INCH-POUND
MIL-R-24719(SH)
4 May 1989

MILITARY SPECIFICATION

RESINS, VINYL ESTER, LOW PRESSURE LAMINATING

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 requirements for epoxy-based, vinyl ester resins suitable for lamination of boat hulls and other Naval applications.

1.2 Classification. Resin shall be of the following grades and classes, as specified (see 6.2).

Grade A - General purpose.
Grade B - Fire retardant.
Class 1 - For use with glass fiber reinforcement.
Class 2 - For use with Aramid fiber reinforcement.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standard. The following specifications and standard 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).

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 20362-5101 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 9330

SPECIFICATIONS

FEDERAL

PPP-P-320 - Fiberboard; Corrugated and Solid, Sheet Stock (Container Grade), and Cut Shapes.

PPP-P-1892 - Paint, Varnish, Lacquer, and Related Materials; Packaging, Packing and Marking of.

MILITARY

MIL-L-19140 - Lumber and Plywood, Fire Retardant Treated.

MIL-C-19663 - Cloth, Woven Roving, for Plastic Laminate.

STANDARD

FEDERAL

FED-STD-313 - Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities.

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

2.2 Non-Government publications. The following documents form a part of this document 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 cited 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)

C 581 - Standard Practice for Determining Chemical Resistance of Thermosetting Resins Used in Glass Fiber Reinforced Structures Intended for Liquid Service.

C 582 - Standard Specification for Contact-Molded Reinforced Thermosetting Plastic (RTP) Laminates for Corrosion-Resistant Equipment.

D 638 - Standard Test Method for Tensile Properties of Plastics. (DoD adopted)

D 648 - Standard Test Method for Deflection Temperature of Plastics Under Flexural Load. (DoD adopted)

D 790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials. (DoD adopted)

D 792 - Standard Test Methods for Specific Gravity (Relative Density) and Density of Plastics by Displacement. (DoD adopted)

D 2344 - Standard Test Method for Apparent Interlaminar Shear Strength of Parallel Fiber Composites by Short-Beam Method. (DoD adopted)

D 2471 - Standard Test Method for Gel Time and Peak Exothermic Temperature of Reacting Thermosetting Resins.

ASTM (Continued)

D 2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor. (DoD adopted)

D 2584 - Standard Test Method for Ignition Loss of Cured Reinforced Resins. (DoD adopted)

D 2734 - Standard Test Methods for Void Content of Reinforced Plastics. (DoD adopted)

D 2849 - Standard Methods of Testing Urethane Foam Polyol Raw Materials.

D 3643 - Standard Test Method for Acid Number of Certain Alkali-Soluble Resins.

E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials. (DoD adopted)

(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, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained by the resin manufacturer.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.4) in accordance with 4.3.

3.2 Material. The resin shall be an epoxy-based, translucent, thermosetting vinyl ester resin suitable for hand lay-up laminating of glass or Aramid fiber reinforcement. Grade B resin shall, in addition to the characteristics of grade A resin, be a halogenated (chemically-bound), fire retardant resin.

3.2.1 Cure. When mixed with appropriate accelerator or promoter and catalyst in accordance with the manufacturer's instructions (see 3.4), the liquid resin shall cure at room temperature (55 to 95 degrees Fahrenheit (°F)) and remain translucent.

3.2.2 Additives. Resin additives shall meet the following requirements specified in 3.2.2.1 through 3.2.2.3.

3.2.2.1 Class 1 resin. Additives which affect the translucency of the glass fiber laminate and preclude visual inspection shall not be used.

3.2.2.2 Thixotropic agents. A thixotropic agent of the type and quantity in accordance with the resin manufacturer's instructions may be used as necessary to minimize drainage, provided there is no deleterious effect on resin properties. It may be supplied pre-mixed with the resin by the resin manufacturer.

3.2.2.3 Tack-free surface. A small quantity of material may be added to the laminate surface coat, as recommended by the manufacturer, in order to obtain an air-curing (non-air inhibited) surface.

