

INCH-POUND

MIL-G-14243D
26 April 1989
SUPERSEDING
MIL-G-14243C
4 March 1976

MILITARY SPECIFICATION

GASKETS: COMBINATION OF METAL AND NONASBESTOS FACING MATERIAL

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers 3 types of metal and nonasbestos combination gaskets for high temperature application (see 6.1).

1.2 Classification. The gaskets shall be of the following types as specified (see 6.2).

- | | |
|----------|--|
| Type I | - Steel sheet with nonasbestos on both surfaces. |
| Type II | - Steel sheet with nonasbestos on one surface. |
| Type III | - Nonasbestos sheathed in sheet metal. |

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: US Army Tank-Automotive Command, ATTN: AMSTA-GDS, Warren, MI 48397-5000, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 2805

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATION

FEDERAL

MMM-A-260	- Adhesive, Water-Resistant, (For Sealing Waterproof Paper).
PPP-B-601	- Boxes, Wood, Cleated-Plywood.
PPP-B-636	- Boxes, Shipping, Fiberboard.
PPP-B-1055	- Barrier Material, Water-Proof, Flexible.
PPP-T-60	- Tape: Packaging, Waterproof.
PPP-T-76	- Tape, Packaging, Paper (For Carbon Sealing).

STANDARDS

MILITARY

MIL-P-116	- Preservation, Methods of.
MIL-B-117	- Bags, Sleeves and Tubing-Interior Packaging.
MIL-STD-129	- Marking for Shipment and Storage.
MIL-STD-2073	- DOD Material Procedures for Development and Application of Packaging Requirements.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Naval Publications and Forms Center, (ATTN: NPODS), 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A109	- Steel, Carbon, Cold-Rolled Strip.
ASTM A308	- Steel Sheet, Colled-Rolled, Long Terme Coated, Specification for.
ASTM A366	- Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
ASTM F36	- Standard Test Method for Compressibility and Recovery of Gasket Materials.
ASTM F104	- Standard Classification System for Nonmetallic Gasket Materials.
ASTM F146	- Fluid Resistance of Gasket Materials, Test Methods for.
ASTM F806	- Compressibility and Recovery of Laminated Composite Gasket Materials, Test Method for.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for MS standards), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), sample gaskets shall be subjected to first article inspection (see 6.4) in accordance with 4.4.

3.2 Material. The materials used in the manufacture of the gaskets shall be as specified herein (see 4.7.1).

3.2.1 Metal sheet.

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3.2.1.1 Type I. Type I gaskets shall have metal sheets or strips of low carbon (0.15 carbon max) composition steel. Steel shall be in accordance with QQ-S-698, ASTM A109, or ASTM A366, cold-rolled, and of a temper and finish specified therein for the intended use. Metals specified in 3.2.1.2 for type II gaskets may be used as an alternative for type I gaskets.

3.2.1.2 Type II. Type II gaskets shall have terne coated steel sheets conforming to commercial quality, coating LT-35, cut lengths, oiled or ASTM A308 or tinplate steel conforming to Type optional, Temper T3 or T-4-CR class common coke or 25 of QQ-T-425.

3.2.1.3 Type III. Type III gaskets shall have metal sheets of terne plate steel or tinplate steel as specified for Type II gaskets or copper sheets conforming to cold rolled, soft annealed temper of QQ-C-576.

3.2.1.4 Other metals. When specified (see 6.2), other metals may be used in lieu of metals specified in 3.2.1, in fabrication of gaskets.

3.2.2 Nonasbestos facing material. The nonasbestos facing material used in gaskets shall conform to the requirements for liquid absorption (see 3.5.2), resistance to boiling water (see 3.5.3) and moisture loss (see 3.5.4).

3.2.3 Recycled, virgin, and reclaimed materials. There are no requirements for the exclusive use of virgin materials. The use of recycled or reclaimed (recovered) materials is acceptable provided that all other requirements of this specification are met (see 6.3.1).

3.3 Construction (see 4.7.1).

3.3.1 Type I. Type I gaskets shall have the steel sheet recessed and formed so as to have closely spaced tangs projecting from both surfaces. The tangs shall hold the nonasbestos to the metal after being pressed, usually without the use of adhesive, except where required to prevent delamination. The nonasbestos shall be plied evenly on both surfaces of the metal with the same thickness on each surface.

3.3.2 Type II. Type II gaskets shall have the steel sheet recessed and formed so as to have closely spaced tangs projecting from one surface only. The tangs shall hold the nonasbestos to the metal after being pressed, usually without the use of adhesive except where required to prevent delamination. The nonasbestos shall be plied evenly on one surface and shall be of uniform thickness. The steel sheet shall be formed to protect the outer edges of the gasket but shall not be closed over the nonasbestos at the outer edges.

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3.3.3 Type III. Type III gaskets shall consist of an inner ply of nonasbestos, sheathed on both faces with metallic sheets. Metallic grommets shall band gaskets, as specified on the drawing or military sheet form standard (MS standard). Adhesives shall not be used. The steel sheets shall be formed to protect the outer edges of the gasket but shall not be closed over the nonasbestos at the outer edges (see 6.2).

