OCEAN ENGINEERING DIVISION

UNITED STATES COAST GUARD

WASHINGTON, D.C.

DECEMBER 2000

SPECIFICATION FOR FABRICATION OF PLASTIC AIDS TO NAVIGATION BATTERY BOXES

SPECIFICATION NO. 199

REVISION J

1. SCOPE

1.1 Scope. This specification defines the requirements for the fabrication of plastic battery boxes used to house and protect batteries on lighted aids to navigation structures. The items covered by this specification are as follows:

- Large Battery Box Assembly (Top and Bottom Half)
- Small Battery Box Assembly (Top and Bottom Half)
- Large Battery Box Top
- Small Battery Box Top

1.2 Government Furnished Property. The Government will provide aluminum molds for the large battery box bottom half, large battery box top half, small battery box bottom half, and small battery box top half (one mold each). The Government will provide the molds to the Contractor as government furnished property (GFP). For information purposes, the applicable National Stock Numbers (NSN) for the molds are listed below.

MOLDS	STOCK NUMBER
Large Battery Box, Top and Bottom (2 Molds)	NSN 6140-00-G00-3749
Small Battery Box, Top and Bottom (2 Molds)	NSN 6140-01-GG0-1032

The Government will ship the molds to the Contractor's facility. The Contractor shall be responsible for any reconditioning required on the molds for the duration of the contract. Upon completion of the contract, the Contractor shall return the molds in the same condition as received. At the completion of the contract, the Contractor shall properly pack the molds for shipping and the Government will ship the molds from the Contractor's facility. The Contractor shall make the molds available for inspection by Government personnel for the duration of the contract.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are referenced in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification which are recommended for additional information or used as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements cited in sections 3 and 4 of this specification, whether or not the referenced documents are listed here.

2.2 Government Documents. The following documents form a part of this specification to the extent referenced herein. Suffixes denoting the specific issue of each document are omitted from future references to the documents in this specification.

SPECIFICATIONS

MIL-S-19622/1B 11 DEC 92	Stuffing Tubes, Straight, Nylon, Military Specification Sheet
MIL-S-19622/19D 11 DEC 92	Stuffing Tube, Nylon, Sizes 4 and 4T: Packing Assembly for, Military Specification Sheet

STANDARDS

FED-STD-595B/REV1 Federal Standard Colors
11 JAN 94

2.3 Industry Publications. The following documents of the issues specified form a part of this specification to the extent referenced herein. Suffixes denoting the specific issue of each document will be omitted from future references to the document in this specification.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D256-97	Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
D638-99	Standard Test Method for Tensile Properties of Plastics
D785-98	Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials
D790-99	Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

AMERICAN SOCIETY FOR QUALITY CONTROL (ASQC)

ANSI/ASQC Q9002-1994	Quality Systems - Model for Quality Assurance in Production, Inspection, and Servicing

2.4 Drawings. The latest revision of the following United States Coast Guard Ocean Engineering drawings form a part of this specification to the extent referenced herein, and shall be referred to as "the drawings" throughout this specification:

Drawing Number	Title
121055	A/N Small Battery Box
121065	A/N Large Battery Box

2.5 Source of Documents. The documents may be obtained from the following sources:

Government Documents.

Standardization Documents Order Desk
Building 4, Section D
700 Robbins Avenue
Philadelphia, PA 19111-5094

Industry Publications.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
1916 Race Street
Philadelphia, PA 19103-1187

AMERICAN SOCIETY FOR QUALITY CONTROL (ASQC)
310 West Wisconsin Avenue
Milwaukee, Wisconsin 53203

2.6 Precedence. In the event of a conflict between the text of this document and the references cited herein, 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 Inspection. When specified (paragraph 6.1), plastic battery boxes shall be subjected to first article inspection in accordance with paragraph 4.3.

3.2 Material. The boxes shall be molded from a plastic composite consisting of an Acrylonitrile-Butadiene-Styrene (ABS) substrate with a cap layer of Acrylonitrile-Styrene-Acrylate (ASA). The ASA plastic shall make up the external portion of the box. The ABS and ASA plastics shall meet the minimum requirements listed below.

