

MIL-P-17416C  
12 September 1983  
SUPERSEDING  
MIL-P-17416B(SHIPS)  
25 February 1975  
(See 6.5)

## MILITARY SPECIFICATION

### PACKING MATERIAL, METALLIC, FLEXIBLE (SYMBOL 1430)

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

#### 1. SCOPE

1.1 Scope. This specification covers flexible metallic packing (Symbol 1430) for use on reciprocating rods, rotary rods, valve stems, and outside packed plungers.

#### 2. APPLICABLE DOCUMENTS

##### 2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified, the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

#### SPECIFICATIONS

##### FEDERAL

- |           |   |
|-----------|---|
| PPP-B-566 | - Boxes, Folding, Paperboard.                 |
| PPP-B-636 | - Boxes, Shipping, Fiberboard.                |
| PPP-B-640 | - Boxes, Fiberboard, Corrugated, Triple Wall. |
| PPP-B-676 | - Boxes, Setup.                               |
| PPP-C-96  | - Cans, Metal, 28 Gage and Lighter.           |

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 5523, Department of the Navy, Washington, DC 20362 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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## STANDARDS

### MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection  
By Attributes.
- MIL-STD-129 - Marking for Shipment and Storage.

2.1.2 Government drawing. The following Government drawing forms a part of this specification to the extent specified herein.

### DRAWING

#### NAVAL SEA SYSTEMS COMMAND (NAVSEA)

NAVSHIPS B 153 - Packings and Gaskets, Application Criteria for.

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

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

#### NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT National Motor Freight Classification

(Application for copies should be addressed to the National Motor Freight Traffic Association, Inc., ATA TRAFFIC Dept., 1616 "P" Street, NW, Washington, DC 20036.)

#### UNIFORM CLASSIFICATION COMMITTEE AGENT

Uniform Freight Classification Ratings, Rules and Regulations

(Application for copies should be addressed to the Uniform Classification Committee Agent, Tariff Publication Officer, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

## 3. REQUIREMENTS

3.1 Qualification. Packing material furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.3 and 6.3).

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**3.2 Material and construction.** The material and construction shall conform to that of the sample submitted for qualification (see 4.3 and 6.3). The packing material shall be continuous strips of approximately uniform cross section. The cross section shall be square or slightly rectangular. The composition of the packing material of soft pliable metal foil, ribbon, or strands, wrapped, crimped, twisted, or braided into a continuous strip, with or without a central core of nonmetallic material, in such a manner that the entire working surface will be metal. When a central core is used, it shall be concentric in cross section.

**3.2.1 Metal.**

**3.2.1.1 Heat resistance.** The metal shall not melt or disintegrate at or below 550 degrees Fahrenheit (°F) when tested as specified in 4.6.1.

**3.2.1.2** The metal shall be soft and pliable. It shall not chip or flake off by reason of the abrasive action of the rod when the packing material is tested as specified in 4.6.5.

**3.2.1.3 Use of lead.** Packings and gaskets containing lead shall not be used on nuclear powered ships in accordance with note B of Drawing B 153.

**3.2.2 Lubricant.** The finished packing material shall contain not more than 10 percent of lubricating material and graphite (see 4.6.2).

**3.3 Recovered materials.** Unless otherwise specified herein, all material, and articles incorporated in the products covered by this specification shall be new and shall be fabricated using materials produced from recovered materials to the maximum extent practicable without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically specified.

**3.4 Performance characteristics.**

**3.4.1 Flexibility.** The packing material shall be sufficiently flexible to be readily formed into coils to fit a rod, the diameter of which is three times the thickness of the packing material (see 4.6.4).

**3.4.2 Simulated performance.** The packing material under initial conditions and during the progress of the simulated performance tests specified in 4.6.5 shall respond readily to gland adjustment for the control of leakages from the stuffing box. On the conclusion of the tests the packing material shall be in satisfactory condition, shall be pliable, and shall have a smooth metallic wearing surface. The rods shall not be grooved, cut or scored.

**3.5 Size.** The packing material shall be furnished in the sizes specified (see 6.2.1).

**3.6 Form.** The packing material shall be furnished in the form of spools, coils or spirals as specified (see 6.2.1).

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3.7 Workmanship. The packing material shall be free from extraneous material and visible defects which may affect its serviceability (see 4.5.1).

