - Gasoline, Automotive, Low Leaded or Unleaded. |

Military Specifications:

- | | |
|-------------|--|
| MIL-L-2104 | - Lubricating Oil, Internal Combustion Engine, Tactical Service. |
| MIL-G-3056 | - Gasoline, Automotive, Combat. |
| MIL-L-46167 | - Lubricating Oil, Internal Combustion Engine, Arctic. |
| MIL-A-52363 | - Air Cleaners, Intake: Dry-Type (for Internal-Combustion Engine). |
| MIL-E-52649 | - Engine Cold Starting Aids, Ether Fuel Primers. |
| MIL-C-62122 | - Cable Assembly: Intervehicle Power: Plug and Receptacle. |

Military Standards:

- | | |
|--------------|--|
| MIL-STD-1400 | - Engines, Gasoline and Diesel, Methods of Test. |
| MS35000 | - Battery, Storage, Lead-Acid, Waterproof. |
| MS35909 | - Spark Plug, Shielded, 14mm, 1-1/4 Inch Well (Other Than Aircraft). |
| MS39254 | - Cylinder, Engine Starting (Engine Cold-Starting Aid). |

MIL-STD-1410

- | | |
|---------|---|
| MS51009 | - Spark Plug, Shielded, 18 MM, 1-1/4 Inch Well (Other Than Aircraft). |
| MS51389 | - Raincap, for Air Cleaner Intake, for Industrial Engines. |
| MS53063 | - Indicator, Air Cleaner, Intake; Restriction Mechanical Type. |
| MS75047 | - Battery, Storage, Lead-Acid, Waterproof 24 Volt. |

(Copies of specifications and standards 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 documents form a part of this standard to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

ENVIRONMENTAL PROTECTION AGENCY (EPA)

40 CFR, Part 85 - Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines.

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

NATIONAL BUREAU OF STANDARDS (NBS)

Handbook H28 - Screw-Thread Standards for Federal Services.

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE Handbook.

(Application for copies should be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15086.)

3. DEFINITIONS

3.1 Industrial-type engine. An industrial-type engine is a heavy-duty, liquid- or air-cooled engine designed specifically for industrial type applications or versions of truck, marine, and automotive engines.

MIL-STD-1410

3.2 Engine accessory. An engine accessory is any functional item attached to the engine which is not necessarily required to operate the engine, i.e., generator, alternator, etc.

3.3 Engine component. An engine component is any functional item which is required for the operation of the engine, i.e., waterpump, fuel pump, fuel injector, carburetor, etc.

4. REQUIREMENTS

4.1 General requirements.

4.1.1 Engine. Engines used in any of the four classifications of end items described herein shall be certified and warranted by the engine manufacturer as being suitable for the intended application using military fuels and lubricants specified herein unless otherwise specified in the end item specification.

4.1.2 Engine components and accessories. Engine components and accessories furnished with each engine shall be the engine manufacturers standard commercial items unless otherwise specified in the end item specification (see 6.2).

4.1.3 Ease of maintenance. Routine engine servicing and adjustments shall be performed without interference or necessity to remove other components.

4.1.4 Threaded parts and common parts. All screw threads shall be in accordance with NBS Handbook H28.

4.1.5 Identification marking. Unless otherwise specified (see 6.2), each engine shall be identified in accordance with the engine manufacturer's standard commercial practice.

4.1.6 Emission control. When required by law, engines for vehicles shall conform to EPA Regulations, 40 CFR, Part 85, as applicable, for control of air pollution by crankcase emissions, exhaust emissions, and fuel evaporative emissions (see 6.2).

4.1.7 Engine rotation. Unless otherwise specified in the end item specification, the rotation of the engine shall be counterclockwise when viewed from the power takeoff end (see 6.2).

4.1.8 Belts and pulleys. Drivebelts (V) and pulleys shall conform to the SAE Handbook Standards.

MIL-STD-1410

4.1.9 Lubrication system. Engines of the wet-sump type shall be equipped with an oil level indicating bayonet gage. The bayonet gage shall be permanently marked to indicate "FULL" and "LOW" oil levels when the engine is stopped. The volume of oil indicated between the "LOW" and "FULL" marks on the dipstick shall be sufficient to permit a minimum of 8 hours of operation without requiring addition of oil. Engines shall be capable of satisfactory operation using military type lubricating oils conforming to MIL-L-210⁴ and MIL-L-46167, grades as applicable.