3.2.1 ABS Plastic. The ABS plastic shall have the following **minimum** property requirements in accordance with the specified ASTM specification:

PROPERTY	REQUIREMENT	ASTM SPECIFICATION
Tensile Strength, yield Type I, .125”	5,400 psi	D-638
Tensile Modulus, Type I, .125”	310,000 psi	D-638
Flexural Strength, yield, .125”	9,600 psi	D-790
Flexural Modulus, .125”	300,000 psi	D-790
Hardness, Rockwell	99 psi	D-785
Izod Impact, Notched, 73°F	8.4 ft-lb/in	D-256
Izod Impact, Notched, -40°F	4.5 ft-lb/in	D-256

3.2.2 ASA Plastic. Coextruded onto the ABS substrate shall be ASA plastic. The ASA plastic shall be at least 0.010 inches thick measured prior to forming. The ASA plastic shall have the following **minimum** property requirements in accordance with the specified ASTM specification:

PROPERTY	REQUIREMENT	ASTM SPECIFICATION
Tensile Strength, yield Type I, .125”	4,600 psi	D-638
Tensile Modulus, Type I, .125”	230,000 psi	D-638
Flexural Strength, yield, .125”	7,500 psi	D-790
Flexural Modulus, .125”	240,000 psi	D-790
Hardness, Rockwell	89 psi	D-785
Izod Impact, Notched, 73°F	6.5 ft-lb/in	D-256
Izod Impact, Notched, -40°F	1.7 ft-lb/in	D-256

3.3 Design and Construction.

3.3.1 Design, Dimensions, and Dimensional Tolerances. All items shall conform to the design, dimensions, and tolerances shown in the drawings.

3.3.2 Color . The ASA portion of the box shall be white (Federal Color Number 17875) in accordance with Federal Standard 595. This white color shall be homogeneous throughout the thickness of the ASA plastic. The ABS substrate shall be either gray or black. The gray or black colors shall be homogeneous throughout the thickness of the ABS plastic substrate.

3.3.3 Finish. The exterior surface of the box shall be smooth and have a gloss luster finish. The finish shall be uniform and shall not exhibit streaks or discoloration from the substrate.

3.3.4 Workmanship. The finished box shall be uniform in color and shall be free from defects such as cracks, wrinkles, ripples, creases, pits, bubbles, sharp edges, and all other imperfections that would adversely affect appearance or serviceability.

3.3.5 Stuffing Tube and Packing Gland. Each battery box bottom section shall have a plastic stuffing tube and rubber packing gland. The stuffing tube shall meet the requirements of MIL-S-19622/1B, size 4T (pin M19622/1-005). The rubber-packing gland shall meet the requirements of MIL-S-19622/19D, size 4T (pin M19622/19-0004). The stuffing tube and packing gland shall be placed in a small bag and securely taped inside the bottom section to prevent loss during shipment.

3.3.6 Locking Device. Snap action locking bosses shall be located on the battery box top flange as shown on the drawings. These shall snap firmly under the bottom flange.

3.3.7 Ventilation and Drainage. As shown in the drawings, a slot shall be located on each side of the bottom flange to provide for ventilation. Two half-inch diameter drain holes shall be located in the box bottom as shown in the drawings. A plastic coated, fibrous glass insect screen shall cover the ventilation slots and drainage holes. The mesh size and nominal filament diameter size of the screening used shall be one of the sizes listed below. All filament sizes listed below shall have a permissible variation in the average diameter of the filament of ±25%. The screen selected shall be attached to the battery box by a permanent adhesive suitable for use in a marine environment that cures at room temperature. This adhesive shall not contain any solvents which might craze the ABS or ASA plastic.

MESH SIZE OF SCREENING*	**NOMINAL FILAMENT DIAMETER (inch)**
16x16	0.0130
18x16	0.0150
18x18	0.0150
20x20	0.0150

* Openings per linear inch

3.3.8 Assembly. The gap between the inside of the top flange and the outside of the bottom flange of the assembled box shall not be greater than 0.125 (1/8th) inch at any

point on the circumference of the box. Metal flanges, clamps, or other appurtenances shall not be used.

3.3.9 Nesting. The finished box components of each size shall nest together without sticking, wedging, splitting, or cracking.

