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SUPERSEDING
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FEDERAL SPECIFICATION

TUBES, SHIPPING, COLLAPSIBLE

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers the requirements for collapsible tubes made of metal, plastic, or laminated materials and caps.

1.2 Classification.

1.2.1 Types and classes. The tubes covered by this specification shall be of the following types and classes, as specified (see 6.2).

Type I - Metal tubes

- Class 1 - Lead
- Class 2 - Aluminum
- Class 3 - Tin

Type II - Plastic tubes

- Class 4 - High density polyethylene
- Class 5 - Low density polyethylene
- Class 6 - Polypropylene
- Class 7 - Ionomer
- Class 8 - Vinyl

Type III - Laminated polyethylene-aluminum foil-paper tubes.

1.2.2 Styles. The tubes shall be furnished in the following styles, as specified (see 6.2).

- Style 1 - Extended neck
- Style 2 - Regular neck, open orifice
- Style 3 - Regular neck, blind end
- Style 4 - Single use

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1.2.3 Size. Tubes shall be of sizes shown on tables I through IV for the applicable type, as specified (see 6.2).

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issues in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

Federal Standard:

Fed. Std. No. 123 - Marking for Domestic Shipment (Civil Agencies).

(Activities outside the Federal Government may obtain copies of Federal Specifications and Standards as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, WA.

(Federal Government activities may obtain copies of Federal Specifications and Standards and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Standards:

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

(Copies of Military Specifications and Standards required by suppliers in connection with specific procurement functions should be obtained from the procuring 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. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

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National Motor Freight Traffic Association, Inc., Agent:

National Motor Freight Classification

(Application for copies should be addressed to the American Trucking Associations, Inc., Tariff Order Section, 1616 P Street, N.W., Washington, D. C. 20036.)

Uniform Classification Committee, Agent:

Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Committee, Room 202 Union Station, 516 W. Jackson Blvd., Chicago, Illinois 60606.)

U. S. Department of Health, Education and Welfare

Federal Food, Drug and Cosmetic Act and Regulations Promulgated Thereunder

(Application for copies should be addressed to the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

3. REQUIREMENTS

3.1 Material. All materials used for tubes, caps, and closures shall be of the type and quality normally used by the manufacturer of the tube and its components, provided that the completed items comply with all provisions of this specification.

3.1.1 Certification. When specified (see 6.2), the supplier shall submit satisfactory evidence to the contracting officer or his authorized representative that the materials for the tubes and caps used under this specification meet the requirements of Federal, Food, Drug, and Cosmetic Act.

3.2 Standard product. The complete tube, with cap and closure (when required), shall be the standard commercial items of the manufacturer except for changes necessary to conform to the requirements of this specification.

3.3 Design. Unless otherwise specified herein, the design tubes, caps, and closure shall be in accordance with figures 1 through 8, as applicable. When specified (see 6.2), the design shall be specified by the procuring activity.

3.4 Construction.

3.4.1 Tubes. Each tube shall be made of materials specified for the applicable type and class (see 1.2.1 and 3.1) and conform to the dimensional and capacity requirements of tables I through V, and figures 2 and 3, as applicable.

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TABLE I. Type I tube dimensions

Tube size	Range of outside diameters tin, lead & alum.	Recommended max. length for any given diameter tin, lead & alum.	Shoulder thickness tin, lead & alum.	Wall thickness			Recommended range of orifices & necks for any given diameter <u>1/</u>
				Tin Max-Min	Lead Max-Min	Alum. Max.	
<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inch</u>	<u>Inch</u>	<u>Inch</u>	<u>Inch</u>	
3/8	0.375 .370	2	0.015 .008	0.0035 .0030	0.0050 .0040	- -	8
1/2	.505 .495	4	.020 .010	.0040 .0033	.0050 .0040	- -	8, 12
5/8	.630 .620	4	.030 .010	.0042 .0035	.0055 .0045	0.0050	8, 12, 16
3/4	.755 .745	4-1/2	.030 .010	.0045 .0035	.0055 .0045	.0050	8, 12, 16
7/8	.880 .870	5-1/4	.035 .015	.0045 .0035	.0055 .0045	.0050	12, 16, 20
1	1.005 .995	6	.035 .015	.0050 .0040	.0065 .0055	.0055	12, 16, 20
1-1/8	1.130 1.120	6-1/2	.035 .015	.0052 .0042	.0065 .0055	.0055	16, 20, 28
1-1/4	1.255 1.245	7	.035 .015	.0055 .0045	.0075 .0065	.0060	16, 20, 28
1-3/8	1.380 1.370	7-1/8	.035 .015	.0055 .0045	.0075 .0065	.0065	16, 20, 28
1-1/2	1.505 1.495	7-1/4	.035 .015	.0060 .0050	.0075 .0065	.0065	16, 20, 28

1/ Code number is in 64th of an inch.

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TABLE II. Types II and III tube dimensions

Tube sizes	Inside diameter (Nominal)	(Nominal) Wall thickness	(Nominal) length	Recommended range of orifices & necks <u>1/</u> <u>2/</u>
<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	
5/8	0.599	0.014	2-3/8 2-7/8 4	12
3/4	.719	.015	2 2-3/8 3-1/8 4-1/8	12, 16
7/8	.839	.016	2 2-1/2 3-3/8 4-1/8 5 5-3/4	M-5, 12, 16
1	.956	.017	2-1/4 2-7/8 3-1/2 4-1/8 4-3/4 5-3/8 6	M-5, M-8, 16, 20
1-3/16	1.153	.018	2-5/8 2-7/8 3-1/4 3-5/8 4-1/8 4-1/2 5-1/2 6-1/4	M-5, M-8, 16, 20, 28
1-3/8	1.351	.018	4-3/8 5 5-5/8 6-1/4 7	M-5, M-8, 16, 20, 28
1-1/2	1.509	.018	4-3/8 4-7/8 5-3/8 6-3/8 7-3/8	M-5, M-8, 28

1/ Code number is in 64th of an inch.2/ Code M-5 is for range of sizes 5/8 to 3/16 inch and M-8 is for a range of sizes

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TABLE III. Type I capacity chart 1/

Capacity fluid ounces	Tube diameter (inches)								
	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2
1/8	1-1/2	<u>2/</u>							
1/4	3								
3/8		3							
1/2		4	3						
3/4			4						
1				4					
1-1/4				5	4				
1-1/2					4-1/2	4			
1-3/4					5	4-1/2			
2					5-1/2	5			
2-1/2					6-1/2	6	5-1/4		
3							5-3/4	5	
3-1/2							6-1/4	5-1/2	5
4							6-3/4	6	5-1/2
4-1/2								6-1/2	6
5									6-1/2
5-1/2									7

1/ Because product weight and filling conditions vary, it is recommended that these figures be used as guides to be confirmed on filling and sealing equipment to be used.