3.3.4 Grommets. When grommets are specified (see 3.3.3), the grommets shall be made of material as specified on the applicable drawing or MS standard.

3.3.5 Coating. To prevent seizure to metallic surfaces, a coating of pulverized carbon containing a binder, or equivalent material as specified or approved by the procuring activity, shall be evenly applied to the nonasbestos surfaces of type I and type II gaskets. Unless otherwise specified on the applicable MS standard or drawing, type III gaskets shall be coated with lacquer or varnish.

3.4 Dimensions.

3.4.1 Shapes, sizes and openings. The shapes, sizes, openings and bolthole locations of the finished gasket shall be as specified on applicable drawing or MS standard (see 4.7.1 and 6.2).

3.5 Physical properties.

3.5.1 Compressibility. The gaskets shall be capable of withstanding a 2,000 pound square inch (psi) [13.9 megapascals (MPa)] load without rupture and compress 10 to 20 percent (%) from original thickness (see 4.7.3).

3.5.2 Liquid absorption. The gaskets shall withstand immersion in hydrocarbon fuel conforming to ASTM Fuel B, water, and petroleum base oil conforming to ASTM Oil Number 3 for a period of 22 hours, with increase of weight, due to liquid absorption by the nonasbestos, not in excess of 20% for any of these liquids. The nonasbestos shall show no evidence of disintegration, or of becoming soft or spongy after immersion (see 4.7.4).

3.5.3 Resistance to boiling water. When immersed in boiling water for 2 hours, the nonasbestos shall not become soft or spongy and shall not separate from the sheet metal (see 4.7.5).

3.5.4 Moisture loss. The moisture loss of the gaskets shall not be more than 2% by weight when subjected to a temperature of 180 degrees Fahrenheit (°F) [82 degrees Celsius (°C)] until weight becomes constant (see 4.7.6).

3.5.5 Flexibility. The metal and nonasbestos in type I and type II gaskets shall not separate when flexed on a 2 inch mandrel (see 4.7.7).

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3.6 Identification marking. The military part number and the manufacturer's identification code of the gaskets shall be marked in accordance with the requirements of MIL-STD-130 (see 4.7.1).

3.7 Workmanship. Workmanship shall be of a quality to assure that the gaskets are with smooth surface, free of projecting tangs noticeable to touch. Edges shall be clean cut and without burrs (see 4.7.2).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order (see 6.2), the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order (see 6.2), the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations is an acceptable practice to ascertain conformance to requirements; however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.2 Classification of inspection. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.4).
- b. Quality conformance inspection (QCI) (see 4.5).
- c. Inspection of packaging (see 4.6).

4.3 Inspection conditions. Unless otherwise specified herein, all inspections shall be performed under the following controlled ambient conditions:

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4.5.2 QCI tests. Subsequent to the examination of 4.5.1, the sample gaskets shall be subjected to the QCI tests specified in table I.

4.6 Inspection of packaging. The preservation, packaging, packing, and marking shall be inspected to determine conformance to 5.1.

4.7 Methods of inspection.

4.7.1 Materials and construction. Conformance to 3.2 through 3.4.1 and 3.6 shall be determined by inspection of contractor records providing proof or certification that design, construction, processing, and materials conform to requirements. Applicable records shall include drawings, specifications, design data, receiving inspection records, processing and quality control standards, vendor catalogs and certifications, industry standards, test reports and rating data.

4.7.2 Workmanship. Conformance to 3.7 shall be determined by examination of the characteristics listed in table II.

4.7.3 Compressibility. To determine conformance to 3.5.1, the specimen from the sample shall be tested in accordance with ASTM F36 or ASTM F806.

4.7.4 Liquid absorption. To determine conformance to 3.5.2, the specimen from the sample shall be tested in accordance with ASTM F146 for Type I materials of ASTM F104.

4.7.5 Resistance to boiling water. To determine conformance to 3.5.3, the specimen shall be visually examined after testing.

4.7.6 Moisture loss. To determine conformance to 3.5.4, the specimen shall be weighed and the weight recorded. The specimen shall then be heated at 180°F (82°C) until the weight becomes constant. The final weight shall be recorded.

4.7.7 Flexability. To determine conformance to 3.5.5, the sample gaskets of type I and type II shall be bent around a 2 inch mandrel and be examined.

5. PACKAGING

5.1 Preservation. Preservation shall be level A or C as specified (see 6.2).

5.1.1 Level A.

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5.1.1.1 Cleaning and drying. Gaskets shall be cleaned according to process C-1 and dried according to process D-4 IAW MIL-P-116.

5.1.2 Unit packs. Preserve in accordance with one of the following alternate methods:

- a. Seal in bags conforming to class B, C, or E of MIL-B-117, using stiffening material internally if needed to maintain rigidity.
- b. Method IA-13 or IA-15 of MIL-P-116.
- c. Place between sheets of, or in fold of, corrugated fiber board of sufficient stiffness to resist bending, overwrap with waterproof wrapping paper conforming to PPP-B-1055 and seal with pressure sensitive tape conforming to PPP-T-76 or PPP-T-60 or adhesive conforming to MMM-A-260. Authorization to use other waterproof barrier materials may be granted upon request.