3.4 Marking.

3.4.1 Identification Marking. For tracking purposes, each item shall be identified by an identification marking. The marking shall be stamped, engraved, or otherwise permanently affixed to each item. The marking shall consist of ½ inch tall block alphanumeric characters and shall be clearly visible. The marking shall be of the form "00-XX." The first two digits shall be the last two digits of the calendar year built and the last two letters shall be the Contractor's designation, which will be furnished by the Contracting Officer after contract award.

3.4.2 Serial Number. For inspection purposes, the Contractor shall assign each item a unique serial number. The serial number shall be stamped, engraved, or otherwise permanently affixed to each item. The serial number shall consist of ½ inch tall block alphanumeric characters and shall be clearly visible.

3.5 Documentation.

3.5.1 Quality Assurance Inspection Form. The Contractor shall develop and provide a Quality Assurance Inspection Form (QAIF). The QAIF shall be used to document the inspections and tests performed during the fabrication process. The form shall be printed on standard (i.e., 8½ x 11 inch) white paper. Inspection results may be handwritten on the form. The form shall be prepared in the Contractor's format and shall be legible, in English, and suitable for reproduction. The Contractor shall maintain the QAIF's on file and make them available for review by the Contracting Officer's Technical Representative (COTR).

3.5.1.1 QAIF Content. At a minimum the QAIF shall include:

a) Item serial number.
b) Date of test or inspection.
c) Test or inspection to be performed (list every test and inspection required by paragraph 4.6).
d) Result of test or inspection.
e) Accept/Reject criteria for each test or inspection.
f) Corrective action taken (if any).
g) Notes.
h) Initials or signatures of Contractor's test personnel.

3.5.2 Material Certifications. The Contractor shall furnish material certifications, either from the material manufacturers or an independent testing laboratory, to the effect that all of the material described in paragraphs 3.2.1 and 3.2.2 have been tested and found to meet the requirements of the applicable sections of this specification. The Contractor shall maintain the material certifications on file and make them available for review by the COTR.

3.5.3 Material Inspection and Receiving Report (DD Form 250). A form DD-250 shall be used as a certification of product quality assurance, as a packing list, and as a

certification of acceptance. The Contractor shall prepare a separate DD-250 for each shipping lot. Prior to shipment, the DD-250 must be signed by the COTR.

4. VERIFICATION

4.1 General. The Contractor's quality assurance program shall meet the requirements of ANSI/ASQC Q9002. However, the Contractor does not have to be Q9002 certified.

4.1.1 Quality Assurance and Control Plan. A quality assurance and control plan shall be provided to the Contracting Officer prior to commencing production of the first articles. The plan shall describe the Contractor's quality assurance program in terms of meeting the requirements of ANSI/ASQC Q9002.

4.1.2 Test Plan and Procedures. The Contractor shall develop and provide a test plan to the Contracting Officer for first article and production items. The plan shall describe how the tests and inspections in paragraph 4.6 shall be performed and documented on the QAIF described in paragraph 3.5.1.

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

a. First article inspection (paragraph 4.3)
b. Contractor production inspection (paragraph 4.4)
c. Coast Guard production inspection (paragraph 4.5)

4.3. First Article Inspection. When first articles are required (see paragraphs 3.1 and 6.1), the Contractor shall perform the tests and inspections listed in paragraph 4.6 on each of the first articles.

4.3.1 First Article Tests and Inspections Notification. The Contractor shall notify the Contracting Officer in writing at least 7 calendar days prior to the scheduled commencement of any first article inspections and tests required by this specification.

4.3.2 Waiver of First Article Requirements. The Contracting Officer reserves the right to waive all or part of the first article requirements specified herein.

4.3.3 Rejection Criteria. The results of the first article inspection will be reviewed by the Contracting Officer to determine compliance with the requirements of this specification. Failure of any of the tests or inspections described herein will be cause for rejection of the first article. If the first article is rejected, the Contractor will be notified in writing by the Contracting Officer and allowed 14 calendar days to fix the defects or resubmit a new first article. Repair or replacement of the first article shall be by the Contractor at the Contractor's expense.

4.3.4 Authorization to Proceed. Upon successful completion of the first article inspection, the Contracting Officer will provide the Contractor with written authorization to begin fabricating production quantities.

