

MIL-C-21004B(SH)
22 December 1983
SUPERSEDING
MIL-C-21004A(SHIPS)
15 June 1965
(See 6.4)

MILITARY SPECIFICATION

CANISTER, LITHIUM HYDROXIDE, SCREENED ENDS, FRICTION TYPE COVERS

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers canisters for shipment and storage of lithium hydroxide (LiOH), to be used in receptacle for CO₂ absorbent (see MIL-R-24159).

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

QQ-T-425 - Tinplate (Hot Dip and Electrolytic).
PPP-B-591 - Boxes, Shipping, Fiberboard, Wood-Cleated.
PPP-B-601 - Boxes, Wood, Cleated-Plywood.
PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
PPP-B-636 - Boxes, Shipping, Fiberboard.
PPP-B-640 - Boxes, Fiberboard, Corrugated, Triple-Wall.
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.

MIL-C-21004B(SH)

MILITARY

- MIL-C-10464 - Cans, Hermetic Sealing, Metal Light Gage Tear and Strip Type.
- MIL-L-10547 - Liners, Case, and Sheet Overwrap; Water-Vaporproof or Waterproof, Flexible.
- MIL-S-11388 - Sealing Material for Metal Container Seams.
- MIL-E-15090 - Enamel, Equipment, Light-Gray (Formula No. 111).
- DOD-P-15328 - Primer (Wash), Pretreatment (Formula No. 117 for Metals) (Metric).
- MIL-P-19602 - Primer, Size Coating, Baking, for Roller Coat Application.
- MIL-E-19603 - Enamel, Baking for Roller Coat Application.
- MIL-L-20213 - Lithium Hydroxide (LiOH), Technical.
- MIL-V-21064 - Varnish, Finishing, Baking for Roller Coat Application.

STANDARDS

FEDERAL

- FED-STD-101 - Preservation, Packaging and Packing Materials: Test Procedures.

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-129 - Marking for Shipment and Storage.
- MIL-STD-1186 - Cushioning, Anchoring, Bracing, Blocking, And Waterproofing, With Appropriate Test Methods.

(Copies of specifications and standards 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.

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.)

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.)

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.

MIL-C-21004B(SH)

3. REQUIREMENTS

3.1 Material. The canister body shall be fabricated from 135-pound base weight, tinplate; and the end rings, covers and screens shall be fabricated from 107-pound base weight tinplate. Tinplate shall conform to type MR, single reduced, class 100, bright finish as specified in QQ-T-425.

3.2 Dimensions. The canister shall be cylindrical and of the multiple friction cover type, and shall be capable of packaging approximately 390 cubic inches of LiOH. The outside height of the canister shall be not less than 11-3/4 inches and not greater than 12 inches. The inside height of the canister from screen to screen shall be not less than 11-3/8 inches and not greater than 11-5/8 inches. The inside body diameter of the canister shall be not less than 6-3/8 inches and not greater than 6-5/8 inches. The outside diameter of the body over the double seam shall not exceed 6-3/4 inches.

3.3 Design and construction.

3.3.1 Body. The body shall be formed from one piece of tinplate not less than 0.015 inch thick. The longitudinal joint shall be an outside or inside lock seam, soldered inside or outside or welded as specified in MIL-C-10464 or PPP-C-96, with a lap seam at each end. The seams shall be soldered the entire length with tin solder. The end ring-to-body seam shall be compound lined. Both ends of the body shall be flanged for lock seaming or crimping of the end rings.

3.3.2 End rings. The end rings shall be formed from tinplate not less than 0.012 inch thick, and shall be not greater than 0.500 inch wide when assembled with the canister body. The end rings shall be flanged for double seaming and shall have an annular groove into which an annular projection on the cover fits. The inside edge of the end ring may be curled under or may project inward to form an additional seal. Flanges shall be precurled and lined with sealing compound conforming to MIL-S-11388.

3.3.3 Cover. The covers shall be formed from tinplate not less than 0.012 inch thick. There shall be an annular projection on the cover to fit snugly into the annular groove in the end ring. When the cover is forced into place on the canister, the cover shall be in continuous contact with the canister on both the outside and the inside of the projection on the cover.

3.3.4 Screens. Both ends of the canister shall be provided with perforated tinplate metal screens, 0.012 inch thick. The total open area of the screens shall be between 25 percent and 45 percent of the total screen area. There shall be at least 17 but not more than 19 holes per inch. The holes shall be 0.033 ± 0.003 inch in diameter. The screens shall be tack soldered to the end rings at three equally spaced locations.