2/ Tube lengths (inches).

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TABLE IV. Type II capacity chart 1/

Capacity fluid ounces	Tube diameter (inches)						
	5/8	3/4	7/8	1	1-3/16	1-3/8	1-1/2
1/4	2-3/8 <u>2/</u>						
1/3	2-7/8	2-3/8					
1/2	4	3-1/8	2-1/2				
3/4		4-1/8	3-3/8	2-7/8			
1			4-1/8	3-1/2	2-7/8		
1-1/4			5	4-1/8	3-1/4		
1-1/2			5-3/4	4-3/4	3-5/8		
1-3/4				5-3/8	4-1/8		
2				6	4-1/2		
2-1/2					5-1/2	4-3/8	
3					6-1/4	5	4-3/8
3-1/2						5-5/8	4-7/8
4						6-1/4	5-3/8
5						7	6-3/8
6							7-3/8

1/ Because product weight and filling conditions vary, it is recommended that these figures be used as guides to be confirmed on filling and sealing equipment to be used.

2/ Tube length (inches).

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TABLE V. Type III capacity chart 1/

Capacity fluid ounces	Tube diameter (inches)						Capacity cubic centimeters
	<u>3/4</u>	<u>7/8</u>	1	1-3/16	1-3/8	1-1/2	
1/4	2	<u>2/</u>					7
1/3	2-3/8	2					10
1/2	3-1/8	2-1/2	2-1/4				15
3/4	4-1/8	3-3/8	2-7/8	2-5/8			22
1		4-1/8	3-1/2	2-7/8			30
1-1/4		4-7/8	4-1/8	3-1/4			37
1-1/2			4-3/4	3-5/8			45
1-3/4			5-3/8	4-1/8			52
2			6	4-1/2			60
2-1/2				5-1/2	4-3/8		75
3				6-1/4	5	4-3/8	90
3-1/2					5-5/8	4-7/8	105
4					6-1/4	5-3/8	120
5						6-3/8	150
6						7-3/8	180

1/ Because product weights and filling conditions, vary it is recommended that these figures be used as guides to be confirmed on filling and sealing equipment to be used.

2/ Tube lengths (inches).

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3.4.1.1 Tube neck. The necks of all tubes shall be integral with the tube and of such construction as is in commercial usage for the type, class, and style required. Necks provided with an orifice shall have the inside diameters as shown on tables I and II and figures 2 and 3 for the applicable type, class, style, and size. When specified (see 6.2), square, rectangular, or other shape orifice shall be provided. The length of the neck shall be measured from the shoulder of the tube to the tip of the neck (figure 1). The orifice opening shall run the full length of the neck.

3.4.1.2 Styles 1 and 4. Styles 1 and 4 tubes, except for shell tubes, shall be furnished with an extended neck. Style 1 tube shall have the length and its opening diameter (orifice) as shown on figures 1 and 2 (dimension HX). The neck shall have a male thread as shown on figure 2 near the shoulder of the tube to receive the cap. Style 4 tubes, except for shells (figure 4), shall be provided with an extended neck (alternatively, the neck may be an extension of the shoulder) which shall form the tip with no opening (orifice). Representative tips are as shown on figure 4.

3.4.1.3 Style 2. The necks shall be of length and opening diameter shown on figures 1, 2, and 3 (dimensions H and I respectively). Unless otherwise specified (see 6.2), each neck shall be furnished with a male thread as shown on either figure 2 or 3.

3.4.1.4 Style 3. The necks shall be similar in construction to style 2 and be provided with an integral diaphragm which shall seal the orifice (see figure 4).

3.4.2 Caps. Caps shall be required for all types, classes, and styles, except style 4. The caps shall be made from either thermoset, thermoplastic, or the same material as used for the tube. The caps shall be knurled or multi-sided. The cap shall have female threads that match the male thread of the tube (see figures 6 and 7). The cap for style 1 tubes shall have the thread at or near the bottom and be designed to cover the extended neck completely. The cap for style 2 tubes shall be as shown on figures 6, 7, and 8. The cap for style 3 shall be provided with a pointed tip suitable for puncturing the diaphragm of the orifice. The cap shall cover the neck and be as shown on figure 8. When specified (see 6.2), caps for style 1 and 2 tubes shall be provided with a commercial liner.

3.4.3 Tube closure. Tubes shall be able to be closed in accordance with any of the methods specified in the appendix of this specification. Clips shall be provided when specified (see 6.2). Clips when used shall be of design, materials, and construction normally supplied by the industry for the intended purpose.

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3.5 Finish. Unless otherwise specified herein, the tubes and caps shall be of the color as manufactured. When specified, the tubes shall be externally coated or pigmented with color specified (see 6.2).

3.6 Workmanship. The tubes shall be clean, free of defective threads and openings, and jagged closure edges. Caps shall fit, seat, and provide a closure that shall not leak when tested as specified in 4.4.1. The tubes shall be free of dents or punctures. The tubes and caps shall be free of mold marks, flash, or fins that may affect serviceability or appearance.

3.7 Appendix. The appendix of this specification covers requirements for closure, contents, marking, and shipment of the filled tubes and shall be considered a part of this specification.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier 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 that supplies and services conform to prescribed requirements.

4.2 Inspection. Sampling for inspection shall be performed in accordance with MIL-STD-105, except where otherwise indicated hereinafter.

4.2.1 Component and material inspection. In accordance with 4.1 above, components and materials shall be inspected and tested in accordance with all the requirements of referenced specifications, drawings, and standards unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

4.3 Inspection of the end item.

4.3.1 Examination of the end item. The end item shall be examined for defects using the inspection levels, and acceptable quality levels (AQL's) expressed as defects per hundred units set forth in table VI. The lot shall be all tubes of the same type, class, style, and size offered for inspection at one time (see 4.3.1.1 and 4.3.1.2). For examination in 4.3.1.3 the lot shall be expressed in units of shipping containers.

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TABLE VI. Inspection levels and AQL's

Examination paragraph	Inspection levels	AQL
4.3.1.1	S-4	4.0
4.3.1.2	S-2	4.0
4.3.1.3	S-2	---
4.3.1.4	S-2	2.5

4.3.1.1 Examination of the end item for defects in construction, appearance, and workmanship. The sample unit for this examination shall be one tube prior to the filling operation (see table VII).

