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TITLE

Packaging Specification

Packaging of Small Electronic Parts in Waffle Packs

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<td>Prep: R. L. Billett ____________________________________________________________________________ Appv: B. J.W. Brooks ____________________________________________________________________________ Materials Technology &amp; Engineering Materials Technology &amp; Engineering</td>
<td>Cover sheet and RCR Page are electronic reproductions of the originals. 1.2 Added last line to address internal TRW use. 2.0 Added applicable documents MIL-B-117, ESD S11.11, and EIA-583. 3.2.4. Static Shielded Bags deleted. Bag requirements moved to paragraph 3.3.7 and subsequent. 3.3.1 Deleted last line. Requirement for the use of bags placed in paragraph 3.3.7 and subsequent. 3.3.4. Replaced requirement for light blue carrier with requirement that carrier contrast in color to the part. 3.3.7, 3.3.7.1, 3.3.7.2, 3.3.7.3 Added to provide requirements for use of bags. 6.3 Added to identify location of changes. Minor editorial changes and corrections in a number of locations.</td>
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1.0 SCOPE

1.1 **Scope.** This specification establishes requirements for the preservation, packaging, electrostatic discharge protection, packing and container marking for small electronic parts. Parts packaged in accordance with the requirements of this specification are to be packaged in multi-compartment rigid plastic carriers (waffle packs) compatible with automated handling and assembly equipment.

1.2 **Purpose.** The purpose of this specification is to provide requirements and guidance for the application of protective packaging of electronic parts which will be suitable for the protection of such parts during initial shipment. In addition, it is intended that the packaging will be compatible with subsequent internal handling and transportation operations of receiving, inspection, testing, storage, kitting and issue to manufacturing for assembly using automated equipment. When parts are not intended for shipment, the requirements of paragraphs 3.5 and 3.6 may not be required.
2.0 APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified the issue in effect on the date of procurement placement shall apply.

SPECIFICATIONS

Military

MIL-B-117 Bags, Sleeves and Tubing | A

STANDARDS

Federal

Federal Test Method Standard 101 Test Procedures for Packaging Materials

Military

MIL-STD-129 Marking for Shipment and Storage

American Society for Testing Materials

ASTM D257 D-C Resistance or Conductance of Insulating Materials

ASTM D991 Volume Resistivity of Electrically Conductive and Anti-Static Products

Electrical Overstress/Electrostatic Discharge Association

ESD S11.11 Surface Resistance Measurement of Static dissipative Planar Materials | A

Electronics Industries Association

RS-471 Symbol and Label for Electrostatic Sensitive Items

EIA-583 Packaging Material Standards for Moisture Sensitive Items | A
3.0 REQUIREMENTS

3.1 General.

3.1.1 Procurement Documentation. In addition to the requirements contained herein, packaging shall conform to specific requirements contained within the procurement documentation (part specifications, purchase order statement of work, etc.) when those requirements are more restrictive or definitive than the requirements contained herein. A specific carrier to be used may be specified on the procurement documentation.

3.1.2 Processes. All packaging and related activities including cleaning, preservation, packaging and packing shall be conducted in a manner to ensure that there is no degradation or physical damage including electrostatic discharge damage to the parts.

3.1.3 Cleaning. Parts shall be clean prior to packaging. When cleaning is required it shall be accomplished by a process or combination of processes, which will remove contaminants without causing degradation or damage including electrostatic discharge damage.

3.2 Packaging Materials. All packaging materials shall be clean, dry and chemically inert and shall maintain their required properties including static dissipative properties throughout normal storage, handling and usage.

3.2.1 Static Dissipative Materials. Packaging materials identified herein as static dissipative shall conform to the following:

(a) Surface resistivity equal to or greater than \(1 \times 10^5\) but not greater than \(1 \times 10^{12}\) ohms/square in accordance with ASTM D257 or ESD S11.11.

(b) Static decay time of less than 2 seconds in accordance with Federal Test Method Standard 101 Method 4046.

(c) The material shall be capable of dissipating static charges when grounded without the production of a spark.

3.2.2 Conductive Materials. Packaging materials identified herein as conductive shall have a surface resistivity of less than \(1 \times 10^5\) ohms/square in accordance with ASTM D991.

3.2.3 Insulating Materials. Packaging materials identified herein as insulating shall have a surface resistivity greater than \(1 \times 10^{12}\) ohms/square in accordance with ASTM D257.

3.2.4 Corrosivity. Materials used for or within unit packages shall be non-corrosive in accordance with Federal Test Method Standard 101 Method 3005.

3.2.5 Solderability. Materials used shall not affect part solderability as defined in the applicable part specification.
3.3 Unit Package.

3.3.1 General Description. The unit package shall be a two-piece, homogenous, static dissipative plastic carrier formed with individual cavities in the lower piece and the upper piece being a cover which secures individual parts in their cavities. These carriers are commonly referred to as chip carriers or waffle packs. No more than one part shall be placed into each cavity. A sheet of static dissipative plastic film or other suitable material may be placed over the cavities before closing the carrier. The closure shall be by friction locks, clips or similar means and shall be easy to open and reclose for reuse without damage to the parts or to the integrity of the package.

