MIL-R-24159A(SH)
27 September '1983
SUPERSEDING
MIL-R-24159(SHIPS)
11 May 1966
(See 6.5)

## MILITARY SPECIFICATION

## RECEPTACLE, CANISTER, CO2 ABSORBENT

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 This specification covers one type of receptacle having a fan mounted integral with a housing to retain lithium hydroxide canisters used in submarines for absorption of carbon dioxide (C02).
  - 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

J-C-175 - Cable Assembly, Power, Electrical, for 125-Volt, 250-Volt, and 125/250 Volt, 50-60 Hz Equipment.

QQ-E-450 - Electrodes, Welding, Covered: Mild Steel.

TT-P-664 - Primer, Coating, Synthetic, Rust-Inhibiting, Lacquer-Resisting.

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.

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 55Z3, 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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MILITARY	
MIL-P-116	Preservation, Methods of.
MIL-S-901	Shock Tests, H.I. (High-Impact), Shipboard Machinery, Equipment and Systems, Requirements for.
MIL-E-917	Electric Power Equipment, Basic Requirements for (Naval Shipboard Use).
MIL-S-3950	Switches, Toggle, Environmentally Sealed, General Specification for.
MIL-F-5504	Filters and Filter Elements, Fluid Pressure, Hydraulic Micronic Type.
MIL-L-10547	Liners, Case, and Sheet, Overwrap; Water-Vapor- proof or Waterproof, Flexible.
DOD-P-15328	Primer, (WASH) Pretreatment, (Formula No. 117 for Metals).
MIL-M-17059	Motors, 60 Cycle, Alternating-Current, Fractional HP (Shipboard Use).
DOD-P-17545	Primer Coating, Alkyd-Red Lead Type, Formula No. 116 and Formula No. 116A.
MIL-C-21004	Canister, Lithium Hydroxide, Screened Ends, Friction Type Covers.

#### STANDARDS

#### MILITARY

MIL-STD-129 Marking for Shipment and Storage.

MIL-STD-167-1 - Mechanical Vibrations of Shipboard Equipment (Type I - Environmental and Type II - Internally Excited).

MIL-STD-278 - Fabrication Welding Inspection; and Casting
Inspection and Repair for Machinery; Piping and
Pressure Vessels in Ships of the United States
Navy.

(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.

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.)

(Industry association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

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 <u>First article</u>. When specified (see 6.2.1), a sample shall be subjected to first article inspection (see 4.3 and 6.3).
- 3.2 <u>Materials</u>. Materials forming a part of the finished product shall be for the purpose intended. The materials shall be free from any-defects that might affect the serviceability or appearance of the finished product. Materials shall be in conformance with the requirements specified herein. Bolts, nuts, studs, screws and other such fastenings or fittings as may be used shall be of a corrosion-resisting material, or of a material treated in a manner to render it resistant to corrosion. Self-tapping screws with sheet metal threads shall not be used. Gaskets shall be fabricated of a good commercial gasket material and shall be a single piece. Screen material shall be 12 by 12 mesh and fabricated of 0.032-inch diameter steel wire and galvanized or zinc coated. Materials not specified hereinafter shall be selected on the basis of meeting the performance requirements specified herein.
- 3.2.1 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.
- 3.3 General design. The arrangement and construction of the  $CO_2$  absorbent canister receptacle shall be as shown on figure 1. It shall accommodate five standard lithium hydroxide canisters as specified in MIL-C-21004 and shall incorporate a removable filter assembly. The canisters shall be arranged in a circular configuration and enclosed in a cylindrical casing. An electric motor with a fan wheel shall be mounted in the center of the housing and arranged so that air is drawn through the CO2 absorbent canisters and discharged to the atmosphere. The filter core shall have a by-pass valve arranged in such a manner that the filter will collect any loose particles of lithium hydroxide when the canisters are being installed or replaced. Spring loaded clamps shall be provided to hold the canisters securely in place. A gasket shall be provided between the filter cap and the filter plenum top to prevent air leakage around the filter. Circular screens shall be provided over each of the five openings in the casing plenum. One screen shall be removable for access to the plenum. The receptacle shall be provided with two lifting handles located diametrically opposite and arranged so as not to project beyond the outside periphery of the casing. The motor and fan wheel assembly shall be provided with removable cover

plates for easy access. Three rubber bumpers or other means shall be provided on the bottom of the casing to prevent chafing. The receptacle shall operate continuously in a maximum of 50 degrees Celsius ( $^{\circ}$ C) ambient temperatures. The total weight of the receptacle without canisters shall not exceed 100 pounds.