4.3.5 Standardization. Materials, parts, design, and fabrication methods used in the production quantities shall be identical to those used in the first articles, unless otherwise authorized in writing by the Contracting Officer.

4.4 Contractor Production Inspection. The tests and inspections required by this specification are not intended to supplant any controls, examinations, inspections, or tests normally employed by the Contractor to assure product quality. The Contractor shall perform the tests and inspections specified in paragraph 4.6 to ensure conformance to this specification. The Contractor shall provide space, personnel, and test equipment to conduct all inspection and test requirements.

4.5 Coast Guard Production Inspection. The Coast Guard reserves the right to observe, verify, or perform the tests and inspections outlined in paragraph 4.6.

4.6 Tests and Inspections. The following tests and inspections shall be conducted for each first article unit and subsequent production units.

a. Visual Inspection (paragraph 4.6.1)
b. Nesting Test (paragraph 4.6.2)
c. Material Thickness Inspection (paragraph 4.6.3)
d. Material Composition Inspection (paragraph 4.6.4)
e. Documentation Review (paragraph 4.6.5)

4.6.1 Visual Inspection. Each item shall be visually inspected to verify compliance with paragraphs 3.3.1 through 3.3.8, 3.4.1, and 3.4.2. Items failing this visual inspection shall be rejected.

4.6.2 Nesting. Four each battery box tops and four each battery box bottoms of the same size shall be nested together. Each nested stack shall be turned with the flanges facing up. In this orientation, they shall be lifted at least 5 feet from the floor and dropped. This operation shall be repeated five times. Following the drop, the box halves shall be undamaged and shall unnest without the use of a prying tool and without sticking to the extent that any box is damaged while unnesting. At a minimum, this test shall be performed at the beginning, middle, and end of production for each delivery order. If any item fails this test, the item shall be rejected. The test shall then be carried out on all items manufactured since the date of the last successful test for the delivery order. All items failing this test shall be rejected.

4.6.3 Material Thickness Inspection. Verification of material thickness shall be by one of two methods:

Method 1 (Preferred). The Contractor shall provide a calibrated device capable of measuring the thickness to the tolerances specified without cutting the battery boxes.

Method 2. The bottoms and tops shall be cut from side to side or corner to corner at the COTR's discretion. Using a micrometer, the thickness of the battery box shall be measured at selected points along the cutting lines. Any battery box(es) destroyed as a result of the testing or inspection procedures shall not be included as deliverables under the contract.

At a minimum, this test shall be performed at the beginning, middle, and end of production for each delivery order. If any item fails this test, the item shall be rejected. The test shall then be carried out on all items manufactured since the date of the last successful test for the delivery order. All items failing this test shall be rejected.

4.6.4 Material Composition Inspection. The material certifications required by paragraph 3.5.2 shall be reviewed for compliance with this specification. All items manufactured

with material that fails to comply with the requirements of paragraphs 3.2.1 and 3.2.2 shall be rejected. Rejected items shall not be resubmitted for testing.

4.6.5 Documentation Review. The documentation required by paragraphs 3.5.1 and 3.5.3 shall be reviewed for conformance with this specification.

4.7 Rejection for Defects. The Coast Guard will reject all items which do not conform to the requirements of this specification. Repair or replacement of the rejected items shall be by the Contractor at the Contractor's expense. All rejected items shall be resubmitted for inspection only when they conform to the requirements of this specification. Resubmitted items shall be identified as such, and shall be kept separate from new items. If defective items are found, no further items will be accepted by the Coast Guard until the Contractor has demonstrated that the defects have been corrected and that the cause of the defects has been eliminated from the production process.

5. PACKAGING

5.1 Packaging requirements are specified in Section D, Part I, Contract Schedule.

6. NOTES

6.1 First Article Inspection. The type and quantity of first articles required will be listed in Section B, Part I, Contract Schedule. A first article inspection shall be performed by the Contractor and at the Contractor’s facility. The first articles shall meet the requirements of this specification and shall pass all the tests and inspections listed in paragraph 4.6.

SPECIFICATION NO. 199J - FABRICATION OF PLASTIC AIDS TO NAVIGATION BATTERY BOXES

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