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Inspection system. The contractor shall provide and maintain an inspection system in accordance with the data ordering document included in the contract or order (see 6.2.2).

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

- (a) Qualification test (see 4.3).
- (b) Quality conformance inspection (see 4.4).

4.3 Qualification test. Qualification tests shall be conducted at a laboratory satisfactory to the Naval Sea Systems Command (NAVSEA). Qualification tests shall consist of all tests specified in 4.5.1 through 4.6.5.

#### 4.4 Quality conformance inspection.

##### 4.4.1 Quality conformance inspection sampling.

4.4.1.1 Inspection lot. An inspection lot shall consist of all finished packing material of one size produced under essentially the same conditions and offered for inspection at one time.

4.4.1.2 Sampling for lot acceptance examination and tests. Representative lengths of packing material shall be selected from each lot offered for inspection in accordance with MIL-STD-105 at general inspection level I. The acceptable quality level (AQL) shall be 2.5 percent defective. Each sample shall be subjected to the visual examination as specified in 4.5.1, the heat resistance test as specified in 4.6.1 and the flexibility test specified in 4.6.4. Failure of the samples to meet the AQL shall be cause for rejection of the lot represented by the samples.

4.4.1.3 Sampling for comparison test. Two lengths of packing material shall be selected at random from the first lot of packing material of each size under a contract or order. From each sample length, a 24-inch specimen shall be cut off for the purpose of the comparison test specified in 4.5.1.1. Two such sample pieces of packing material shall be selected from one of every ten lots which have passed the examination and tests specified in 4.5.1, 4.6.1 and 4.6.4.

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#### 4.5 Quality conformance tests.

4.5.1 Visual examination. A visual examination shall be conducted to detect defects in workmanship and dimensions. For each length of packing material, major defects such as rip, tear, hole, void, crease, crimp, gouge or extraneous particulate matter on the surface, shall be cause for rejection of that length. Minor surface defects not affecting the serviceability of the packing material shall not be cause for rejection.

4.5.1.1 Comparison tests. The sample specimens selected in accordance with 4.4.1.3 shall be subjected to those tests which will establish the identity of the inspection samples with that given qualification and to the tests specified in 4.6.1 through 4.6.5 inclusive.

4.5.1.1.1 Action in case of failure. Acceptance of the first lot under a contract or order shall be withheld until a satisfactory report is received on the comparison test sample. Except as hereinafter specified, acceptance and rejection of lots shall normally be on the basis of the lot acceptance examination and tests specified in 4.5.1, 4.6.1 and 4.6.4. Lot acceptance shall then not be withheld pending receipt of a test report (see 6.2.2) on the subsequent production sample. However, upon receipt of an unsatisfactory test report on a comparison test sample, additional samples shall be selected from every subsequent lot offered for delivery. The sample so selected shall be submitted to a laboratory satisfactory to NAVSEA and shall there be subjected to the comparison tests specified in 4.5.1.1. Lots shall then be accepted only upon receipt of a satisfactory test report on the samples so selected. Additional testing shall be discontinued and lot acceptance returned to the normal basis when four successive lots have been accepted.

#### 4.6 Test procedures.

4.6.1 Heat resistance of metal. A specimen shall be cut from each of the samples and subjected to a dry heat temperature of 550°F for 2 hours. Acceptance criteria for the test shall be as specified in 3.2.1.1.

4.6.2 Lubricant. A 5-gram specimen shall be used to determine percentage total lubricant in the packing material. The specimen shall be weighed to the nearest milligram and placed in the siphon cup. An extraction flask shall be dried at a temperature of 212 to 221°F, cooled in a desiccator, and weighed. A few milliliters (mL) of 32 percent acetone - 68 percent chloroform mixture shall be added to the cup and the cup agitated gently to dislodge the bulk of the graphite which shall be removed by decanting into the extraction flask. This procedure is necessary to prevent the siphon cup from becoming clogged. Usually two or three such treatments are sufficient to remove most of the graphite which shall be collected in the extraction flask along with the acetone-chloroform-soluble materials. Sufficient acetone-chloroform mixture shall be added to the flask to bring the volume up to 60 to 75 mL. The extraction cup containing the specimen and the flask shall be assembled. The specimen shall be extracted for 2 hours with the acetone-chloroform mixture at such a rate that from 2.5 to 3.5 minutes are required to fill and empty the extraction cup. At the end of the extraction period, the extracted specimen shall be transferred to a watch glass and air dried. The dry fibers shall be carefully separated, and the remaining graphite brushed off and collected on the watch glass and then added