3.3 Toxic products. The material shall have no adverse effect on the health of personnel when used for its intended purpose. Questions pertinent to this effect shall be referred by the contracting activity to the Naval Medical Command (NAVMEDCOM) who will act as an advisor to the contracting activity.

3.3.1 Material safety data sheet (MSDS). The contracting activity shall be provided a material safety data sheet at the time of contract award. The MSDS shall be provided in accordance with the requirements of FED-STD-313. The MSDS shall be included with each shipment of the material covered by this specification (see 6.6).

3.4 Instructions for use. The resin manufacturer shall provide detailed instructions for use of the material with each container. The instructions shall cover the following:

(a) Storage conditions and shelf life.
(b) Resin, promoter or accelerator, and catalyst proportions to achieve room temperature cure with the specified working life.
(c) Additives (see 3.2.2).
(d) Mixing procedures.
(e) Specific suitable reinforcements and surface finishes, and specific combinations, as applicable.
(f) Any other information necessary for proper use.
(g) Safety precautions.

3.5 Identification. The resin manufacturer shall identify each specific resin system by name or code number and with appropriate grade and class under this specification (see 1.2).

3.6 Shelf life. The resin system supplied shall have a shelf life of not less than 3 months.

3.7 Liquid resin. The uncured resin shall have the properties specified in table I for first article inspection. Quality conformance inspection results shall be within the range shown in table I.

TABLE I. Liquid vinyl ester resin.

Property	Requirements	
	First article	Quality conformance
Specific gravity (min) at 77°F (25°C)	1.02 (grade A) 1.14 (grade B)	± 2% of actual first article value ± 2% of actual first article value
Viscosity range at 77°F (25°C) cp (dPa)	350 to 800 (3.5 to 8)	Within the range
Gel time (minutes)	As determined	± 15% of first article value
Acid number	As determined	± 20% of first article value
Styrene content range (percent by weight)	As determined	± 2% of first article value

3.7.1 Cured clear resin coating. When cured under room temperature conditions, the resin shall have the properties specified in table II.

TABLE II. Cured vinyl ester resin (1/8-inch thick clear casting).

Property	Requirements
Specific gravity (min) at 77°F (25°C)	1.12 (grade A) 1.24 (grade B)
Tensile strength (min) lb/in^2 (MPa)	10,000 (69)
Flexural strength (min) lb/in^2 (MPa)	15,000 (103)
Flexural modulus (min) lb/in^2 (GPa)	450,000 (3.1)
Heat distortion temperature (min) °F (°C)	200 (93.3) (grade A) 210 (98.9) (grade B)
Barcol hardness (min)	30 (grade A) 35 (grade B)
Elongation to failure percent (min)	4.0

3.7.2 Glass fiber reinforced laminate (for class 1 and 2 resins). Laminates of 1/4-inch (6.35 millimeters (mm)) thickness, conforming to ASTM C 582 shall meet the requirements of table III.

TABLE III. Glass fiber reinforced laminate (for class 1 and 2 resins).

Property	Requirement
Tensile strength - room temperature lb/in^2 (MPa) (min)	15,000 (103)
Tensile modulus - room temperature lb/in^2 (GPa) (min)	1.4×10^6 (9.7)
Tensile strength 200°F (93°C) lb/in^2 (MPa) (min)	15,000 (103)
Tensile modulus 200°F (93°C) lb/in^2 (GPa) (min)	1.0×10^6 (6.89)
Flexural strength - room temperature lb/in^2 (MPa) (min)	23,000 (159)
Flexural modulus - room temperature lb/in^2 (GPa) (min)	1.0×10^6 (6.89)
Flexural strength 200°F (93°C) lb/in^2 (MPa)	20,000 (138)
Flexural modulus 200°F (93°C) lb/in^2 (GPa)	0.75×10^6 (5.5)
Glass content percent (max)	40

3.7.3 Fire resistance (grade B). Unfilled translucent laminates 1/8-inch thick shall have a maximum flame spread of 50 (see 4.5.6.8).