TABLE VII. Visual examination of defects in design, construction, appearance, and workmanship

Examine	Defect
Design	
Tube, cap, and closure	Not in accordance with figures 1 through 8, as applicable.
Construction	
Tube	Not style specified.
Neck	Not integral with tube. Threads not as specified. Orifice wrong size. No orifice, when required. Orifice on style 4. Integral diaphragm missing (style 3).
Caps	Missing when required. Material (not as specified). Not fitted with a liner when required. Threads not as specified. Do not cover the neck as specified. Do not have pointed tip (style 3 only).

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TABLE VII. Visual examination of defects in design, construction, appearance, and workmanship (con.)

Examine	Defects
Closure	Clips missing, when required.
Finish	Coating or impigmented color missing and not as specified, when required.
Tubes contained	
Workmanship	Not clean. Defective threads and opening. Jagged closure edges. Dented, punctured, mold marks, flash, or fins that affect serviceability and appearance.

4.3.1.2 Examination of the end item for dimensional or capacity defects. The sample unit for this examination shall be one tube. Any dimension or angle or capacity not within the tolerances specified in table I through V, and figures 1, 2, 3, 6 and 7 shall be scored as a defect.

4.3.1.3 Standard compliance. Proof of compliance with the requirements of 3.1.1 shall be submitted to the Government representative.

4.3.1.4 Examination of the end item for count per unit package. The sample unit shall be one unit package of tubes. The average count per package when applicable shall be not less than the specified or indicated quantity.

4.3.1.5 Examination of preparation for delivery. An examination shall be made to determine that packaging, packing, and marking comply with the requirements of section 5. Defects shall be as listed in table VIII. The sample unit shall be one shipping container packed and selected just prior to the closing operation.

TABLE VIII. Examination of preparation for delivery

Examine	Defect
Packaging	Unit packaged sealed.
Packing	Not in conformance with 5.2.
Markings (unit packages and shipping containers)	Omitted, incomplete, incorrect, illegible, of improper size, location, sequence or method of application.

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4.3.1.6 Testing of the end item. One sample taken at random from the samples selected in 4.3.1.1 shall be subjected to test specified in 4.4 for compliance with 3.6.

4.4 Test procedures (see 3.4.3 and 3.6). An empty tube shall be closed and capped. The cap area shall then be examined for leakage by submerging in water, contained in a vacuum chamber or other suitable container that will maintain a vacuum of 10 inches of mercury for not less than 30 seconds. A leak is indicated by a steady progression of bubbles. Isolated bubbles caused by entrapped external air are not considered as signs of leakage. Any leakage around the cap shall be considered a failure of the test.

5. PREPARATION FOR DELIVERY

5.1 Packaging.

5.1.1 Level C. Unless otherwise specified in the contract or order, unfilled tubes assembled with caps of the type, class, style, and size specified, shall be unit packaged in the quantity and container usually furnished according to commercial practice for that tube; or, when specified (see 6.2) shall be packaged as required for filled tubes in the appendix to this specification, except that the inner packages shall be left unsealed.

5.2 Packing.

5.2.1 Level C. Unfilled tubes, packaged as specified in 5.1.1 shall be packed in a manner to insure acceptance and safe delivery at destination at the lowest transportation rate for such supplies. Containers shall be in accordance with Uniform Freight Classification Rules or National Motor Freight Classification Rules, as applicable.

5.3 Marking.

5.3.1 Military requirements. Marking of interior packages and exterior containers shall be in accordance with the requirements of MIL-STD-129 and the contract or order.

5.3.2 Civil agencies. In addition to any special marking required by the contract or order, shipments shall be marked in accordance with Fed. Std. No. 123.

6. NOTES

6.1 Intended use. Tubes covered by this specification are intended for unit packaging and dispensing various commodities such as liquid, grease, paste, and other materials of similar consistency.

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6.1.1 Class 1, 2, and 3 tubes. Class 1, 2, and 3 tubes may be used for hydrocarbon products. Class 1 tubes shall not be used for food or for formulations for personal use.

6.1.2 Types II and III tubes. Types II and III tubes are made from different materials and are not interchangeable for all products which are suitable for these tubes. The determination of the suitability of a type II or III tube for the packaging of a specific commodity is the responsibility of the procuring agency.

6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

- (a) Title, number, and date of this specification.
- (b) Type, class, and style (where applicable) (see 1.2).
- (c) Tube size including diameter, length, orifice code or dimension, and neck length (see 1.2.3).
- (d) When certification is required (see 3.1.1).
- (e) Design desired other than specified (see 3.3).
- (f) When shape and dimensions of orifice other than specified are required (see 3.4.1.1).
- (g) When specific thread is required for style 2 (see 3.4.1.3).
- (h) When caps are required to have a liner (see 3.4.2).
- (i) When clips are required for closure (see 3.4.3).
- (j) When external finish is required, and color required (see 3.5).
- (k) When unit packaging other than specified is required (see 5.1.1).
- (l) Whether other closure procedure is required (see 30).
- (m) When closure sealant is required (see 30.1).
- (n) When content markings are required and the markings required (see 40).
- (o) Level of packaging required (see 50).
- (p) When type II and III tubes require protection (see 50.1).
- (q) When 2 oz tubes require further protection (see 50.2.1).
- (r) Level of packing required (see 60).
- (s) When weather resistant containers are required for level B shipments (see 60.2.1).
- (t) When other than Uniform Freight or National Motor Freight shipment is required for level C (see 60.3).

APPENDIX
CLOSURE, CONTENT MARKING AND
SHIPMENT OF FILLED COLLAPSIBLE TUBES

10. SCOPE

10.1 Scope. This appendix covers requirements for the closure, content marking, and packaging, packing, and marking filled collapsible tubes.

20. APPLICABLE DOCUMENTS

20.1 The following documents, of the issue in effect on date of invitation for bids, form a part of this appendix:

Federal Specifications:

PPP-B-566	- Boxes, Folding, Paperboard
PPP-B-585	- Boxes, Wood, Wirebound
PPP-B-601	- Boxes, Wood, Cleated-Plywood
PPP-B-621	- Boxes, Wood, Nailed and Lock-Corner
PPP-B-636	- Box, Fiberboard

(Copies of Specifications, Standards, Drawings, and Publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

30. Filled tube closure. Unless otherwise specified herein, tubes shall be closed in accordance with the provision specified hereinafter. When specified (see 6.2) other specific procedures for closure shall be required. The closed tubes shall not leak when tested as specified in 80.