- 3.3.1 Casing. Casings" shall be fabricated from No. 16 gage steel, hot-dipped galvanized or electroplated with zinc and shall be made air tight.
- 3.3.2 Fan and motor assembly. The assembly shall deliver a minimum of 60 cubic feet per minute with the canisters installed. The fan motor shall be so mounted as to minimize vibration and noise.
- $3.3.2.1~{\tt Motor.}$  The motor shall be in accordance with MIL-M-17059 and shall conform to the following:

Service	A
Rating	1/4 horsepower (hp)(min)
Enclosure	Spraytight
Voltage	115 V a.c.
Frequency	60 hertz
Phase	Single
Speed	Constant
Bearings	Ball
Duty	Continuous
Insulation	Class B or F; motor temperatures not to
	exceed temperature rise for class B
	insulation shown under 50°C in accordance
	with MIL-M-17059
Ambient	50°c

- 3.3.2.2 Fan. The fan wheel shall be constructed of aluminum and shall achieve the desired air flow as specified herein.
- 3.3.3 Filter. The filter shall be a hydraulic micronic type, similar to AN Part No. conforming to MIL-F-5504 except that it need not be subjected to the tests specified in MIL-F-5504. The filter shall be accessible for examination, cleaning, or replacement
- 3.3.4 Electrical equipment. The electrical equipment shall conform to MIL-E-917 and as specified herein.
- 3.3.4.1 Control. A single pole, single throw "on-off" switch conforming to MIL-S-3950 'e provided to start and stop the unit. The switch shall be mounted in a readily accessible space near the motor assembly housing. A label plate shall be provided to indicate the "on" and "off" position of the switch .
- 3.3.4.2 Wiring. The wiring between the electrical devices shall conform to the requirements of MIL-E-917. The wiring shall be complete with a power cable and a bladed plug, type 1 in accordance with J-C-175 with size 14 conductors. Cable shall be 25 feet, plus or minus 6 inches long. The unit shall be ready for connection to the power source. Electrical terminals shall be protected against moisture, mechanical damage and accidental contact by personnel.

- 3\*3\*4\*3 Terminal strip. A terminal strip with ground shall be provided and mounted in the unit.
- 3.4 Shock. The receptacle assembly shall be capable of passing the high-impact shock test specified in MIL-S-901 (see 4.6.2).
- 3.5 <u>Welding</u>. The surfaces of all parts to be welded shall be free from rust, scale, paint, grease and other foreign matter. All welding shall be in accordance with MIL-STD-278.
- 3.5.1 Where zinc-coated steel is used for fabricating parts, the metallic zinc shall be removed from all joints and surfaces on which welds are to be deposited and for a distance of 1/2-inch from the expected toes of the welds. In areas where the metallic zinc cannot be removed and it is necessary to weld over the zinc-coated surfaces, electrode type 6010 in accordance with QQ-E-450 shall be used.
- 3.6 Finish. Zinc coated surfaces including welds and areas damaged by shearing, punching, bending, welding, or any other fabricated process, shall receive a thorough wash and a hot phosphate acid treatment, or a pretreating coating in accordance with DOD-P-15328, prior to applying one coat of primer conforming to TT-P-664 or DOD-P-17545 and at least two final coats of gray enamel.
- 3.7 <u>Identification and information plates</u>. Each receptacle assembly shall be provided with an identification plate not to exceed 4 by 3 inches. The type of markings for the letters shall be Gothic capitals, and numerals and other characters shall be of similar appearance. The size of letters, numerals and other characters shall be necessary for easy readability. The plate shall be of the anodized aluminum photographic process type.
- 3.7.1 <u>Identification plate</u>. The identification plate shall contain the following information:
  - (a) Item name.
  - (b) Air capacity.
  - (c) Current and voltage rating.
  - (d) Federal stock number.
  - (e) Component identification number (CID).
  - (f) Contract number.
  - (q) Manufacturer's name and address.
  - (h) Weight.
- 3.7.2 <u>Information plates</u>. Information plates (operating instructions) shall be provided as shown on figure 1.
- 3.8 <u>Drawings</u>. Drawings shall be in accordance with the data ordering document specified in the contract (see 6.2.2).
- 3.9 <u>Workmanship</u>. Sharp edges, burrs and other Imperfections shall be removed from all parts subject to contact with personnel to prevent cuts during repair and maintenance.