3.7.4 Chemical resistance. Laminates shall have a maximum recommended use temperature of at least 180°F (82 degrees Celsius (°C)) after exposure to the following liquids for a period of 1 year: diesel oil, fuel oil, gasoline, hydraulic fluid, jet fuel, kerosene, motor oil, and seawater (see 4.5.6.9).

3.8 Woven roving reinforced laminates. Laminates conditioned as specified in 4.5.1 shall meet the requirements as specified in table IV. Average values shall meet the minimum requirements in table IV. No individual specimen tested for mechanical strength (see 4.5.6.2, 4.5.6.3, and 4.5.6.7) shall indicate a value lower than 80 percent of the average of the results of the five specimens tested for the property. No individual specimen tested for void content (see 4.5.4) shall exceed the maximum percentage specified in table IV.

TABLE IV. Woven roving reinforced vinyl ester laminates.

Property	Requirement	
	Class 1	Class 2
Resin content (percent min)		
Grade A	43	50
Grade B	45	52
Void content (percent max)	3	4
Tensile strength (min) $lb/in^2 \times 10^3$ (MPa)	42.0 (291)	54.4 (375)
Tensile modulus (min) $lb/in^2 \times 10^6$ (GPa)	2.25 (15.6)	2.50 (17.4)
Flexural strength (min) $lb/in^2 \times 10^3$ (MPa)	45 (313)	27 (186)
Flexural modulus (min) $lb/in^2 \times 10^6$ (MPa)	2.0 (14.9)	2.25 (15.9)
Short-beam shear strength (min) lb/in^2 (MPa)	4000	2700

3.8.1 Accelerated water immersion. Laminates subjected to 48 hours immersion in boiling water shall meet the requirements of table V (see 4.5.7).

TABLE V. Wet properties of woven roving reinforced vinyl ester laminates.

Property	Requirements	
	Class 1	Class 2
Water absorption (percent max)	0.80 (grade A) .60 (grade B)	2.5 2.5
Flexural strength retention (percent min)	70 (grade A) 70 (grade B)	70 (grade A) 70 (grade B)
Flexural modulus retention (percent min)	90	90
Short-beam shear strength retention (percent min)	70 (grade A) 80 (grade B)	70 (grade A) 80 (grade B)

3.9 Workmanship. The resin as supplied shall remain translucent (see 3.2.1), be free of visible contaminants, and contain no lumps or show other signs of partial gelation.

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 (examinations and tests) 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 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 the 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 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. First article inspection shall consist of the tests specified in 4.5 (see 6.3).

4.4 Quality conformance inspection. Quality conformance inspection shall consist of the following inspections:

(a) Lot inspection tests (4.4.3.1).
(b) Comparison tests (4.4.3.2).
(c) Examination of filled containers (4.4.3.3).

4.4.1 Inspection lot. A lot shall consist of a quantity of resin of uniform chemical composition produced under like conditions in one unchanged process by one contractor and presented for acceptance at one time.

4.4.2 Sampling. Sampling for quality conformance shall be as specified in 4.4.2.1 and 4.4.2.2.

4.4.2.1 Sampling for quality conformance inspection. Sufficient material shall be removed from the lot to permit verification of conformance to the inspection requirements specified in 4.4.3.1.

4.4.2.2 Sampling for examination of filled containers. A sample of filled containers shall be selected from each lot in accordance with table VI to verify conformance to this specification regarding inspection requirements not involving tests (see table VII and 6.2).

TABLE VI. Sampling for examination of filled containers.

Major defects	
Lot size	Sample size[1/]
2 - 150	13[2/]
151 - 280	20
281 - 500	29
501 - 1200	34
1201 - 3200	42
3201 - 10000	50
10001 - 35000	60
35001 - OVER	74
Minor defects	
2 - 50	5[2/]
51 - 90	7
91 - 150	11
151 - 280	13
281 - 500	16
501 - 1200	19
1201 - 3200	23
3201 - OVER	29

1/ Inspect sample size until reject criteria is reached.
2/ If lot is smaller than sample size, inspect entire lot.

TABLE VII. Classification of defects.