30.1 Type I, mechanical closure. Type I tubes shall be closed by folding the open end over on itself in accordance with one of the methods illustrated in figure 5. A clip shall be used where commercial practice applies or the tube may be crimp closed. When required (see 6.2) a sealant consisting of either soft commercial gasketing materials or an adhesive shall be applied to the body walls before filling.

30.2 Type I, electric closure. Type I tubes shall be closed by thermal, electric seam, or ultra-sonic welding processes.

30.3 Types II and III, heat closure. Types II and III tubes shall be closed by radiant heat, contact heat, or by electronic high frequency seals.

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40. Content marking. When specified (see 6.2) content marking shall be applied as specified in 40.1 or 40.2 and 40.3.

40.1 Type I tubes. The content markings specified in the contract or order shall be lithographed on each metal tube. Uncoated tubes shall be marked with a waterproof, black ink commercially used for the purpose. Coated tubes shall be marked with a contrasting color, waterproof printing ink commercially used for the purpose.

40.2 Type II and III tubes. The content markings specified in the contract or order shall be applied on each tube in a contrasting color using waterproof materials commercially used for the purpose.

40.3 The content markings shall be proportionate to the tube size and be legible.

50. Packaging. Packaging shall be level A or C, as specified (see 6.2).

50.1 Protection. Filled type I tubes not individually packaged in folding or setup boxes shall be furnished with a corrugated fiberboard protector for the clipped or folded and crimped end of each tube. Unless otherwise specified (see 6.2) type II and III tubes require no protection.

50.2 Level A.

50.2.1 Unit packaging. Unless otherwise specified (see 6.2), filled and capped collapsible tubes of less than 2-fluid-ounce capacity shall be individually packaged in folding or setup boxes conforming to PPP-B-566 or PPP-B-676. Unless otherwise specified (see 6.2), filled and capped tubes of 2-fluid-ounces capacity or more shall require no further individual packaging.

50.2.2 Intermediate package.

50.2.2.1 Tubes of less than 2-fluid-ounces capacity. Filled tubes of less than 2-fluid-ounces capacity, packaged as specified in 50.2.1 shall be intermediate packaged in the boxes, and in quantities, and arrangement specified in table IX. A.

50.2.2.2 Tubes of 2-fluid-ounces capacity or more. Filled tubes of 2-fluid-ounces capacity or more shall be intermediate packaged in the boxes, and in quantities, and arrangement specified in table IX. B.

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TABLE IX A. Intermediate packages of collapsible tubes of less than 2-fluid-ounces capacity

Capacity of tubes (fl. oz.)	Total No. of tubes	Quantity and arrangement of tubes in cartons con- forming to Specs. PPP-B-566 and PPP-B-676	Quantity and arrangement of cartons in box conforming to Spec. PPP-B-636, class 2
Up to 2 ounces	144	12 (3 rows, 4 each row)	12 cartons (3 layers, 2 rows of 2 each)

TABLE IX B. Intermediate packages of collapsible tubes of 2-fluid-ounces capacity or more

Capacity of tubes (fl. oz.)	Total No. of tubes	Arrangement of tubes in box conforming to Specification PPP-B-636, class 2		
		No. of layers	No. of rows	No. in rows
2 to 4 (not incl)	72	3	4	6
4 to 8 (not incl)	36	2	3	6
8 to 16	24	2	3	4

50.2.2.3 Cushioning in intermediate boxes. Cushioning in intermediate boxes shall be furnished in the form of partitions, liners, pads, and separators, as required, and may be constructed of the same material used for the intermediate container. Separators shall be placed between all layers of unit packaged tubes.

50.2.2.3.1 Paperboard boxes. Paperboard boxes, specified in tables IX A and IX B for use as intermediate packages for tubes not otherwise packaged, shall have partitions, vertical corrugated liners, and full size top and bottom pads. The cells formed by the partitions shall be of such size that each tube will fit snugly in its cell. Partitions, liners, and pads are not required when tubes have been given individual or multiple packaging in folding cartons or setup boxes within the intermediate package.

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50.2.2.3.2 Paperboard boxes. Paperboard boxes, specified in table IX A as interior containers, shall have slotted partitions of paperboard. If the tubes are individually packaged in folding or setup paperboard boxes, the partitions prescribed herein will not be required.

50.3 Level C. Packaging of filled tubes shall be such as to furnish protection against damage during shipment and storage from shipping point to first receiving activity. The supplier may use his standard practice when it meets this requirement.

60. Packing. Packing shall be level A, B, or C, as specified (see 6.2).

60.1 Level A. Filled tubes, packaged as specified in 50 shall be packed in shipping containers conforming to class 3 use of PPP-B-585; overseas type of PPP-B-601; class 2 of PPP-B-621; or V2s or V3s of PPP-B-636. Gross weight of shipping containers shall not exceed 200 pounds, except that fiberboard boxes shall not exceed 65 lbs for V2s and 40 lbs for V3s. Closure, waterproofing and reinforcing of the shipping containers shall be in accordance with the appendix of the applicable container specification.

60.2 Level B. Unless otherwise specified (see 60.2.1), filled tubes, packaged as specified in 50 shall be packed in shipping containers conforming to domestic class of PPP-B-636. Gross weight of shipping containers shall not exceed the gross weight allowed by PPP-B-636 for the grade used. Closure of shipping containers shall be in accordance with method II of the appendix of PPP-B-636.

60.2.1 When specified (see 6.2), the fiberboard shipping containers shall be a grade V3c, V3s, or V4s fiberboard in accordance with PPP-B-636 and closed in accordance with the appendix thereto for weather resistant boxes.

60.3 Level C. Unless otherwise specified (see 6.2), filled tubes shall be packed in commercial containers of the type, size, and kind commercially used for the purpose and in a manner which shall assure acceptance by the common carrier and safe delivery to destination at the lowest transportation rate for such supplies. Containers shall be in accordance with Uniform Freight Classification Rules or National Motor Freight Classification Rules, as applicable.

70. MARKING

70.1 Military requirements. Marking of interior packages and shipping containers of filled tubes shall be in accordance with the requirements of MIL-STD-129 and the requirements of this specification.

70.2 Civilian agencies. In addition to any special marking required by the contract or order, shipments shall be marked in accordance with FED-STD-123.