3.3.5 Assembly. One end assembly (end ring and screen) shall be installed as specified in 3.3.4 and complete end assembly double seamed to canister body. The cover shall be sealed to the canister with an adhesive which may be brushed into the end ring annular groove and which will maintain an air tight seal. The adhesive shall not take a permanent set over a prolonged period of time and shall form an airtight seal for repeated openings and closings. The top end ring shall be attached to the canister by double seaming.

MIL-C-21004B(SH)

3.4 Capacity. The nominal capacity of the canister shall be 390 cubic inches. The actual capacity shall be not less than 385 and not greater than 395 cubic inches.

3.5 Leakage. Canisters shall show no leakage when subjected to the air pressure test specified in 4.4.1.

3.6 Coating.

3.6.1 The coating on the exterior of the canisters shall be applied only after the surfaces have been freed of oil, grease, dirt, rust, mill scale, or other extraneous matter adversely affecting adhesion.

3.6.2 The exterior of the canisters shall have a pretreatment consisting of one coat of coating conforming to DOD-P-15328 to a thickness of 0.3-0.5 mils applied to the clean surface. The pretreatment shall be followed with a gray enamel coating, conforming to MIL-E-15090, of such thickness that the pretreatment plus the gray enamel coating shall be not less than 2.0 mils at any point. The cleaning, pretreatment and gray enamel shall produce a uniform, continuous, tightly-adhering coating reasonably free on all surfaces from cracks, scratches, holidays and other film defects or irregularities that may adversely affect the corrosion-resisting properties of the coating. Either type I, class 1 or class 2 of MIL-E-15090, or class 1 and class 2 of MIL-E-19603 may be used. As an optional method, body, end rings and covers may be roller coated with a primer conforming to MIL-P-19602 followed with a gray enamel coating conforming to MIL-E-19603, (color modified to match the color specified in MIL-E-15090) and a varnish coat conforming to MIL-V-21064.

3.6.3 Recovered materials. Unless otherwise specified herein, all equipment, 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.

3.7 Marking. Canisters shall be marked on the side with the following information:

Carbon dioxide (CO₂) absorbent (lithium hydroxide)

Do not open until required for use

Manufacturer _____

Contract number _____

Lot number _____

Date of manufacture _____

Stock No. _____

Gross weight when packed _____ pounds

Net weight when packed _____ pounds

(The actual weights to be stamped in when packed)

MIL-C-21004B(SH)

Use: Open canister by removing both top and bottom covers and inserting canister in CO₂ canister receptacle. Each pound is good for 10 man-hours.

EMERGENCY USE: In case power supply fails, open canister by distorting the screen with screwdriver or blunt tool and spread the carbon dioxide absorbent approximately 1/4 inch depth over bunks or other flat spaces not in contact with water or excessive moisture. Carbon dioxide absorbent shall be spread to the extent of 1 pound for 10 men for 1 hour.

CAUTION: The carbon dioxide absorbent may cause severe burns on contact with the skin or eyes. In the event of contact, flush with water for 20 minutes and seek medical advice.

3.7.1 Method. The marking shall be colored black and shall be applied by the silk screen process, rubber stamp, or stencil. As an optional method, marking may be applied by lithography. Waterproof ink shall be used. Minimum height of letters shall be 0.125 inch.

3.8 Finish. Special attention shall be given to ensure that the canisters are dry prior to shipment and that all parts are free from dirt, grease or other foreign material.

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.

4.2 Sampling for quality conformance inspection.

4.2.1 Lot. All canisters offered for delivery at one time shall be considered a lot for purposes of quality conformance inspection.

4.2.2 Sampling for visual and dimensional examination. A random sample for canisters shall be selected from each lot in accordance with MIL-STD-105 at inspection level I. However, the smallest sample size to be used shall be 25. The acceptable quality level shall be 2.5 percent defective.

4.2.3 Sampling for quality conformance tests. A random sample of canisters shall be selected from each lot in accordance with MIL-STD-105 at inspection level S-3. The acceptable quality level shall be equal to 1.5 percent defective.

MIL-C-21004B(SH)

4.3 Quality conformance tests. Each of the sample canisters selected in accordance with 4.2 shall be subjected to the tests of 4.4 to verify compliance with this specification. A sample canister failing any test shall not be offered for delivery, and if the number of defective canisters in any sample exceeds the acceptance number for that sample, the lot represented by the sample shall be rejected.