Defects	Defect	Method of inspection
Major:		
101	Type of container not as specified	Visual
102	Nonuniform resin (see 3.9)	Visual
103	Contaminated resin (see 3.9)	Visual
103	Improper weight	Approved scale[1/]
Minor:		
201	Lack of, or improper instructions for use (see 3.4)	Visual
202	Wrong size container	Visual
203	Container improperly closed	Visual
204	Marking misleading or unidentifiable	Visual

1/ As approved by the contracting activity.

4.4.3 Inspection. Inspection shall consist of the tests specified in 4.4.3.1 through 4.4.3.3.

4.4.3.1 Lot inspection tests. The specific resin formulation to be used by the contracting activity (including promoter, catalyst, and other additives (see 3.2.2)), shall be tested to determine conformance to 3.8 and 3.8.1.

4.4.3.2 Comparison tests. The contracting activity may require that subsequent lots of material be subjected to any or all first article tests. If a lot fails a comparison test, no further lots shall be accepted until the contractor has presented sufficient evidence to show that the condition which caused the failure has been corrected (see 6.3).

4.4.3.3 Examination of filled containers. Sample units of resin shall be visually examined for quality conformance (see 4.4.2.2 and 6.5), and packaging, packing, and marking for the defects shown in table VII.

4.5 Tests. Tests shall be conducted in accordance with 4.5.1 through 4.5.7.

4.5.1 Standard conditions. Standard conditions shall be 73.4 ± 2°F (23 ± 1°C) and 50 ± 4 percent relative humidity.

4.5.2 Test specimens.

4.5.2.1 Reinforcements. For class 1, glass woven roving conforming to MIL-C-19663 shall weigh 24 ounces per square yard (0.81 kilogram per square meter (kg/m^2)). For class 2, Aramid woven roving shall be Kevlar 49 of E.I. DuPont Company, or equal, and shall be style 1350 (basket weave, 25 mils (0.61 mm thick), 26 by 22 ends per inch (10 by 9 ends per centimeter (cm)), 2130 yards per denier (237 tex), 13.5 ounces per square yard (0.46 kg/m^2)). Glass chopped strand mat conforming to Owens Corning M-700, or equal, shall weigh 1 ounce per square foot (0.31 kg/m^2).

4.5.3 Resin content. Resin content of class 1 glass fiber reinforced laminate shall be determined in accordance with the test method as specified in ASTM D 2584. Resin content of class 2 Aramid fiber reinforced laminate shall be estimated as follows using known weights of reinforcements as fabricated:

$$\frac{\text{Weight of laminate - weight of reinforcements}}{\text{Weight of laminate}} \times 100 = \text{resin content (percent)}$$

If applicable, correction shall be made for known amount of additive. For purposes of this document, the resin content subtracted from 100 shall be considered the glass content.

4.5.4 Void content. Void content test for class 1 shall be in accordance with method A of ASTM D 2734. Void content test for class 2 shall be in accordance with method C of ASTM D 2734.

4.5.4.1 Calculations. Void content test for calculations shall be in accordance with method B of ASTM D 2734. The following densities shall be assumed for the calculations: aramid fiber - 1.44 grams per cubic centimeter; glass fiber - 2.54 grams per cubic centimeter; and vinyl ester resin - as determined.

4.5.5 Liquid vinyl ester resin. Liquid vinyl ester resin shall be tested in accordance with 4.5.5.1 through 4.5.5.4.

4.5.5.1 Specific gravity and viscosity range. The specific gravity and viscosity range of liquid vinyl ester resin shall be determined by the test methods as specified in ASTM D 2849 (see table I).

4.5.5.2 Gel time. The time from the initial mixing of the liquid vinyl ester resin until it starts to solidify shall be determined in accordance with ASTM D 2471 (see table I).

4.5.5.3 Acid number. The acid number of the liquid vinyl ester resin shall be determined in accordance with ASTM D 3643 (see table I).