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to the extract in the flask. The acetone and chloroform shall be distilled off on a steam bath passing a gentle current of filtered air through the flask to prevent boiling of the liquid. The flask shall be removed from the steam bath just before the last trace of solvent has disappeared and the current of air continued for 10 minutes. The flask and contents shall be dried in circulating air for 1 hour at a temperature of  $221 \pm 3.6^{\circ}\text{F}$ , cooled in a desiccator and weighed.

4.6.3 Results. The lubricant content of the specimen shall be calculated as follows: Total organic solvent-soluble lubricant plus graphite, percent,  $\frac{L}{W} \times 100$  where: L is the weight of graphite and acetone-chloroform-soluble material in grams; and W is the weight of the specimen before extraction in grams. Acceptance criteria for the test shall be as specified in 3.2.2

4.6.4 Flexibility. The packing shall be coiled by hand around a rod, the diameter of which shall be three times the thickness of the packing. Only sufficient packing to make two complete turns around the rod shall be used. Acceptance criteria shall be as specified in 3.4.1.

4.6.5 Simulative service test. The simulative service test shall be made under simulated operating conditions in a machine designed for the purpose. The following test conditions shall apply:

- (a) Reciprocating rod service with saturated steam at 300 pounds per square inch ( $\text{lb/in}^2$ ) and a rod speed of 100 feet per minute ( $\text{ft/min}$ ). The test shall be concluded after 3500 hours of operation.
- (b) Rotary rod service with feed water at  $100 \text{ lb/in}^2$  and  $250^{\circ}\text{F}$ , and a peripheral rod speed of 4000  $\text{ft/min}$ . The test shall be concluded after 1500 hours of operation.

Acceptance criteria for the test shall be as specified in 3.2.1.2 and 3.4.2.

4.7 Inspection of packaging. Preservation-packaging, packing and marking shall be examined for conformance with section 5 of this specification.

## 5. PACKAGING

(The preparation for delivery requirements specified herein apply only for direct Government acquisition. For the extent of applicability of the preparation for delivery requirements of referenced documents listed in section 2, see 6.4.)

5.1 Packaging. Packaging shall be level A or C, as specified (see 6.2.1).

### 5.1.1 Level A.

5.1.1.1 Preservation-packaging. Packing material, put-up as spools specified in 3.6, shall be protected by placing a wrap of greaseproof barrier material over the packing material and between the flanges of the spool. The wrap shall be secured, utilizing pressure-sensitive tape. Packing material furnished in putup form other than on spools shall be completely wrapped in barrier material.

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and secured with tape as specified herein. The greaseproof barrier herein is not required when the unit container selected (see 5.1.1.1.1) is treated for greaseproofness or is inherently greaseproof.

5.1.1.1.1 Unit containers. Each package shall be placed in fiberboard or paper box, or a metal can, at the contractor's option. The unit container selected shall conform to the following applicable specifications:

<u>Specification</u>	<u>Container</u>
PPP-B-566	Boxes, Folding, Paperboard
PPP-B-636	Boxes, Shipping, Fiberboard
PPP-B-676	Boxes, Set Up
PPP-B-96	Cans, Metal, 28 Gage and Lighter

Sealing and closure, as applicable, of the unit container shall conform to the applicable container specification or appendix thereto, with method I closure applicable to domestic, and method V closure applicable to weather-resistant containers of PPP-B-636. The net weight of packings in paperboard boxes shall not exceed 10 pounds. The net weight of the packings in fiberboard boxes shall not exceed 50 pounds.

5.1.2 Level C. Preservation-packaging of packing material shall afford protection against deterioration and physical damage during shipment from the supply source to the first receiving activity for immediate use. The contractor's normal retail or wholesale preservation-packaging methods may be utilized when such meets the requirements of this level.

5.2 Packing. Packing shall be level A, B, or C as specified (see 6.2.1).

5.2.1 Level A. Packing material, preserved-packaged as specified (see 6.2.1), shall be packed in containers conforming to any one of the following specifications at the contractor's option.

