INCH-POUND

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PERFORMANCE SPECIFICATION

PACKAGING OF FOOD IN POLYMERIC TRAYS

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the performance criteria for packaging materials and the packaging of food in polymeric trays to include the filling and hermetic sealing of the tray, the processing of the filled and sealed tray, and the application of a protective sleeve for the tray and lid. The combination of the tray and tray lid is referred to as the container.

1.2 Classification. The packaged and processed products will be of the following types as specified (see 6.1).

1.2.1 Types. Packaged and processed types are as follows:

Type I - Retortable products
Type II - Oven-baked products

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, US Army Research, Development and Engineering Command, Natick Soldier Center, AMSRD-NSC-CF-F, 15 Kansas Street, Natick, MA 01760-5018 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 89GP

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in section 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or 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 requirement documents cited in section 4 of this specification, whether or not they are listed.

2.2 Government documents. None.

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

ASTM INTERNATIONAL (ASTM)

D999	- Standard Methods for Vibration Testing of Shipping Containers
D1974	- Standard Practice for Methods of Closing, Sealing and Reinforcing Fiberboard Boxes
D3985	- Standard Test Method for Oxygen Gas Transmission Rate Through Plastic Film and Sheeting Using a Coulometric Sensor
D5118/D5118M	- Standard Practice for Fabrication of Fiberboard Shipping Boxes
D5276	- Standard Test Method for Drop Test of Loaded Containers by Freefall
F1249	- Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor

(Copies of these documents are available from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428)

2.4 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.

3. REQUIREMENTS

3.1 Performance characteristics.

3.1.1 Tray configurations and dimensions. Tray material shall be fabricated into trays as specified in figure 1. The tray shall have a minimum capacity of 96 fluid ounces.

3.1.2 Oxygen gas transmission rate.

3.1.2.1 Tray material. The oxygen gas transmission rate (O_2GTR) of the material shall not exceed 0.01 cubic centimeters (cc)/mil/100 square inch (sq. in.)/24 hours (hrs).

3.1.2.2 Tray lid. The O_2GTR of the material shall not exceed 0.0039 cc/100 sq. in./24 hrs.

3.1.3 Water vapor transmission rate.

3.1.3.1 Tray material. The water vapor transmission rate (WVTR) of the material shall not exceed 0.69 gram (gm)/mil/100 sq. in./24 hrs.

3.1.3.2 Tray lid. The WVTR of the material shall not exceed 0.00064 gm/100 sq. in./24 hrs.

3.1.4 Processing. The tray and lid material shall be capable of withstanding the process specified in the applicable food document.

3.1.5 Lid material. The lid material shall be capable of hermetically sealing the tray filled with product.

3.1.6 Protective sleeve (Type I only). The sleeve shall protect the tray, lid, and seals from physical damage. The maximum height of the filled, sealed and processed tray with protective sleeve shall not exceed 2-1/8 inches. The length of the protective sleeve shall cover the entire tray flange, and shall not exceed 12-13/16 inches. The width of the protective sleeve shall fit snugly against the tray flange so as to restrict the sliding motion of the tray within the sleeve. The top and bottom faces of the sleeve at the open ends shall be compressed in such a manner so as to keep the top sleeve face flush against the tray lid and seams (see 6.4). The tray shall be restrained within the sleeve, at both ends, in such a manner so as to prevent the tray from sliding out. The sleeve shall provide added stacking strength to the tray. The color of all inside and outside surfaces of the sleeve shall be natural kraft, tan, or dull gray. A label with the following instructions shall be printed, stamped, or otherwise applied onto the protective sleeve, in a manner that does not damage the sleeve, with permanent ink of any contrasting color. Type size of the label shall be no smaller than shown below (printed on 8-1/2" x 11" paper), but can be larger.

ATTENTION!

PROTECTIVE SLEEVE-DO NOT THROW AWAY

SAVE AND RE-USE TO PROTECT TRAY FROM DAMAGE

To Avoid Damaging Tray Lid:

1. **Keep This Protective Sleeve Secured to Tray Until Ready to Heat, Then Remove.**
2. **Insert Tray Back Into Sleeve After Heating.**
3. **Always Use Sleeves When Transporting Trays in Insulated Food Containers.**
4. **If Sleeves Are Unavailable, Stack Trays Lid-to-Lid with Fiberboard Pads in Between.**

3.1.7 Rough handling survivability. After processing, the filled and sealed container, with protective sleeve added, shall be capable of withstanding rough handling.