4.5.5.4 Styrene content range. The styrene content range shall be determined as manufactured (see table I).

4.5.6 Cured vinyl ester resin. Cured vinyl ester resin shall be tested in accordance with 4.5.6.1 through 4.5.6.9.

4.5.6.1 Specific gravity. Cured vinyl ester resin shall be tested to determine its specific gravity in accordance with ASTM D 792 (see table II).

4.5.6.2 Tensile strength. The tensile properties of cured vinyl ester resin shall be tested in accordance with ASTM D 638 (see table II).

4.5.6.3 Flexural strength and modulus. The flexural strength and modulus of cured vinyl ester resin shall be tested in accordance with ASTM D 790 (see table II). Specimen shall be 1 inch (2.54 cm) wide. Span to depth ratio shall be 16:1. Tests shall be conducted with the mat face (mold surface) in tension.

4.5.6.4 Heat distortion temperature. The temperature at which a deformation in cured vinyl ester resin occurs shall be tested in accordance with ASTM D 648 (see table II).

4.5.6.5 Barcol hardness. The hardness of cured vinyl ester resin shall be tested in accordance with ASTM D 2583 (see table II).

4.5.6.6 Elongation. The percent of elongation to failure shall be tested in accordance with ASTM D 638 (see table II).

4.5.6.7 Short-beam shear strength. The short-beam shear strength shall be tested in accordance with ASTM D 2344. Span to thickness ratio shall be 4:1. Specimen shall be 1 inch (2.54 cm) wide by 2 inches (5.08 cm) long. Tests shall be conducted with the mat face (mold surface) in tension (see tables IV and V).

4.5.6.8 Fire resistance (grade B). Sample laminates shall be prepared as specified in ASTM C 582, using a type II laminate of a thickness between 0.25 and 0.50 inch. Laminate shall be tested in accordance with ASTM E 84 (see 3.7.3).

4.5.6.9 Chemical resistance. Sample laminates prepared as specified (see 3.7.4) shall be tested in accordance with ASTM C 581 (see 3.7.4).

4.5.7 Woven roving reinforced laminate comparison test. A panel having approximate dimensions 24 by 24 by 1/4-inch thick (61 by 61 by 0.64 cm) shall be fabricated by hand lay-up process using room temperature (70 to 80°F) cure. Gel coat shall not be applied. The laminate shall consist of one surface ply of chopped strand mat on the mold side followed by six plies of woven roving. Specimens shall be prepared without post curing. Fuzzy edges of Aramid specimens, caused by machining, shall be sanded smooth with wet-dry sandpaper. For the accelerated water immersion test, two sets of specimens shall be prepared from a portion of the test panel that has been post cured at 200 to 212°F for 1 to 2 hours. One set shall be tested dry at standard conditions. The set of water immersion specimens shall be weighed before immersion and permitted to cool in the water after the specified immersion time. After cooling to room temperature, they shall be surface dried and immediately weighed to determine the percent of water absorption in the specimens. This shall be followed immediately by flexural and short-beam shear tests. Tests results shall be compared to the initial dry post cured properties (see 3.8.1).

4.6 Toxicological formulations. The contractor shall have the toxicological formulations and associated information available for review by the contracting activity to evaluate the safety of the material for the proposed use.

4.7 Inspection of packaging. Sample packages and packs, and the inspection of the preservation, 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 packaging requirements specified herein apply only for direct Government acquisition.)

5.1 General.

5.1.1 Navy shipboard stowage fire-retardant requirements:

(a) Lumber and plywood. When specified (see 6.2), all lumber and plywood (including laminated veneer material used in shipping container construction members, blocking, bracing, and reinforcing) shall be fire-retardant treated material conforming to MIL-L-19140 as follows:

Levels A and B - Type II - weather resistant.
Category 1 - general use.

Level C - Type I - non-weather resistant.
Category 1 - general use.

(b) Fiberboard. When specified (see 6.2), fiberboard used in the construction of class-domestic, non-weather resistant fiberboard and cleated fiberboard boxes (including interior packaging forms) shall meet the flamespread and the specific optic density requirements specified in PPP-F-320.