- 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 Classification of inspections. The inspection requirements specified herein are classified as follows:
  - (a) First article inspection (see 4.3).
  - (b) Quality conformance inspection (see 4.4).
- 4.3 First article inspection. Unless otherwise specified (see 6.3), first article inspection shall be performed on one unit (see 3.1). The inspection shall consist of the examination of 4.5 and the tests of 4.6.
- 4.4 Quality conformance. Quality conformance inspection shall be selected in accordance with 4.4.2 and shall consist of the examination of 4.5 and the test of 4.6.1.
- 4.4.1 Lot. Receptacles offered for delivery at one time shall be considered a lot for purposes of quality conformance inspection.
- 4.4.2 <u>Sampling for examination</u>. A random sample of receptacles shall be selected from each lot in accordance with table I and shall be subjected to the examination specified in 4.5.

TABLE I. Sampling for examination.

AQL (approx) 1.5 percent defective			
Lot size Number of units	Sample size Number of units	Acceptance number	Rejection number
l to 6 7 to 15 16 to 25 26 to 40 41 to 65 66 to 110 111 to 180 181 to 300 301 to 500	All 7 10 13 17 22 28 35 45	0 0 0 1 1 2 2 2	1 1 1 2 2 2 3 3 3

4.5 Examination. Each sample, selected in accordance with table I, shall be visually examined to determine conformance with this specification. The classification of possible defects in table II is the minimum that is to be considered in the examination. Any receptacle in the sample containing one or more defects shall not be offered for delivery and if the number of defective units in any sample exceeds the acceptance number for the sample, this shall be cause for rejection of the lot represented by the sample.

TABLE 11. <u>Classification of defects</u>.

Categories	Defects
Critical:	None defined.
Major:	
101	Incomplete, component parts missing or improperly assembled.
102	Materials defective or not as specified.
103	Limiting dimension exceeded.
104	Welding incomplete, not. free of cracks, nonfusion, heavy porosity, Welding not in accordance with MIL-STD-278.
105	Drawing not followed.
106	Bolts, nuts and screws not tight, missing (parts shall be
	properly fastened and secured).
107	Painting (as applicable) nonconforming.
108	Surfaces not smooth, evidence of sharp edges or burrs.
109	Marking, identification and information plate not complete, missing, not permanent, illegible or not as specified

## 4.6 <u>Tests</u>.

- 4.6.1 Operational test. Each receptacle shall be energized to conform to the requirements specified herein. Electrical metering equipment shall be connected in the circuitry to demonstrate that current and voltage is within rated values and that no shock hazard exists. Evidence of improper electrical operation or personnel hazard and inability of the unit to deliver the proper air quantity shall be cause for rejection.
- 4.6.2 Shock. The receptacle shall be subjected to the grade A, class 1, type A, lightweight H.I. shock test in accordance with MIL-S-901 as specified in 3.4. For the purposes of the shock test, the three rubber bumpers on the bottom of the casing shall be removed and replaced with 1-inch diameter by 3/4-inch thick steel stand-offs. The receptacle shall then be bolted solidly to the mounting shelf of the lightweight high impact shock machine with three 1/4-20 NC hex-socket-head cap screws. The test shall be conducted subsequent to tests specified in 4.6.3. Evidence of fragmentation or missile effect of parts, deformation that will cause active interference between parts, or leakage shall be cause for rejection.
- 4.6.3 <u>Air flow</u>. An anemometer, pressure gage, or other measuring device shall be used for the purpose of determining the air flows. The measurements shall be made with the canisters and filter in place.

4.7 <u>Inspection of packaging.</u> 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-Sampling shall be in accordance with table I.

#### 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 Preservation. Preservation shall be level A or C, (see 6.2.1).
- 5.1.1 Level A. Receptacles shall be cleaned, dried and individually unit protected in accordance with method 1A-14 of MIL-P-116.
- 5.1.1.1 <u>Unit containers</u>. Unit containers shall conform to PPP-B-636 or PPP-B-640 with class, type and style and container selection at the option of the contractor. Container closure shall conform to the applicable specification or appendix thereto, with method I closure applicable to PPP-B-636 class domestic boxes and method V closure applicable to PPP-B-636 class weather resistant boxes. Metal staples shall not be used for box closure.
- 5.1.2 Level C. Receptacles shall be individually preserved to afford protection against corrosion, deterioration and physical damage during shipment from the supply source to the first receiving activity for immediate use. The contractors normal retail or wholesale packaging methods may be used 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 <u>Level A.</u> Receptacles preserved as specified (see 6.2.1), shall be packed for containers conforming to any one of the following specifications at the option of the contractor:

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

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 manufacturer's joints are sealed and waterproofed with pressure sensitive tape in accordance with the applicable container 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 reinforced filament tape or nonmetallic bonding applied in accordance with the appendix to the applicable

fiberboard box specification in lieu of metal 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. Fiberboard boxes conforming to class weather-resistant (see 5.1.1.1), closed, sealed and bonded as specified herein may be used as the shipping container.