4.2 Special characteristics and features. The following special characteristics and features shall apply to engines furnished in the end item classifications Classes III and IV, when specified in the end item specification.

4.2.1 Operational requirements. The engine shall start within 5 minutes from initial starting action (turning on glowplugs, discharging ether unit, engaging cranking motor or any other initiating action). Full power shall be obtained after 15 minutes of warmup under any of the conditions or combination of conditions specified in 4.2.1.2, 4.2.1.3, and 4.2.1.4 unless otherwise specified in the end item specification (see 6.2).

4.2.1.1 Maximum engine operating limits. Unless otherwise specified in the end item specification, the maximum engine operating limits allowable except for Group I gasoline engines shall not exceed conditions specified in Table I (see 6.2).

Table I. Maximum Engine Operating Limits

| Data Items | Standard Commerical | Modified Commercial | Noncommercial Counterpart | Military Design |
|-------------------------------|---|---|---|---------------------------------|
| Bhp | Equal to or less than established by 1.2.1.1. | Equal to or less than established by 1.2.1.2. | Equal to or less than established by 1.2.1.3. | Same as established by 1.2.1.4. |
| Oil Gallery Temperature | 230°F* | 230°F* | 230°F | 230°F |
| Radiator Top Tank Temperature | 210°F* | 210°F* | 210°F | 210°F |
| Exhaust Smoke (Value) | 4.5** | 4.5** | 4.5 | 4.5 |

* Limits which vary from specified values shall be based on acceptable performance of commercial end item and will be allowable only when the engine manufacturer agrees to warrant engines at the higher limits.

** Exhaust smoke (diesel engine only) shall be limited in accordance with MIL-STD-1400 except those that are limited by EPA certification.

MIL-STD-1410

4.2.1.2 Elevation conditions. Operation at any elevation from sea level (29.92 inches Hg) with a maximum ambient temperature of 125°F to 5000 feet (24.9 inches Hg) with a maximum ambient temperature of 107°F.

4.2.1.3 Temperature conditions. At any ambient temperature from +125°F to -25°F.

4.2.1.4 Tilt conditions. The engine shall operate at the tilt angle specified in the end item specification with minimum oil level as shown on the dipstick measured with the engine in the level or normal position (see 6.2).

4.2.2 Average oil consumption. The average oil consumption of a liquid-cooled engine, as applied to the end item, shall not exceed .0035 lbs bhp hr.

4.2.3 Lifting provisions. The engine shall be provided with lifting eyes or other attachments that would enable the engine to be lifted in its normal position. Each attachment shall be of sufficient size and strength to allow lifting of the engine without damage to the attachment or any part or accessory of the engine.

4.2.4 Manual throttle control. A manual throttle control shall be furnished and shall permit operation of the engine at any selected speed under any of the conditions specified herein. The manual throttle shall not restrict the action of the governor when the engine is operating at a governed speed.

4.2.5 Control systems. When any or all of the following controls are to be provided they shall be of the engine shutoff, warning-light, or buzzer type as specified in the end item specification (see 6.2). Glass-tube mercury switches and controls actuated by the gage needle position shall not be used.

4.2.5.1 High-temperature control.

4.2.5.1.1 Liquid-cooled engines. When liquid-cooled engines are to be provided with a high coolant temperature engine shutoff control, the cooling-liquid-temperature control shall be set to actuate at the temperature recommended by the engine manufacturer.

4.2.5.1.2 Air-cooled engines. When air-cooled engines are to be provided with a high cylinder-head temperature engine shutoff control, the control shall be set to actuate at the maximum temperature recommended by the engine manufacturer.

MIL-STD-1410

4.2.6 Lubricating oil control. When engines are to be provided with a control to limit low lubricating oil pressure operation, the control shall operate through direct pressure of the lubricating oil. The control shall be set to actuate at the minimum oil pressure recommended by the engine manufacturer.

4.2.7 Overspeed control. The engine shall be provided with an overspeed control to automatically stop the engine if the engine speed exceeds the maximum speed recommended by the manufacturer. The overspeed control shall operate independently from the regular governing mechanism and shall require manual resetting. When corrective action prior to loss of power is specified in the end item specification, an audible or visual overspeed warning device shall be provided in lieu of or addition to time delay automatic overspeed stopping of the engine as specified.