5.2 Packaging requirements. The resin shall be preserved level A or commercial, packed level A, B, or commercial as specified (see 6.2), and marked in accordance with PPP-P-1892 and 5.3. Packaging shall include bar coding and applicable packaging acquisition options therein as specified (see 6.2). Preservation shall be in 1-gallon metal cans, 5-gallon metal pails, or 55-gallon metal drums, as specified (see 6.2).

5.3 Special marking. In addition to any special marking required (see 6.2), each container, intermediate and shipping, shall contain marking indicating shelf life (in number of months).

5.4 Instructions for use. Instructions for use shall be included with each container of resin. Where space permits, the instructions may be marked on the container. Otherwise, the instructions shall be placed in a transparent polyethelene bag, 4 mils thick (minimum), and sealed to prevent loss or damage to the instructions (see 3.4).

5.5 Material safety data sheet. A copy of the material safety data sheet shall be attached to the shipping document for each destination (see 3.3.1).

6. NOTES

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

6.1 Intended use. This resin is intended for use in hand lay-up process with room temperature cure of glass or Aramid fiber reinforced laminate structures or coverings for Naval applications.

6.2 Acquisition requirements. Acquisition documents must specify the following:

(a) Title, number, and date of this specification.
(b) 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).
(c) Grade and class required (see 1.2).
(d) When first article inspection is required (see 3.1).
(e) If classification of defects is other than as specified (see 4.4.2.2).
(f) When fire-retardant materials are required (see 5.1.1(a) and (b)).
(g) Level of preservation and packing required (see 5.2).
(h) Bar coding and packaging acquisition options (see 5.2).
(i) Type of container required (see 5.2).
(j) Special marking required (see 5.3).
(k) Quantity of resin required.

6.3 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DoD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

Reference paragraph	DID number	DID title	Suggested tailoring
4.3	DI-MISC-80678	Certification/ data report	----
4.4.3.2	DI-T-2072	Reports, test	----

The above DIDs were those cleared as of the date of this specification. The current issue of DoD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DIDs are cited on the DD Form 1423.

6.4 First article. When a first article inspection is required, the items should be a first article sample. The first article should consist of one unit. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results and disposition of first articles. Invitations 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.

6.5 Rejection. When examined in accordance with 4.4.3.1, any failure is cause for rejection of the lot. When examined in accordance with 4.4.3.2, any nonconforming material specimen or container in each sample is cause for rejection. If the number of nonconforming specimens or containers exceeds the acceptance number specified for that sample in table VIII, the entire lot should be rejected. When examined in accordance with 4.4.3.3, a lot containing nonconforming filled containers in excess of the acceptance number specified in table VIII should be rejected.

TABLE VIII. Lot acceptance and rejection criteria.

Lot size	Sample size	Accept	Reject[1/2/3/]
Major defects			
2 - 150	13[4/]	0	1
151 - 280	20	0	1
281 - 500	29	0	1
501 - 1200	34	0	1
1201 - 3200	42	0	1
3201 - 10000	50	0	1
10001 - 35000	60	0	1
35001 - OVER	74	0	1
Minor defects			
2 - 50	5[4/]	0	1
51 - 90	7	0	1
91 - 150	11	0	1
151 - 280	13	0	1
281 - 500	16	0	1
501 - 1200	19	0	1
1201 - 3200	23	0	1
3201 - OVER	29	0	1

1/ All defective items must be replaced with acceptable items prior to lot acceptance.
2/ Inspect sample size until reject criteria is reached.
3/ Rejected lots may be screened and resubmitted for inspection and retest.
4/ If lot is smaller than sample size, inspect entire lot.

6.6 Material safety data sheet (MSDS). Contracting officers must identify those activities requiring copies of MSDS's. Additional required Government information is contained in FED-STD-313. In order to obtain the MSDS, FAR clause 52.223-3 must be in the contract.

6.7 Subject term (key word) listing.

Glass fiber reinforced laminate
Short-beam shear
Void content
Woven roving

Preparing activity:
Navy - SH
(Project 9330-N001)

*U.S. GOVERNMENT PRINTING OFFICE 1989 - 604-033/13008

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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3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
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