4.4 Test procedures.

4.4.1 Air pressure test. The test shall be done in accordance with method 5009 of FED-STD-101. Canisters shall be subjected to an air pressure of 3 ± 0.5 pounds per square inch for 1 minute to determine conformance with 3.5.

4.4.2 Coating thickness test. Conformance with the thickness specified in 3.6.2 shall be verified by appropriate nondestructive means such as magnetic analysis which can be used over the entire surface of the canister.

4.4.3 Visual and dimensional examination. Each of the sample canisters selected in accordance with 4.2.2 shall be visually and dimensionally examined to verify compliance with 3.2, 3.6, 3.7 and 3.8.

4.5 Inspection of packaging. Sample packages and packs and the inspection of the packaging, packing and marking for shipment and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

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 6.3.)

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

5.1.1 Level A. Canister shall be packed in containers conforming to any one of the following specifications at the option of the contractor.

| <u>Specification</u> | <u>Container</u> | <u>Type or class</u> |
|----------------------|------------------------------|----------------------|
| PPP-B-591 | Fiberboard, wood cleated | Class 2 |
| PPP-B-601 | Wood, cleated-plywood | Overseas type |
| PPP-B-621 | Wood, nailed and lock corner | Class 2 |
| PPP-B-636 | Fiberboard | Weather-resistant |
| PPP-B-640 | Fiberboard | Class 2 |

5.1.1.1 Closure, case liners and gross weight. When specified (see 6.2.1), shipping containers shall have case liners conforming to MIL-L-10547. Case liners shall be closed and sealed in accordance with the appendix to MIL-L-10547. Case liners for fiberboard boxes may be omitted provided all center and edge seams and the contractor's joints are sealed and waterproofed with pressure sensitive tape in accordance with the applicable container

MIL-C-21004B(SH)

specification or appendix thereto. Containers shall be closed, strapped or banded in accordance with the applicable container specification or appendix thereto, with method V closure applicable to PPP-B-636 boxes. Fiberboard boxes shall be reinforced with pressure sensitive filament reinforced tape or non-metallic banding applied in accordance with the appendix to the applicable fiberboard box specification in lieu of steel strapping. The gross weight of wood or wood cleated boxes shall not exceed 200 pounds, fiberboard boxes shall not exceed the weight limitations of the applicable fiberboard box specification.

5.1.2 Level 3. Canisters shall be cushioned, anchored, blocked, braced and packed as specified for level A (see 5.1 and 5.1.1), except that containers shall conform to the domestic type or class, case liners and strapping is not required.

5.1.3 Cushioning, anchoring, blocking and bracing. Cushioning, anchoring, blocking and bracing of container contents shall be by the use of internal separators or partitions applied in accordance with MIL-STD-1186.

5.1.4 Level C. Canisters shall be cushioned, blocked, braced and packed in containers acceptable to the common carrier which will ensure safe delivery at destination in a satisfactory condition at the lowest applicable rate. Containers, packing or method of shipment shall conform with Uniform Freight Classification, Ratings, Rules and Regulations, or National Motor Freight Classification or other carrier rules as applicable to the mode of transportation.

5.2 Marking. In addition to any special marking required (see 6.2.1), exterior shipping containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. Canisters covered by this specification are intended for use in the shipment and storage of lithium hydroxide (LiOH) and in carbon dioxide (CO₂) canister receptacles, to be utilized in absorbing carbon dioxide from the atmosphere of submarines in assistance or in emergency when auxiliary carbon dioxide scrubbers are not operating.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- (a) Title, number and date of this specification.
- (b) Levels of packing required (see 5.1).
- (c) When case liners are required (see 5.1.1.1).
- (d) Special marking required (see 5.2).

6.3 Sub-contracted material and parts. The preparation for delivery 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.

MIL-C-21004B(SH)

6.4 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.

Preparing activity:
Navy - SH
(Project 8110-N267)

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 6, 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 8 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.

(Fold along this line)

(Fold along this line)

DEPARTMENT OF THE NAVY
COMMANDER
NAVAL SEA SYSTEMS COMMAND (SEA 5523)
DEPARTMENT OF THE NAVY
WASHINGTON, DC 20362



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO 12503 WASHINGTON D C

POSTAGE WILL BE PAID BY THE DEPARTMENT OF THE NAVY

COMMANDER
NAVAL SEA SYSTEMS COMMAND (SEA 5523)
DEPARTMENT OF THE NAVY
WASHINGTON, DC 20362