80. QUALITY ASSURANCE PROVISIONS

80.1 The general quality assurance provisions as stated in 4.1 of this specification shall apply.

80.2 Lot. A lot shall consist of all containers in a contract or order which are ready for shipment at the same time and to the same destination.

80.3 Sampling. Samples shall be taken in accordance with MIL-STD-105.

80.4 Examination. Samples taken in accordance with 70.3 shall be examined for conformance with this appendix. Interior packages may be examined prior to packing.

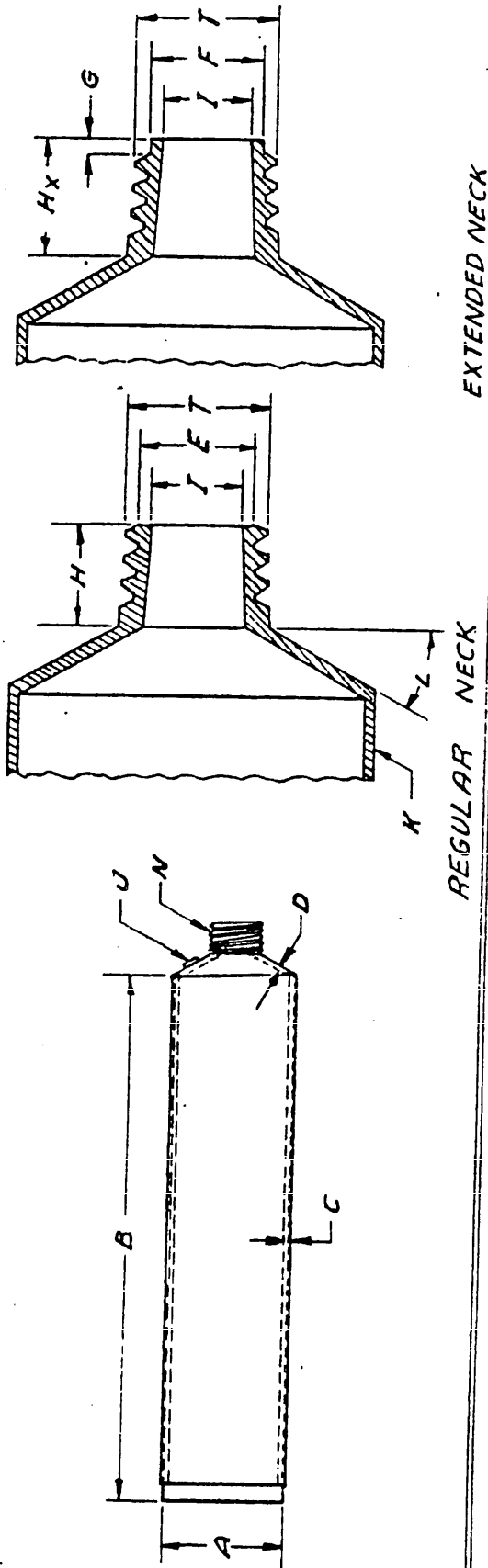
80.5 Classification of defects. The AQL for all defects itemized in table VIII and herein shall be 4.0 percent. In addition the following defects shall be scored:

<u>Examine</u>	<u>Defect</u>
Material	Not as specified.
Tube closure	Any component missing. Not as specified.
Tube content markings	Not proportionate or legible.
Packaging	Unit package not uniform or not providing protection specified.

80.6 Testing of the filled tubes. One sample taken at random from the samples selected in 4.3.1.4 shall be subjected to tests specified in 90.

90. Test. The filled tube shall be tested for leaks with the cap and closure secured. The cap and closure shall be examined for leakage by submerging in water, contained in a vacuum chamber or other suitable container that will maintain a vacuum of 10 inches of mercury for not less than 30 seconds. A leak is indicated by either the steady progression of bubbles or oozing of contents. Isolated bubbles caused by entrapped external air are not considered as signs of failure. A leakage shall be considered a failure of the test.

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NOTES:

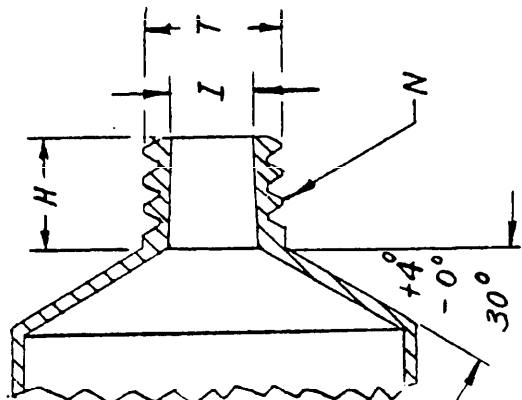
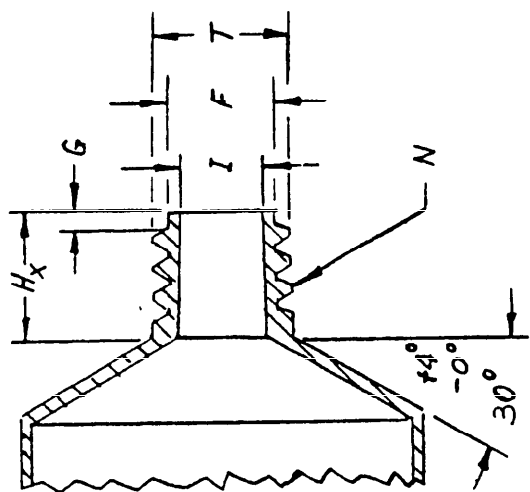
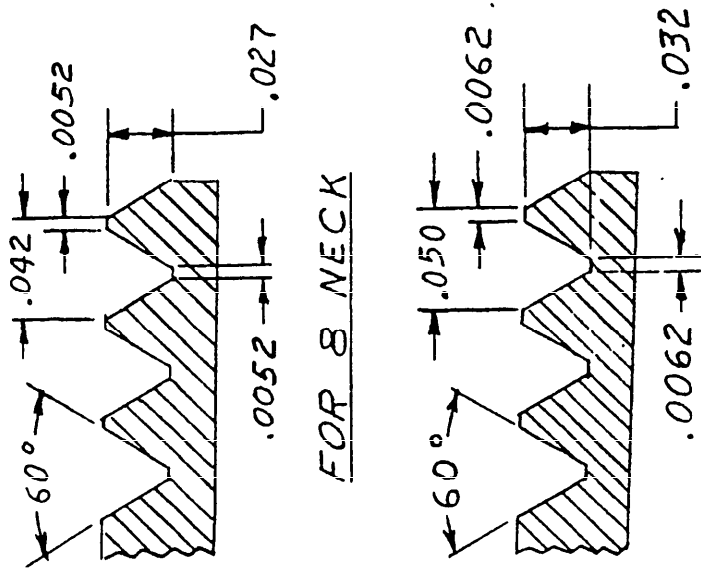
1. OUTSIDE DIAMETER AND WALL THICKNESS APPLIES ONLY TO PLAIN (UNDERCOATED) TUBES. ADD .002 TO O.D. "A" AND .001 TO WALL THICKNESS "C" FOR DECORATED TUBES.