5.1.3 Level C. Gaskets shall be placed between two fiberboard stiffeners, taped, and placed in a commercial heat sealed bag.

5.1.4 Intermediate packaging. Unit packs shall be intermediate packaged if the size and weight limitations meet the requirements of MIL-STD-2073-1A, Appendix F.

5.2 Packing. Packing shall be level A, B, or C as specified (see 6.2).

5.2.1 Level A. Gaskets packaged as specified in 5.1 shall be packed in an overseas type shipping container conforming to PPP-B-601, closure shall be IAW the appendix to PPP-B-601.

5.2.2 Level B. Gaskets packed as specified in 5.1 shall be packed in a PPP-B-636 type weather resistant box. Closure shall be IAW the appendix of PPP-B-636.

5.2.3 Level C. Gaskets packaged as specified in 5.1 shall be packed in a PPP-B-636, domestic type box. Closure shall be IAW appendix of PPP-B-636.

5.3 Marking. In addition to any special marking required by the contract or order (see 6.2), interior and shipping containers shall be marked IAW MIL-STD-129.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

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6.1 Intended use. Gaskets covered by this specification are intended for use in automotive vehicle engine applications where the gaskets will be subjected to high temperatures as in cylinder head and exhaust manifold.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type of gasket required (see 1.2).
- c. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- d. If first article is required (see 3.1).
- e. Metals other than as specified (see 3.2.1.4).
- f. Title, number, and date of applicable drawing or MS standard (see 3.3.3 and 3.4.1).
- g. If responsibility for inspection should be other than as specified (see 4.1).
- h. If inspection conditions should be other than as specified (see 4.3).
- i. First article inspection category(s) (see 4.4 and 6.4).
- j. Sample size for each first article inspection category (see 4.4).
- k. Sample size for QCI examination and tests (see 4.5.1 and 4.5.2).
- l. Selection of applicable level and packaging requirements (see 5.1).

6.3 Definitions.

6.3.1 Recovered materials. "Recovered materials" means materials that have been collected or recovered from solid waste (see 6.3.2).

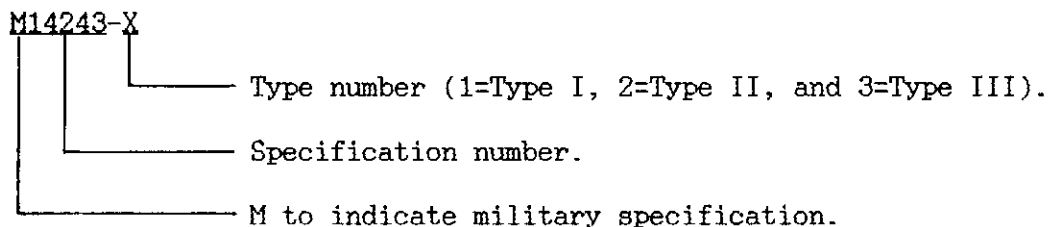
6.3.2 Solid waste. "Solid waste" means (a) any garbage, refuse, or sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility; and (b) other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities. It does not include solid or dissolved material in domestic sewage, or solid or dissolved material in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Clean Water Act, (33 U.S.C. 1342 et seq.), or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) (Source: Federal Acquisition Regulations, section 23.402).

6.4 First article. When first article inspection is required, the contracting officer should include specific instructions in acquisition documents regarding the category(s) of first article inspection, sample size for each category and arrangements regarding location for conducting first article inspection, approval of first article inspection results, and

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disposition for first articles. Invitation for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.5 Part or Identifying Number (PIN). Except when part number are specified on the drawing, MS standards or military specification sheet (MS sheet), the PIN to be used for items acquired to this specification should be developed as follows:



6.6 Subject term (key word) listing.

Automotive engine
Boiling Water
Cylinder head
Engine
Exhaust manifold
Flexibility
Liquid Absorption
Nonasbestos

6.7 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

6.8 SI values. Dimensions and properties in inch-pound units are primary. Dimensions and properties in SI units are shown as approximate equivalents of the primary units.

Custodians:
Army - AT
Navy - MC

Preparing activity:
Army - AT

(Project 2805-0555)

Review activity:
DLA - CS

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL*(See Instructions – Reverse Side)***1. DOCUMENT NUMBER****2. DOCUMENT TITLE****3a. NAME OF SUBMITTING ORGANIZATION****4. TYPE OF ORGANIZATION (Mark one)**☐ **VENDOR**☐ **USER**☐ **MANUFACTURER**☐ **OTHER (Specify):** _____**b. ADDRESS (Street, City, State, ZIP Code)****5. PROBLEM AREAS****a. Paragraph Number and Wording:****b. Recommended Wording:****c. Reason/Rationale for Recommendation:****6. REMARKS****7a. NAME OF SUBMITTER (Last, First, MI) – Optional****b. WORK TELEPHONE NUMBER (Include Area Code) – Optional****c. MAILING ADDRESS (Street, City, State, ZIP Code) – Optional****8. DATE OF SUBMISSION (YYMMDD)**