- 5.2.2 Level B. Receptacles preserved as specified (see 6.2.1), shall be packed as specified for level A (see 5.2.1) except that containers shall conform to the domestic type or class, case liners and strapping are not required and method I closure shall apply for PPP-B-636 boxes.
- 5.2.3 <u>Level C.</u> Receptacles, preserved as specified (see 6.2.1), shall be 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 comply with Uniform Freight or National Motor Freight Classification Rules and Regulations or other carrier rules as applicable to the mode of transportation
- 5.3 <u>Marking</u>. In addition to any special marking required (see 6.2.1), interior packages and exterior shipping containers shall be marked in accordance with MIL-STD-129 and MIL-P-116 as applicable.
  - 6. NOTES
- 6.1 <u>Intended use</u>. This receptacle is intended to retain lithium hydroxide canisters used in submarines for absorption of carbon dioxide (CO<sub>2</sub>)0
  - 6.2 Ordering data.
- 6.2.1 Acquisition requirements. Acquisition documents should specify the following:
  - (a) Title, number, and date of the specification.
  - (b) First article sample when required (see 3.1 and 6.3).
  - (c) Levels of preservation and packing required (see 5.1 and 5.2).
  - (d) When case liners are required (see 5.2.1).
  - (e) Special marking required (see 5.3).
- 6.2.2 <u>Data requirements</u>. 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.

Paragraph no.	Data requirement title	Applicable DID no.	<u>Option</u>
3.8	Drawings, engineering and associated lists	DI-E-7031	Level 3 Design activity designation- contractor Design activity drawing number - contractor
4.3	Report, first article test	UDI-T-23790	

(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.)

- 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 First article inspection Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection as 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.
- 6.4 <u>Sub-contracted material and parts</u>. The preparation for delivery requirements of referenced documents listed in section 2 do not apply when the 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 <u>Changes from previous issue</u>. 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 4240-N776)

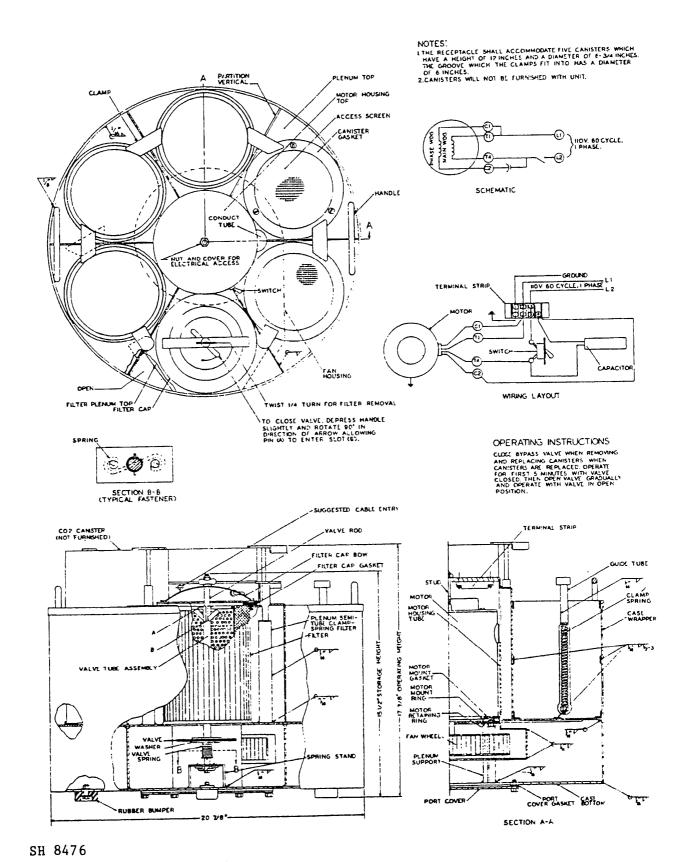


FIGURE 1. CO2 absorbent can ister receptacle.

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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)		
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		VENDOR
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c. Resson/Rationale for Recomm	endetion:	
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7a. NAME OF SUBMITTER (Last, F	irst. MI) - Optional	b. WORK TELEPHONE NUMBER (Include A
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