3.1.8 Headspace.

3.1.8.1 Residual gas (Type I only). Residual gas volume in the filled, sealed and processed trays shall not exceed 250 cubic centimeters.

3.1.8.2 Vacuum (Type II only). The filled and sealed polymeric tray shall show evidence of vacuum.

3.1.9 Closure seal. The closure seal, defined as the width of fusion bonded seal at any point perpendicular to the tray flange along the tray perimeter, shall be not less than 1/8 inch wide. The first 1/16 inch of the seal at the food product edge shall be free of defects or anomalies, such as, but not limited to entrapped matter, moisture or grease. The closure seal shall be continuous along the tray flange surface. The closure seal shall be free of impression or design on the seal surface and free of wrinkles.

3.1.10 Internal pressure.

3.1.10.1 Destructive. The filled, sealed and processed trays shall withstand an internal pressure of 20 pounds per square inch gauge (psig).

3.1.10.2 Non-Destructive (Type I only). The filled, sealed and processed trays shall withstand a compression force of 1,400 pounds.

3.1.11 Lid opening. The tray lid shall be easily removed with a knife.

3.1.12 Camouflage. The color of exterior surfaces of the tray and tray lid shall contribute to woodland camouflage (i.e., earth brown, black, olive drab, forest green, etc.).

4. VERIFICATION

4.1 Conformance inspection. Conformance inspection includes those examinations and tests from table I, as defined in the contract or purchase order, performed on specified samples (see 6.1).

TABLE I. Verification methods

Characteristic 1/	Requirement	Verification
Tray configurations and dimensions	3.1.1	4.3.1
Oxygen gas transmission rate	3.1.2	4.3.2
Water vapor transmission rate	3.1.3	4.3.3
Processing	3.1.4	4.3.4
Lid material	3.1.5	4.2
Protective sleeve	3.1.6	4.3.5
Rough handling survivability	3.1.7	4.3.6
Headspace	3.1.8	4.3.7
Residual gas (Type I only)	3.1.8.1	4.3.7.1
Vacuum (Type II only)	3.1.8.2	4.3.7.2
Closure seal	3.1.9	4.2
Internal pressure	3.1.10	4.3.8
Destructive	3.1.10.1	4.3.8.1
Non-Destructive (Type I only)	3.1.10.2	4.3.8.2
Lid opening	3.1.11	4.3.9
Camouflage	3.1.12	4.3.10

1/ In lieu of testing, determination of compliance to camouflage requirements may be ascertained by examination of records, invoices, or other valid documents. In addition, compliance to the requirements for O_2GTR, WVTR, processing, rough handling survivability, outside tray dimensions, stacking strength of sleeve, lid opening, and tray capacity may be verified by certificate of conformance.

4.2 Examination of container. After processing, the container shall be visually examined for compliance with 3.1.4, 3.1.5, and 3.1.9. Defects and defect classifications are listed in table II.

TABLE II. Filled, sealed and processed container defects 1/

Category				Defect
Critical	Major A	Major B	Minor	
				General
1				Swollen container.
2				Tear, crack, cut, hole, or if a multi-layered laminate is used, abrasion through more than one layer of the tray or through the barrier (e.g. foil) layer of the lid material or leakage through any seal or surface.
3				Closure seal not continuous along tray flange surface.
4				Foldover wrinkle extending into the seal such that the closure seal is reduced to less than 1/8 inch.
5				Presence of delamination when a multi-layered laminate is used. 2/
	101			Unclean container. 3/
	102			Any impression or design on the seal surfaces which conceals or impairs visual detection of seal defects.
		151		Presence of delamination when a multi-layered laminate is used. 2/
			201	Presence of delamination when a multi-layered laminate is used. 2/ 7/