2. "A" - O.D TO BE DETERMINED THROUGH USE OF "GO" AND "NOT GO" GAGES. ACCEPTABLE TUBE NOT TO ENTER "NOT GO" (MINIMUM DIAMETER) AND TO PASS COMPLETELY THROUGH "GO" GAGE (MAXIMUM DIAMETER) WITHOUT DEFORMATION.

3. WALL THICKNESS "C" IS DETERMINED BY AVERAGING SEVERAL SINGLE WALL THICKNESS MEASURED AROUND THE TUBE AT THE MIDPOINT BETWEEN SHOULDER AND OPEN END.

4. EXTERNAL LENGTH MEASUREMENT "B" WILL BE MADE FROM OUTER EDGE OF SHOULDER TO OPEN END OF TUBE. TOLERANCE ON THIS DIMENSION TO BE $\pm 1/32$.

FIGURE 1 - COLLAPSIBLE TUBE NOMENCLATURE

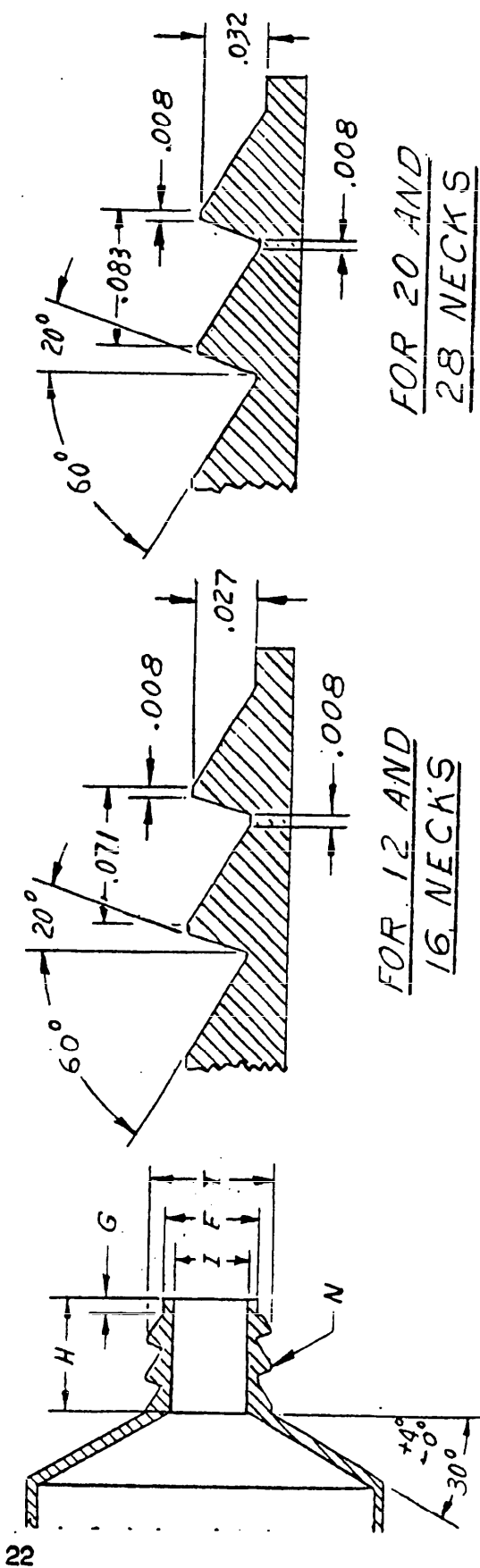


FOR 12 THRU 28 NECKS

SYMBOL	DESCRIPTION	ORIFICE CODE					TOLERANCE
		#8	#12	#16	#20	#28	
I	NECK ORIFICE DIA.	1/8	3/16	1/4	5/16	7/16	
I	NECK ORIFICE DIA.	.125	.188	.250	.313	.438	± .010
T	FINISH NECK DIA.	.250	.313	.375	.438	.563	+0.010 -0.005
F	PILOT DIA	-	.240	.300	.365	.470	± .005
G	PILOT LENGTH	-	1/32	1/16	1/16	1/16	± 1/64
H	REGULAR NECK LG	5/32	3/16	7/32	7/32	7/32	± 1/64
Hx	EXTENDED NECK LG	-	9/32	9/32	5/16	5/16	± 1/64
N	THREADS PER INCH	24	20	20	20	20	