<u>Specification</u>	<u>Container</u>	<u>Type or class</u>
PPP-B-636	Fiberboard	Weatherboard-resistant
PPP-B-640	Fiberboard, corrugated, triple wall	Class 2

Containers shall be closed, waterproofed, and reinforced with tape or nonmetallic banding as specified in the appendix to the applicable specification, with method V closure applicable to PPP-B-636 containers. Containers shall not exceed the weight limitations of the applicable container specification.

5.2.2 Level B. Packing material, preserved-packaged as specified (see 6.2.1), shall be packed in containers specified in 5.2.1, except that the containers shall be of the domestic class or type. Containers shall be closed in accordance with the applicable container specification or appendix thereto, with method I closure applicable to PPP-B-636 containers, using pressure-sensitive tape.



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5.2.3 Level C. Packing material, packaged as specified (see 6.2.1), shall be packed in containers acceptable to the common carrier which will insure safe delivery at destination in a satisfactory condition at the lowest applicable rate. Containers, packing, or method of shipment shall be complete with Uniform Freight Classification Ratings, Rules and Regulations or National Motor Freight Classification or other carrier rules as applicable to the mode of transportation.

5.3 Marking. In addition to any special marking required (see 6.2.1), interior packages and effective shipping containers shall be marked for shipment in accordance with MIL-STD-129.

## 6. NOTES

6.1 Intended use. Packing material is intended for general shipboard service in valve stems and rods, and rotary rods and shafts handling saturated steam, hot and cold water, air, refrigerant, lube oil, fuel oil, diesel oil and gasoline. The packing material is not to be used in potable water systems. Specific applications for the packing can be found in Drawing B 153.

## 6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Size required (see 3.5).
- (c) Form required (see 3.6).
- (d) Levels of preservation-packaging and packing required (see 5.1 and 5.2).
- (e) Special marking required (see 5.3).

6.2.2 Data requirements. When this specification is used in an acquisition which incorporates a DD Form 1423, Contract Data Requirements List (CDRL), the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved CDRL incorporated into the contract. When the provisions of DAR 7-104.9 (n)(2) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification is cited in the following paragraphs.

<u>Paragraph no.</u>	<u>Data requirement title</u>	<u>Applicable DID no.</u>	<u>Option</u>
4.1.1	Inspection system program plan	DI-R-4803	----
4.5.1.1.1	Reports, test	DI-T-2072	----

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5000.19L., Vol. II, AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)



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6.2.2.1 The data requirements of 6.2.2 and any task in section 3, 4, or 5 of this specification required to be performed to meet a data requirement may be waived by the contracting/acquisition activity upon certification by the offeror that identical data were submitted by the offeror and accepted by the Government under a previous contract for identical item acquired to this specification. This does not apply to specific data which may be required for each contract regardless of whether an identical item has been supplied previously (for example, test reports).

6.3 With respect to products requiring qualification, awards will be made only for products which are at the time set for opening for bids, qualified for inclusion in the applicable Qualified Products List QPL-17416 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the Qualified Products List is Naval Sea Systems Command, SEA 5523, Department of the Navy, Washington, DC 20362, and information pertaining to qualification of products may be obtained from that activity. Application for qualification tests shall be made in accordance with "Provisions Governing Qualification SD-6" (see 6.3.1).

6.3.1 Copies of "Provisions Governing Qualification SD-6" may be obtained upon application to Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

6.4 Sub-contracted material and parts. The packaging requirements of referenced documents listed in section 2 do not apply when material and parts are acquired by the contractor for incorporation into the equipment and lose their separate identity when the equipment is shipped.

6.5 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

## Custodians:

Army - AR

Navy - SH

## Preparing activity:

Navy - SH

(Project 5330-0588)

## Review activities:

DLA - IS

**INSTRUCTIONS:** In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (**DO NOT STAPLE**), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

**NOTE:** This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

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**STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL***(See Instructions - Reverse Side)*

1. DOCUMENT NUMBER MIL-P-17416C		2. DOCUMENT TITLE PACKING MATERIAL, METALLIC, FLEXIBLE (SYMBOL 1430)	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one)  <input type="checkbox"/> VENDOR  <input type="checkbox"/> USER  <input type="checkbox"/> MANUFACTURER  <input type="checkbox"/> 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)	