TABLE II. Filled, sealed and processed container defects 1/ cont'd

Category				Defect
Critical	Major A	Major B	Minor	
			202	Color does not contribute to woodland camouflage.
			203	Presence of any permanent tray body deformation, such that deformed area is discolored and roughened in texture.
			204	Areas of "wave-like" striations or wrinkles along the seal area that span the entire width of seal. 4/ 7/
				Type I Products
6				Abrasion on the lid material within 1/16 inch of food product edge of seal such that barrier (e.g., foil) layer of the lid material is exposed. 7/
7				Presence of entrapped matter within 1/16" of the food product edge of seal or entrapped moisture or vapor within 1/16" of the food product edge of seal that results in less than 1/16" of defect free seal width at the outside edge. 5/ 7/
	103			Closure seal width less than 1/8 inch. 6/ 7/
			205	Presence of any seal defect or anomaly (for example, entrapped moisture, gases, etc.) within 1/16 inch of food product edge of seal. 5/ 7/
				Type II Products
8				Closure seal width less than 1/16 inch. 6/
9				Presence of entrapped matter (e.g., crumbs, topping, etc.) within seal area that results in less than 1/16 inch of continuous defect free seal width at any point perpendicular to the tray flange.
			206	Closure seal width less than 1/8 inch. 6/

1/ The following procedure may be used by inspection personnel to examine for filled, sealed and processed container defects on a consistent basis:

1. Remove tape from one end of protective sleeve only.
2. Remove tray from open end of protective sleeve.
3. Observe interior of sleeve for signs of food product/wetness as this may indicate a potential defect.
4. Observe all sides of tray/lid for obvious leaks.
5. Set tray on flat surface, lid up and observe for apparent swelling. As there is a maximum for allowable residual gas requirement, appearance of the lid should typically range from flush with the surface of the tray flanges to somewhat concave from applied vacuum.

6. With the tray still on a flat surface, press down on the lid with both hands (palms down) and apply a medium force (e.g., 30-40 Pounds). Listen and look for signs of air or food product leakage.
7. Examine lid surface for cuts, holes, leaks, abrasions, seal width, continuous seals, etc. Focus attention to where the lid body interfaces the seal area. If the lid material overhangs the tray flange at the outer edges, lift lid material slightly and examine where the underside of the lid contacts the tray flange. This area may be slightly wetted if a non-continuous seal or other defect is present.
8. Hold tray with lid down and examine the tray body for holes, cuts, cracks, etc. or any areas where wet or dry food product is apparent.
9. Record any defects in accordance with Table II above.
10. Re-insert tray into sleeve and re-tape.

2/ Delamination defect classification:

Critical - Evidence of outer ply delamination such that the adjacent ply in the lid body is exposed or evidence of multi ply delamination such that the food contact layer is exposed. Any evidence of outer ply delamination of the tray body or internal layer separation within the tray body due to, (for example) poor adhesion between layers.

Major B - Delamination of the outer ply in the lid seal area that can be propagated to expose the adjacent ply at the food product edge of the lid. The separated outer ply shall be grasped between thumb and forefinger and gently lifted toward the food product edge of the seal or if the separated area is too small to be held between thumb and forefinger, a number two stylus shall be inserted into the delaminated area and a gentle lifting force applied against the outer ply. If separation of the outer ply can be made to extend to the product edge of the seal with no discernible resistance to the gentle lifting, the delamination shall be scored as a Major B defect. Additionally, spot delamination of the outer ply in the body of the lid that can be propagated beyond its initial borders is also a Major B defect. To determine if the delaminated area is a defect, use the following procedure: Mark the outside edges of the delaminated area using a bold permanent marking pen. Open the tray and remove the contents. Cut the lid on opposing sides

of the delaminated area not closer than 3/16 inch from the delaminated area. Hold the delaminated area between the thumb and forefinger of each hand with both thumbs and forefingers touching each other. The delaminated area shall then be rapidly flexed 10 times by rotating both hands in alternating clockwise-counter clockwise directions. After flexing, the separated outer ply shall be grasped between thumb and forefinger and gently lifted away from the lid surface or if the separated area is too small to be held between thumb and forefinger, a number two stylus shall be inserted into the delaminated area and a gentle lifting force applied against the outer ply. Any propagation of the delaminated area, as evidenced by the delaminated area exceeding the limits of the outlined borders, shall be scored as a Major B defect.

Minor - Minor delamination of the outer ply in the lid seal area is acceptable and shall not be classified as a minor defect unless it extends to within 1/16 inch of the food product edge of the seal. Isolated spots of delamination in the body of the lid that do not propagate when flexed as described above shall be classified as minor. Post-retort wrinkling of the outer ply in the lid seal area shall also be scored as a minor defect. Note: Post-retort wrinkles of the outer ply are typically perpendicular to the flange direction, in a straight line, and extend from within the food product area to the outer edges of the lid.