FIGURE 2. COLLAPSIBLE TUBE NECK AND ORIFICE SIZES AMERICAN STANDARD THREAD FORM

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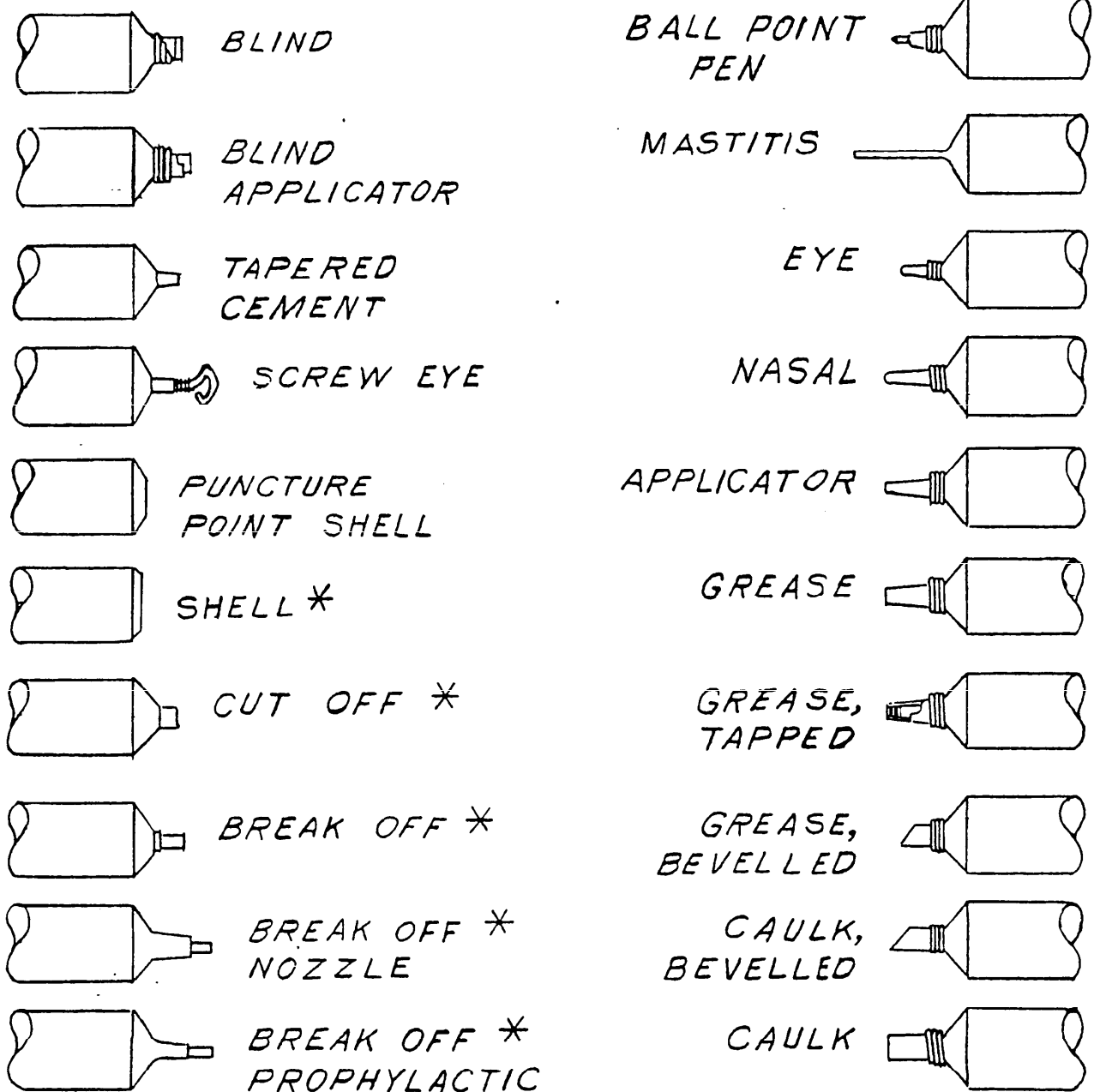
FOR 20 AND 28 NECKS

FOR 12 AND 16 NECKS

SYMBOL	DESCRIPTION	ORIFICE CODE				TOLERANCE
		#12	#16	#20	#28	
I	NECK ORIFICE DIA.	3/16	1/4	3/16	7/16	
I	NECK ORIFICE DIA.	.188	.250	.313	.438	± .010
T	FINISH NECK DIA.	.313	.375	.438	.563	+0.10 -0.005
F	PILOT DIA.	.240	.300	.365	.470	± .005
G	PILOT LENGTH	1/32	1/16	1/16	1/16	± 1/64
H	NECK LENGTH	9/32	9/32	5/16	5/16	± 1/64
N	THREADS PER INCH	14	14	12	12	