4.2.8 Cooling systems.

4.2.8.1 Liquid-cooled engines. The cooling system shall be of the type specified in the end item specification (see 6.2) and shall conform to the engine manufacturer's recommendations for all of the specified operating conditions.

4.2.8.2 Air-cooled engines. When an air-cooled engine is furnished (see 6.2), the engine shall be cooled by a fan that is either gear-driven, belt-driven, or directly driven from the crankshaft. The air intake face of the fan shroud shall be provided with a removable grille or screen guard.

4.2.9 Exhaust system. The exhaust header outlet shall be provided with a suitable connection for attachment to the exhaust system in the end item.

4.2.10 Governing system. Engines shall be provided with either a centrifugal or hydraulic variable speed governor (see 6.2), gear driven from the engine. Provisions shall be made for trimming governed speed setting throughout the entire load range while the engine-driven equipment is in operation. The engine speed at any load between no-load and full rated load shall be not less than rated load speed nor exceed rated load speed by more than 10 percent. Engines for vehicle application may be supplied with a maximum-minimum speed governor, or as specified in the end item specification.

4.2.11 Air-induction system. When a heavy-duty air cleaner is furnished (see 6.2) it shall be of the dry type conforming to MIL-A-52363 with a raincap conforming to MS51389 and a restriction indicator conforming to MS53063.

MIL-STD-1410

4.2.12 Cranking system. Unless otherwise specified in the end item specification, an electric-cranking system shall be furnished (see 6.2).

4.2.12.1 Electric-cranking system. The electric-cranking system shall be either a 12 volt or 24 volt (see 6.2) electric circuit energized by storage batteries. The electric circuit shall have a negative ground and shall include the following:

- (a) Electric-cranking motor with appropriate automatic engagement and drive mechanisms.
- (b) Storage batteries with appropriate frame or box.
- (c) Battery-charging generator alternator with appropriate regulator, wiring, and mounting provisions.
- (d) Circuit devices, including switches, relays, connectors, receptacles, and wiring.

4.2.12.2 Cranking motors. The cranking motor shall be furnished by the engine manufacturer or shall be approved by the engine manufacturer for the particular end item application.

4.2.12.3 Storage batteries. Unless otherwise specified (see 6.2), batteries shall be furnished and shall conform to MS35000 or MS75047. The batteries shall be shipped charged and dry with one filling of electrolyte furnished separately with each battery. Batteries shall be contained and restrained in a corrosion-resisting and acid-resisting box or frame providing for gas venting, drainage, rigid battery positioning, and accessibility to and observation of the battery cells and terminals. The battery terminals and clamps shall be at least 1 inch away from any uninsulated electrical conductors. With the battery-container cover removed, sufficient clearance shall be provided for removal of batteries and to permit connection and disconnection of the battery cables without danger of shorting the battery against other components.

4.2.12.4 Battery cables and terminals. Battery cables shall be in accordance with SAE J541 for "Heavy Duty Use", at the applicable voltage. Battery cables shall not be spliced. Cable resistance shall conform to starter motor manufacturer's recommendations.

4.2.12.5 Starting priming systems. When utilized (see 6.2), the auxiliary fluid priming system shall conform to MIL-E-52649, Type III, size as applicable. Fuel cylinders shall conform to MS39254 using primer fuel conforming to O-F-1044. A tapped and plugged hole, or holes, 1/4 inch NPT, shall be provided in the intake manifold or other component of the air-induction system to facilitate application of priming devices.

MIL-STD-1410

4.2.12.6 Charging generator/alternator. The battery-charging generator shall be of the direct current or alternator (rectified alternating current) type. A protective-relay assembly shall be provided to protect the complete battery-charging system when an alternator system is furnished. The relay assembly shall protect the charging system from the batteries being incorrectly installed, incorrect polarity of slave or jumper cables, and performing maintenance or repairs anywhere on the engine or engine-driven equipment when using an electric-arc welder.

4.2.12.7 Charging receptacles. When auxiliary electrical power is required (see 6.2), a waterproof slave receptacle shall be provided for connection to an external power source for emergency engine starting and for recharging the batteries. The receptacle shall conform to MIL-C-62122 and shall have sufficient clearance to insert a plug conforming to MIL-C-62122 with its cable. The receptacle shall be mounted for access outside the enclosure of the engine-driven equipment and shall be connected into the battery circuit.