3/ Scale or dust on the outside of container caused by retort water may be removed by washing. The following examples shall not be scored as defects for unclean:

a. Water spots.

b. Ten or less specks of dried product each of which measure 1/8 inch by 1/8 inch or equivalent area, or less.

c. Any foreign matter which presents no health hazard or no potential container damage and which readily falls off when container is lifted and shaken lightly.

d. Very thin film of grease, oil, or product residue which is discernible to touch, but not readily discernible by visual examinations.

e. Thread-like strands or specks of melted and hardened polyolefin, typically along the outer edges of the lid and tray flange.

4/ Score this defect only if fingernail “catches” when dragged over wrinkle.

5/ The following shall be scored as minor defects if present within 1/16 inch of the food product edge of seal:

a. Small concave impressions or cavities indicating slight tray imperfections or hard particulates affixed to the seal head and contacting the lid and tray.

b. Small (i.e., 1/32 inch or less in any direction) convex bumps or points on the seal area indicating small imperfections on the seal head. NOTE: This anomaly is typically visible on successive trays coming off the heat sealer.

c. Minor impressions or scorching of the top layer of the lid material on the seal area indicating soft particulates on the seal head being “burned-off” during sealing. NOTE: This anomaly is typically visible on successive trays coming off the heat sealer.

d. Anomalies caused by entrapped moisture or vapor (which typically appear as concave spots on the tray flange surface) that result in less than 1/8” but not less than 1/16” of defect free seal width at the outside edge of these spots.

e. For solid products only, anomalies caused by entrapped matter that result in less than 1/8" but not less than 1/16" of defect free seal width at the outside edge of these spots. Solid products would include eggs, stuffing, mashed potatoes, rice, lasagnas, bakes, and other items possessing minimal or no capability for hydraulic stresses during transport, and would exclude items packed in brine, gravy, and/or other low viscosity sauces.

6/ Score this defect once at any point perpendicular to the tray flange along the tray perimeter.

7/ A Non-Destructive Static Compression Tester (see 4.3.8.2) may be utilized to verify container integrity by quantifying the impact of this container defect, if found during the visual examination.

4.3 Tests.

4.3.1 Tray configurations and dimensions. Prior to filling, sealing and processing, tray dimensions shall be measured and compared to the requirements of figure 1. The tray shall be placed on a flat surface and filled with 96 fluid ounces of water. Any tray dimension exceeding the requirements of figure 1 or tray that cannot hold a minimum of 96 fluid ounces of water shall be considered a test failure.

4.3.2 Oxygen gas transmission rate. The O_2GTR of the material shall be determined in accordance with ASTM D3985 at 73°F and 50 % relative humidity.

4.3.3 Water vapor transmission rate. The WVTR of the material shall be determined in accordance with ASTM F1249 at 104°F and 90 % relative humidity.

4.3.4 Processing. Testing for processing of the material shall be as follows: Material shall be formed into trays in accordance with figure 1. For Type I, trays shall be filled with approximately 96 ounces of water, sealed with the tray lid material, and exposed to the same processing conditions as required by the food product document. For Type II, trays shall be filled and sealed with representative product in accordance with the appropriate food product

document. Following processing, containers shall be examined in accordance with table II.

4.3.5 Protective sleeve (Type I only). The protective sleeve with the filled, sealed and processed tray inside shall be placed on a flat surface and examined for conformance to dimension, labeling, and stacking strength requirements. Any sleeved tray with a height greater than 2-1/8 inches; or sleeve not covering the entire flange length; or sleeve exceeding 12-13/16 inches in length; or sleeve not preventing sliding of the tray along the sleeve width; or sleeve not continuously compressed in such a manner as to keep the top sleeve face flush against the tray seal surfaces; or sleeve that does not prevent the tray from sliding out through an open end; or sleeve not providing added stacking strength equivalent or better than a sleeve constructed of grade 275 fiberboard in accordance with ASTM D5118/D5118M and with flutes oriented parallel to the sleeve width; or sleeve not of a natural kraft, tan or dull gray color; or label instructions missing; or label instructions not legible shall be considered a test failure.

4.3.6 Rough handling survivability. Container survival rates shall be 100 % at standard temperature (see 4.3.6.1) and at least 85 % at frozen temperature (see 4.3.6.2).