FIGURE 3
 COLLAPSIBLE TUBE
 NECK AND ORIFICE SIZES
 MODIFIED BUTTRESS THREAD FORM

PPP-T-1637



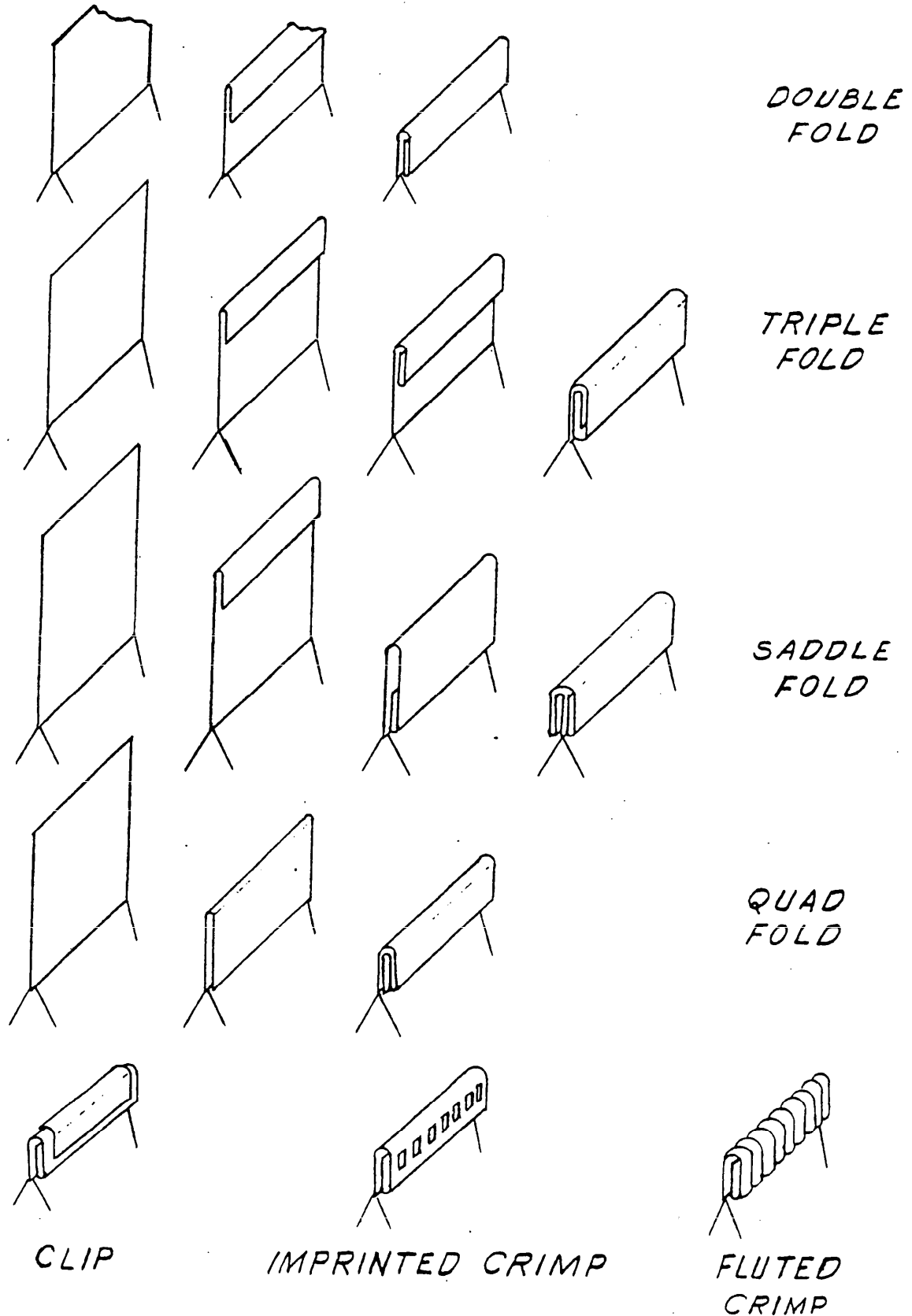
SEALED UNTIL USE

CLOSED ONLY BY CAP

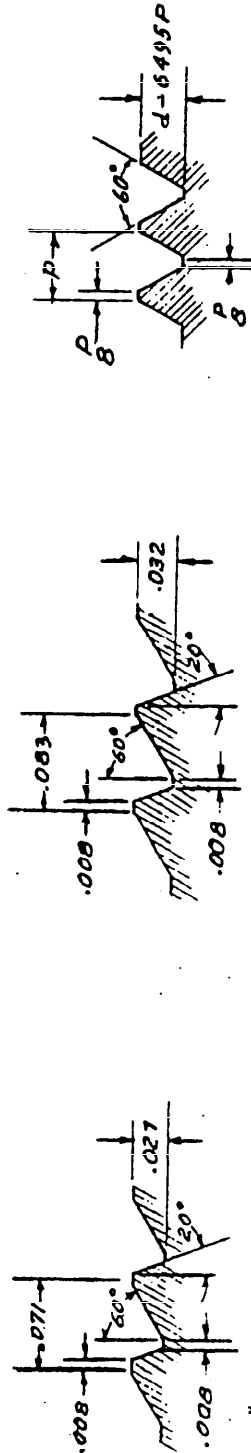
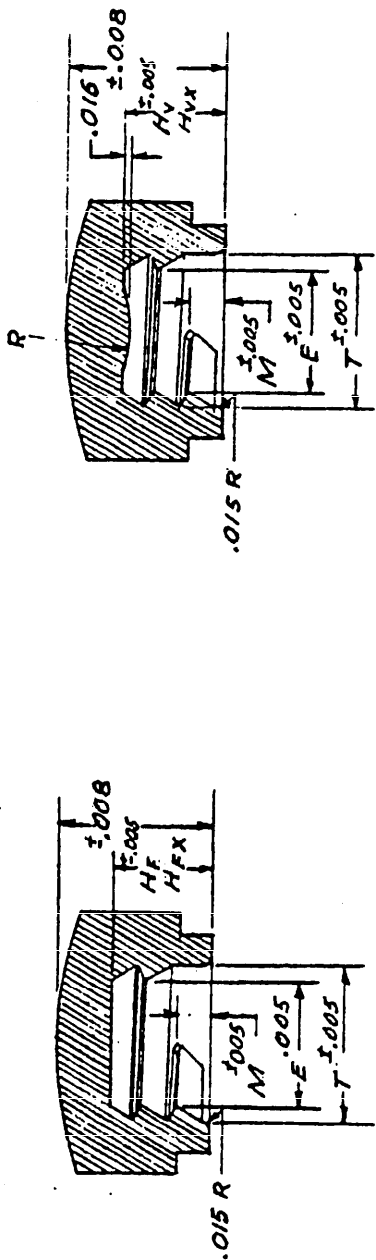
*SINGLE USE TUBES. ALL OTHERS SHOWN ARE RECLOSABLE

FIG. 4
 REPRESENTATIVE
 SPECIAL TIPS

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#12 AND #16 MODIFIED BUTTRESS #20 AND #28 MODIFIED BUTTRESS AMERICAN STANDARD THREAD

NOTE: FOR LINED FLAT H_F & H_FX SEAT REFER TO FIGURE 6

TUBE SIZE	AMERICAN STANDARD THREAD						MODIFIED BUTTRESS THREAD										
	T	E	N	P	M	H _F	H _F X	H _V	H _V X	E	N	P	M	H _F	H _V	H _V X	
8	.125	.265	.211	.24	.042	.063	.140		.140								.23/64
12	.188	.328	.264	20	.050	.063	.172	.265	.172	.265	14	.071	.100	.265	.265	.265	35/64
16	.250	.390	.326	20	.050	.063	.203	.265	.203	.336	14	.071	.100	.265	.265	.265	53/64
20	.313	.453	.389	20	.050	.063	.203	.297	.203	.389	12	.083	.100	.297	.297	.297	17/16
28	.438	.578	.514	20	.050	.063	.203	.297	.203	.514	12	.183	.100	.297	.297	.297	21/16

FIGURE 7 - COLLAPSIBLE TUBE THERMOPLASTIC CAP SIZES



FIG. 8
REPRESENT ACTIVE CAPS FOR
COLLAPSIBLE TUBES

PPP-T-1637

MILITARY CUSTODIANS:

Army - GL
Navy - SA
Air Force - 69

Review activities:

Navy - MS
Air Force - 82

User activities:

Army - MD, MU

Preparing activity:

Army - GL

CIVIL AGENCIES INTEREST:

AGR
GSA
HEW
VA

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SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 22-R255
<p>INSTRUCTIONS: This sheet is to be filled out by personnel, either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments and suggestions submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or serve to amend contractual requirements.</p>		
<p>SPECIFICATION Tubes, Shipping, Collapsible PPP-T-1637</p>		
<p>ORGANIZATION</p>		
<p>CITY AND STATE</p>		<p>CONTRACT NUMBER</p>
<p>MATERIAL PROCURED UNDER A <input type="checkbox"/> DIRECT GOVERNMENT CONTRACT <input type="checkbox"/> SUBCONTRACT</p>		
<p>1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? A. GIVE PARAGRAPH NUMBER AND WORDING.</p>		
<p>B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES</p>		
<p>2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID</p>		
<p>3. IS THE SPECIFICATION RESTRICTIVE? <input type="checkbox"/> YES <input type="checkbox"/> NO (If "yes", in what way?)</p>		
<p>4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)</p>		
<p>SUBMITTED BY (Printed or typed name and activity - Optional)</p>		<p>DATE</p>