4.3 Peculiar requirements. Peculiar requirements for engines furnished in end item classifications, Classes III and IV, shall be as follows when specified in the end item specification.

4.3.1 Gasoline engines.

4.3.1.1 Valve mechanism (4-stroke cycle engines). Induction hardened exhaust valve seats or replaceable exhaust valve seat inserts, pressed or shrunk into place, shall be used.

4.3.1.2 Two-stroke cycle engines. Two-stroke cycle engines shall be lubricated from a pressure-vapor system. The gasoline tank filler shall incorporate a cap marked to indicate the quantity of lubricating oil to be mixed with a full tank of gasoline.

4.3.1.3 Four-stroke cycle engines. Four-stroke cycle engines shall be of the wet-sump type and shall have a splash, a forced feed and splash, or a pressure system for lubrication.

4.3.1.4 Fuel system. All components of the fuel system shall operate with fuels conforming to MIL-G-3056 or WV-G-1690.

4.3.1.5 Cranking system. Manual cranking for Group I engines shall be either a rope or handcrank. The rope shall be furnished. If an automatic-rewind-rope starter is used, the rope shall be galvanized flexible steel stranded wire rope or braided nylon. An auxiliary starting sheave at an accessible location shall be provided for use in the event the rewind starter becomes inoperative.

MIL-STD-1410

4.3.1.6 Ignition system. A distributor, magneto, or breakerless type ignition system shall be furnished. The system shall be complete and shall include all accessory items necessary for operation of the engine. An ignition switch shall be provided. Spark plugs for 4-stroke cycle engines shall conform to W-S-506, MS35909, or MS51009.

4.3.2 Diesel engines.

4.3.2.1 Cylinder blocks. Cylinder blocks shall be provided with replaceable cylinder liners or individually replaceable cylinders for any bore diameter above 4 inches, unless a sleeveless engine is specified. All engines having aluminum alloy cylinder blocks shall have cast in or replaceable cylinder liners.

5. TEST

5.1 Preproduction tests.

5.1.1 Classes I and II end item classifications. Unless otherwise specified in the end item specification (see 6.2), preproduction tests of engines are not required for standard commercial or modified commercial end items.

5.1.2 Classes III and IV end item classifications. The engines shall be tested in accordance with MIL-STD-1400, Test Method 2000, prior to the installation in the end item when specified in the end item specification (see 6.2).

5.2 Production engine tests. Each engine shall be examined and tested in accordance with the engine manufacturer's standard production run-in tests. The engine manufacturer shall certify that the test method used has been his current standard commercial practice for at least 6 months prior to bid. If at anytime the certified test method is changed, the engine manufacturer shall recertify that the new method is his current commercial practice.

5.3 Production control tests. Production control tests shall be conducted on sample engines in accordance with the engine manufacturer's standard quality control procedures. The engine manufacturer shall certify that the quality control procedures used has been his current standard commercial practice for at least 6 months prior to bid.

6. NOTES

6.1 First article baseline. Successful completion of the end item first article tests shall determine the engine baseline configuration for the duration of the contract. Changes to the engine will be controlled through configuration management procedures.

MIL-STD-1410

6.2 Options. End item procurement documents should specify the following:

- (a) Title, number, and date of this standard.
- (b) When a gasoline or diesel engine shall be furnished (see 1.1).
- (c) End item classification (see 1.2).
- (d) Method of selecting engine (see 1.2.1 through 1.2.1.4).
- (e) When engine components and accessories are not manufacturer's standard commercial items (see 4.1.2).
- (f) When engine identification marking will not be the manufacturer's standard commercial practice (see 4.1.5).
- (g) When engine is required to conform to EPA Regulations (see 4.1.6).
- (h) When engine rotation is other than counterclockwise (see 4.1.7).
- (i) When environmental operating conditions shall be other than specified in this standard (see 4.2.1).
- (j) When maximum engine operating limits may be exceeded (see 4.2.1.1, Table I).
- (k) Tilt conditions required (see 4.2.1.4).
- (l) When engine control systems and type are to be furnished (see 4.2.5).
- (m) Type cooling system required (see 4.2.8.1 and 4.2.8.2).
- (n) Type of governing system to be furnished (see 4.2.10).
- (o) When a heavy-duty air cleaner is to be furnished (see 4.2.11).
- (p) Type cranking system other than electric to be furnished (see 4.2.12).
- (q) Whether cranking system shall be 12 or 24 volt (see 4.2.12.1).
- (r) When MS storage batteries are to be furnished (see 4.2.12.3).
- (s) When a starting priming system (ether) is required (see 4.2.12.5).
- (t) When a charging receptacle is to be provided (see 4.2.12.7).
- (u) When preproduction tests on engines are required (see 5.1.1).
- (v) When the engine shall be tested in accordance with MIL-STD-1400, Test Method 2000 (see 5.1.2).