4.3.6.1 Standard temperature test. Four trays, filled with a representative food product, processed and prepared as specified in the applicable food document shall be inserted into the protective sleeve as specified in 3.1.6 and packed in a snug fitting fiberboard box conforming to style RSC-L, type CF, grade 275 of ASTM D5118/D5118M. The sleeved trays shall be placed flat with the first two trays placed with the lids together and the next two trays with the lids together. The inside of each box shall be provided with a box liner. The height of the box liner shall be equal to the full inside depth of the box (+ 0 inch, - 1/8 inch). The box shall be closed in accordance with ASTM D1974. Condition the box of four trays in an atmosphere uniformly maintained at 72°F ± 2°F for a period of 48 hours. Conduct a drop test in accordance with ASTM D5276, Assurance Level I for a series of 10 drops, to include: (1) a bottom corner drop at the manufacturer's joint; (2 & 3) edge drops on the shortest and next shortest edges radiating from the corner; (4) an edge drop on the longest edge radiating from that corner; (5 & 6) flatwise drops on the smallest and opposite smallest faces; (7 & 8) flatwise drops on the medium and opposite medium faces; (9 & 10) flatwise drops on the longest and opposite longest faces. Immediately after completion of the drop test, conduct a vibration test (on the same box of four trays) in accordance with ASTM D999, at 268 RPM (4.5 Hz) for a period of one hour. Remove trays from the box and examine visually. Any cracked, split or broken tray or lid at any location; width of defect/anomaly free closure seal at the food product edge less than 1/16 inches; or tear, hole, or puncture through protective sleeve causing a hole in the tray lid; or wet or stained protective sleeve due to one or more leaking trays; or any evidence of food product leakage from tray or lid; or absence of protective sleeve; or protective sleeve no longer preventing the tray from sliding out through an open end shall be considered a test failure.

4.3.6.2 Frozen temperature test. Prepare the box of four trays as specified in 4.3.6.1, but condition in an atmosphere uniformly maintained at -20°F ± 2°F for a period of 48 hours. While still in frozen state, conduct drop and vibration tests as specified in 4.3.6.1. Remove trays from

the box and allow to fully thaw prior to visual examination. Any cracked, split or broken tray at any location, except along the outermost flange edges, or lid at any location; or width of defect/anomaly free closure at the food product edge less than 1/16 inches; or tear, hole, or puncture through protective sleeve causing a hole in the tray lid; or wet or stained protective sleeve due to one or more leaking trays; or any evidence of food product leakage from tray; or absence of protective sleeve, shall be considered a test failure.

4.3.7 Headspace testing.

4.3.7.1 Residual gas. The samples for test shall be opened under 75°F ± 5°F water and the gases shall be collected by water displacement in a graduated cylinder or other calibrated tube. The volume of the gases shall be reported to the nearest 5 cc. Any residual gas volume exceeding 250 cc shall be considered a test failure.

4.3.7.2 Vacuum. Eight filled, sealed and processed polymeric trays shall be allowed to cool to 75°F ± 5°F and held for at least 24 hours. To examine for vacuum, lay a straight edge onto the tray flanges spanning the entire length of the polymeric tray and crossing the center point of the lidding. There shall be a visible gap between the straight edge and the lidding material along the entire length of lidding below the straight edge. The same procedure shall be used across the width of the polymeric tray. The lidding material shall also be examined for evidence of tautness. Any lack of visible gap between the straight edge and lidding and lack of tautness by the lidding shall be considered a test failure.

4.3.8 Internal pressure.

4.3.8.1 Destructive. Internal pressure resistance shall be determined by pressurizing the container without protective sleeve while restrained between two rigid plates. There shall be a minimum clearance of 1/8 inch between the bottom surface of the top plate and the top surface of the tray flange (with attached lid). A four-seal tester (designed to pressurize filled container by use of a hypodermic needle through the container wall or lid) shall be used and all four seals tested simultaneously. It may also be necessary to restrain the tray body during the test within either a wood or metal base, such that excessive deflection of the tray does not render a false lid failure. Pressure shall be applied gradually until 20 psig pressure is reached. The 20 psig pressure shall be held constant for 30 seconds and then released. The container then shall be examined for separation or yield of the heat seals. Any rupture of the container (i.e., through tray, lid or closure seal) or evidence of any seal separation greater than 1/16 inch or minimum closure seal width less than 1/16 inch shall be considered a test failure.

4.3.8.2 Non-Destructive (Type I only). Internal pressure resistance and container integrity shall be determined by using the approved Non-Destructive Static Compression Tester (ND Tester) or other test apparatus expressly approved by the Government as specified below. Compress the tray in the ND Tester between the two plates. The outer perimeter of the top plate shall extend no closer than 1 inch from the inside edge of the tray flange, thus allowing the lid

stock to bulge up and strain the seal. The bottom plate shall be shaped to match the oval indentation on the bottom of the tray. Apply a compression force of 1,400 pounds on the tray and hold for 60 seconds. At the end of the ND test, remove the tray from the tester, re-inspect the seal and measure the minimum closure seal width along the entire tray seal.

4.3.8.2.1 Internal pressure resistance. When determining internal pressure resistance in accordance with 4.3.8.2, the following criteria shall apply: (a) Any rupture of the container (i.e., through tray, lid or closure seal) or evidence of any seal separation greater than 1/16 inch or evidence of minimum closure seal width less than 1/16 inch shall be considered a test failure. The tray tested shall be withheld from the lot. (b) Any tray passing the ND test and possessing a minimum closure seal width greater than 1/8 inch may be placed back into the lot.

4.3.8.2.2. Container integrity. When determining container integrity in accordance with 4.3.8.2, the following criteria shall apply: (a) Any rupture of the container (i.e., through tray, lid or closure seal) or evidence of minimum closure seal width less than 1/16 inch shall be considered a test failure. The defect being verified shall be reclassified as a critical defect, for that lot only, and will result in rejection of the lot. The tested tray shall be withheld from the lot. (b) Any evidence of minimum closure seal width greater than 1/16 inch, but less than 1/8 inch shall not be considered a test failure. The defect being verified shall be reclassified as non-scoreable, for that lot only. This may result in the lot passing the visual container examination. The tray tested shall be withheld from the lot. (c) Any tray passing the ND test and possessing a minimum closure seal width greater than 1/8 inch shall be reclassified as non-scoreable, for that lot only. This may result in the lot passing the visual container examination. The tray tested may be placed back into the lot.

4.3.9 Lid opening. Place a filled, sealed and processed tray on a flat surface and remove the protective sleeve, if necessary. Position one hand along the tray flange and use a sharp-pointed knife in the other hand to cut open the lid along the inside edge of the complete tray flange, approximately 1/4 inches away from the flange edge. The inability to open the lid in the manner described herein shall be considered a test failure.

4.3.10 Camouflage. Visually examine the exterior surfaces of the tray and tray lid after processing.

5. PACKAGING

This section is not applicable to this specification.

6. NOTES

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

6.1 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of the specification.

b. Type required (see 1.2).

c. Sampling for conformance inspection (see 4.1).

6.2 Tray material. The US Army Research, Development and Engineering Command (RDECOM), Natick Soldier Center (NSC) has found that a seven layer coextruded structure consisting of polypropylene, regrind, tie, ethylene vinyl alcohol (EVOH), tie, regrind, and polypropylene, when formed into a tray with a minimal wall thickness of 0.032 inches, a tray weight of 155 grams ± 15 grams, an EVOH content of 6 percent, and a minimum EVOH barrier layer thickness of 0.0015 inches meets the performance criteria of this specification. A polymeric tray (Drawing #9212, Revision H) constructed of the above material is available from Rexam Containers, Union, MO 63084. Note: It has been found that during rough handling testing at -20° F (see 4.3.6.2) the possibility exists that in a small percentage of containers, the tray body at the open ends of the protective sleeve may fracture from excessive dropping. Care should be taken to minimize the rough handling of polymeric trays when frozen.