6.3 Special clauses. The clauses given in the succeeding paragraphs are to aid the procuring agency in preparing invitations for bids and contracts to insure that required data and information is supplied by the supplier to determine compliance with the applicable selection method.

6.3.1 Required data. The end item supplier is responsible for obtaining from the engine manufacturer all information and data required in this standard for review by the Government. The supplier shall be considered nonresponsive if all required information and data is not included in proposal, see Table II. Each supplier should indicate below which one of the following selection methods, as defined in 1.2.1, the engine to be furnished meets:

MIL-STD-1410

- ☐ Commercial Experience.
(If checked, Figure 1 "Engine Description and Performance History" shall be submitted with the suppliers proposal.)
- ☐ Environmental Protection Agency (EPA) Tests.
(If checked, EPA certification along with maximum certified brake horsepower rating achieved during the 1000 hour test shall be submitted with the suppliers proposal.)
- ☐ Manufacturer's Certified Test Data.
(If checked, supplier shall furnish for review by the procurement activity certified engine test data based upon a minimum of 1000 hours engine endurance testing.)
- ☐ Engine Test - Applicable only to Class III, Noncommercial Counterpart End Items.
(If checked, engine shall be successfully tested and certified test data submitted to the Government for review prior to application in the end item.)

Table II.

| Required Data | Time of Submission |
|--|-----------------------------------|
| Engine description and performance data, see 1.2.1.1(a), 1.2.1.2(a), and 1.2.1.3(a). | Submission of Bid |
| EPA data, see 1.2.1.1(b), 1.2.1.2(b), and 1.2.1.3(b). | Submission of Bid |
| Manufacturer's certified test data, see 1.2.1.1(c), 1.2.1.2(c), and 1.2.1.3(c). | Prior to First Article Inspection |
| MIL-STD-1400 certified test data, see 1.2.1.3(d). | Prior to First Article Inspection |
| Certification of suitability for intended use, see 4.1.1 and 6.3.2(a). | Prior to First Article Inspection |
| Certification of production engine and production control tests, see 5.2 and 5.3 including copy of procedures. | Submission of Bid |
| Warranties, see 6.3.2(a), (b), and (c). | Submission of Bid |

MIL-STD-1410

6.3.2 Warranty clause. In addition to the warranty extended by the prime supplier for the end item, a separate warranty shall be furnished by the engine manufacturer to cover the following:

- (a) Suitability of the engines for specified end item classification use. The engine shall be certified and warranted by the engine manufacturer that the engine is suitable for its intended use providing the end item supplier's installation design is approved by the engine manufacturer.
- (b) Satisfactory operation of the engine on the fuels and lubricants specified herein.
- (c) Satisfactory operation of the engine at the environmental conditions specified in the end item specification.
- (d) Certify that components and accessories are current items of production for Class I and Class III engines.

Custodians:

Army - ME
Air Force - 82

Preparing activity:

Army - ME

Project No. 2805-0506

Review activities:

Army - CE, EA
DSA - CS

ENGINE DESCRIPTION AND PERFORMANCE HISTORY

1. Engine manufacturer _____
2. Engine Model No. _____ Specification No. _____
3. Horsepower
 - Maximum power _____ bhp at _____ max rpm _____ bmeq.
 - Maximum intermittent (1 hr) _____ bhp at _____ rpm _____ bmeq.
 - Net continuous _____ bhp at _____ rpm _____ bmeq.
 - Horsepower required for end item bhp at _____ rpm _____ bmeq.
4. Maximum torque _____ lbs/ft at _____ rpm.
5. Bore _____ in.
6. Stroke _____ in.
7. Total displacement _____ cu in.
8. Major customers for end item application.

NameAddress

| | |
|-------|-------|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

9. End item description _____
- _____
- _____
- _____

FIGURE 1.

X-3092

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