6.3 Lid material. It has been found that a lid material structure consisting of, from inside to outside, 0.003 to 0.004 inch thick polyolefin, 0.00035 to 0.0007 inch thick aluminum foil, a 0.0006 inch thick biaxially oriented polyamide and 0.0005 inch thick polyester meets the performance criteria of this specification. The above material is available from Smurfit-Stone Container Corporation, Schaumburg, IL, 60173, Pechiney Plastic Packaging, Inc., Cincinnati, OH, 45241, Fuji Tokushu Shigyo Company, Limited, Seto, Aichi, Japan, 489-0071, and Amcor Flexibles Schüpbach AG, CH-3401, Burgdorf, Switzerland. A lid material structure consisting of, from inside to outside, 0.003 inch thick polyolefin, 0.0006 inch thick biaxially oriented polyamide, 0.0008 inch thick aluminum foil and 0.0005 inch thick polyester also meets the performance criteria of this specification. The above material is available from Lawson Mardon Singen Gmbh, Singen, Germany, D-78221 and Lawson Mardon Neher CH-Kreuzlingen (members of the ALCAN group of companies). A lid material structure consisting of, from inside to outside, 0.004 inch thick polyolefin, 0.0006 inch thick biaxially oriented polyamide, 0.00035 inch thick aluminum foil and 0.0005 inch thick polyester meets the performance criteria of this specification. The above material is also available from Fuji Tokushu Shigyo Company Limited. RDECOM (NSC) has found that a lid material structure consisting of, from inside to outside, 0.004 inch think polyolefin, 0.00035 inch thick aluminum foil, 0.001 inch thick biaxially oriented polyamide and 0.0005 inch thick polyester also meets the performance criteria of this specification. This material is available from Dai Nippon Printing Co., Ltd., Ihigaya-Kagachu, Shinjuku-Ku, Tokyo 162-8001, Japan. A lid material structure consisting of, from inside to outside, 0.004 inch thick polyolefin, 0.0006 inch thick biaxially oriented polyamide, 0.0005 inch thick aluminum foil and 0.0005 inch thick polyester also meets the performance criteria of this

specification. The above material is available from Hyewon Packmaster International, Kangnam-gu, Seoul, Korea. It has also been found that a lid material structure consisting of, from inside to outside 0.003 to 0.004 inch thick polyolefin, 0.0006 inch thick biaxially oriented polyamide, 0.00035 thick aluminum foil and 0.0005 inch thick polyester meets the performance criteria of this specification. The above material is available from Floeter Inc., Elk Grove Village, IL 60007. A plus or minus 20% tolerance is permitted for thin gauge plastic film thickness measurements and a plus or minus 10% tolerance is permitted for aluminum foil thickness measurements. Note: RDECOM (NSC) has observed that during rough handling testing at -20°F (see 4.3.6.2), the possibility exists that the lid material may pinhole, puncture, or develop raised bumps from frozen food product within the tray. Care should be taken to minimize the rough handling of polymeric trays when frozen.

Comment [NSC1]: Natick case ES07-130, change 03 13 Jul 07; add newly approved domestic source for lid material.

6.4 Protective sleeve material. It has been found that a protective sleeve material constructed of grade 275 fiberboard in accordance with ASTM D5118/D5118M, oriented with flutes parallel to the sleeve width, jointed and hot melt glued along either the vertical length or bottom face of the sleeve, and then compressed and securely taped across the open ends of the sleeve at their midpoints meets the performance criteria of this specification.

6.5 Non-Destructive Static Compression Tester. It has been found that a Non-Destructive Static Compression Tester developed under the Defense Logistics Agency Combat Ration Network Program, Short Term Project #2016, meets the performance criteria of this specification.

6.6 Technical information. Specific technical inquires may be addressed to the Commander, US Army Research, Development and Engineering Command, Natick Soldier Center, AMSRD-NSC-CF-F, 15 Kansas Street, Natick, MA 01760-5018.

6.7 Subject term (key word) listing.

Combat field feeding
Operational rations

6.8 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodians:
Army - QM
Navy - MC

Preparing activity:
Army - GL

(Project 89GP-0007)

Review activities:

Army – MD
Navy - SA
DLA - SS

Civil agency:
USDA - FV

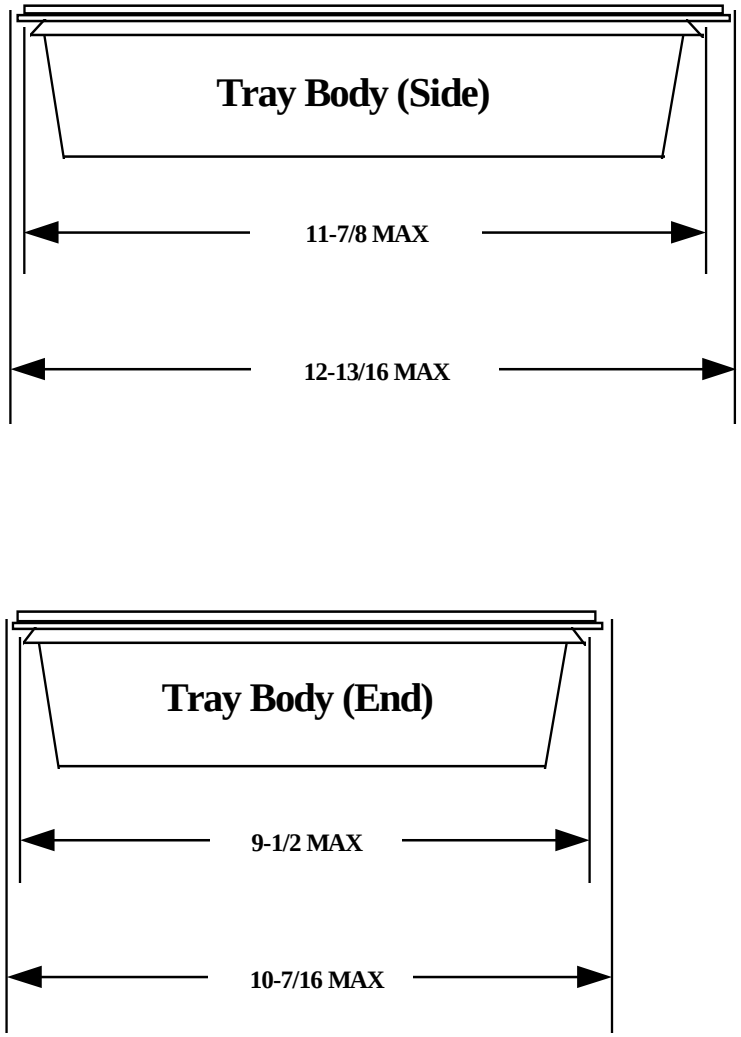

FIGURE 1: Dimensional Requirements for the Polymeric Tray.
All Dimensions are in Inches.

For DSCP web site posting

Subject: ES07-130, Document Change, MIL-PRF-32004B Packaging of Food in Polymeric Trays; add newly approved domestic source for the lid material.

1. Working with Floeter, Inc., Elk Grove, IL, a vendor submitted samples to the NSRDEC for evaluation in accordance with (IAW) the methods and criteria outlined in MIL-PRF-32004B, paragraph 4.3.6. This testing consisted of rough handling survivability testing of water-filled, thermally processed polymeric trays at frozen (-20°F) and standard (70°F) temperature. Overall, the Floeter material performed well and was found to be acceptable for use as a lidding material for polymeric trays produced IAW MIL-PRF-32004B.

2. Natick recommends that DSCP implement the following changes for all current, pending, and future procurements until the subject document is formally amended or revised:

> Page 15, Section 6.3, line 24, after "…Seoul, Korea." please insert "It has also been found that a lid material structure consisting of, from inside to outside 0.003 to 0.004 inch thick polyolefin, 0.0006 inch thick biaxially oriented polyamide, 0.00035 thick aluminum foil and 0.0005 inch thick polyester meets the performance criteria of this specification. The above material is available from Floeter Inc., Elk Grove Village, IL 60007."

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.

2. The submitter of this form must complete blocks 4, 5, 6, and 7, and send to preparing activity.

3. The preparing activity must provide a reply within 30 days from receipt of the form.

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I RECOMMEND A CHANGE:	**1. DOCUMENT NUMBER** MIL-PRF-32004B	**2. DOCUMENT DATE** (*YYYYMMDD*) 2003 10 29

3. DOCUMENT TITLE

PACKAGING OF FOOD IN POLYMERIC TRAYS

4. NATURE OF CHANGE (*Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.*)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (*Last, First, Middle Initial*)	b. ORGANIZATION	
c. ADDRESS (*Include ZIP code*)	d. TELEPHONE (*Include Area Code*) (1) Commercial (2) DSN (*If applicable*)	**7. DATE SUBMITTED** (*YYYYMMDD*)

8. PREPARING ACTIVITY

a. NAME US Army Research, Development and Engineering Command, Natick Soldier Center	b. TELEPHONE (Include Area Code) (1) Commercial: (508) 233-5907 (2) DSN: 256-5907
c. ADDRESS (*Include ZIP code*) US Army Research, Development and Engineering Command, Natick Soldier Center AMSRD-NSC-CF-F 15 Kansas Street Natick, MA 01760-5018	**IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:** Defense Standardization Program Office (DLSC-LM) 8725 John J. Kingman Road, Suite 2533 Fort Belvoir, Virginia 22060-6221 Telephone (703) 767-6888 DSN 427-6888

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