3.3.2 Carrier Size. The preferred carrier size shall be 2 inches by 2 inches. Whenever the part size or other factors make this size impractical a 4-inch by 4-inch carrier may be used.

3.3.3 Cavity Size. The size of individual cavities in the carrier is dependent upon the size of the part contained. The cavity shall be large enough so that there is no pressure on the part when the carrier is closed. The width and length of the cavity shall be large enough to allow the use of common tweezers to insert or remove the part from its cavity. The depth of the cavity shall not allow the part to turn over when the carrier is closed. Except for parts which are smaller than 0.050 inches square, the cavity size shall not allow the part to rotate within its cavity.

3.3.4 Carrier Color. The carrier color shall provide a contrast to the part color unless otherwise specified for the part purchased.

3.3.5 Orientation. The carrier shall have a chamfer on one corner as an orientation indicator. With the chamfer in the upper left hand corner, parts shall be placed in the carrier starting with the cavity on the left side of the top row. Additional parts shall be placed in the top row moving from left to right then to the second row filling from left to right, etc. All parts shall be orientated identically with respect to each other.

3.3.6 Dimensional Stability. The carrier shall be manufactured from a dimensionally stable material and be of sufficient rigidity so that it will not deform in use to the extent that excessive stress is placed on the parts contained. To facilitate the use of the carriers on automated equipment the carrier shall not distort or rock from pressure applied to the carrier or any part contained in the carrier when the carrier is resting on a flat surface.

3.3.7 Bags. Carriers shall be packaged in bags when required by the following paragraphs.

3.3.7.1 Moisture Sensitive Parts. Carriers containing parts sensitive to moisture shall be preserved in accordance with standard EIA-583 by being placed into a bag conforming to the requirements of MIL-B-117, Type I, Class F, along with a suitable amount of desiccant and a humidity indicator. Excess air shall be removed from the bag and then heat sealed.

3.3.7.2 Static Sensitive Parts. Carriers containing parts sensitive to electrostatic discharge shall be packaged in bags conforming to MIL-B-117, Type I, Class F or Class H, or other static shielded bag made from a laminated plastic film which has static dissipative exterior surfaces and a continuous conductive interior layer. The bag shall be closed by heat seal, zipper, or other suitable means.

3.3.7.3 Other Parts. The use of bags for parts not sensitive to moisture or electrostatic discharge is optional, however when a bag is used it shall conform to the requirements of paragraph 3.3.7.2.
3.4 **Documentation.** Documentation provided with parts shall be packaged as a separate unit package. When plastic bags or envelopes are used for this purpose they shall be of static dissipative material.

3.5 **Intermediate Container.** Intermediate containers are required whenever the shipment contains more than one unit package of a single part number and more than one part number in a single shipment. The use of intermediate containers is optional for other shipments. When required, unit packages containing identical parts shall be placed into an intermediate container which may be a static dissipative bag or fiberboard container. Voids shall be filled using a clean, non-dusting, and chemically neutral cushioning material. The gross packed weight of the intermediate container shall not exceed its design specification.

3.6 **Shipping Containers.** Unit and intermediate containers shall be over packed into shipping containers acceptable for the mode of transportation used. When fiberboard boxes are used as shipping containers they shall bear a boxmaker’s certificate in accordance with applicable freight regulation and classification. The gross weight limit indicated in the box certificate shall not be exceeded.

3.7 **Marking.** All containers shall be legibly and durably labeled, tagged, or marked to show the information specified in the following paragraphs.

3.7.1 **Unit Packages.** The unit packages shall be marked using labels secured to the carrier and to the unit package bag when used. The marking shall show the following information:

(a) TRW Part Identification Number
(b) Manufacturer’s Name, Initials, or Trademark
(c) Nomenclature or description of contents
(d) Quantity of parts contained
(e) Electrostatic-Sensitive Device Label (when applicable, see paragraph 3.7.4)
(f) Special marking when required including lot date code

3.7.2 **Intermediate Containers.** Intermediate containers (when used) shall show the following information:

(a) TRW Part Identification Number
(b) Purchase Order or Contract Number
(c) Nomenclature or description of contents
(d) Quantity of parts contained
(e) Electrostatic-Sensitive Device Label (when applicable, see paragraph 3.7.4)
3.7.3 **Shipping Containers.** Shipping containers shall show the following information:

(a) TRW Purchase Order or Contract Number
(b) Manufacturer’s Name and Identifying Code
(c) Electrostatic-Sensitive Device Label (when applicable, see paragraph 3.7.4)
(d) Precautionary marking or labeling to ensure the safe handling of shipping containers.
(e) Shipping documentation (packing slips) shall indicate the quantity of each part number contained in the shipment if not included in the shipping container marking.

3.7.4 **Electrostatic Discharge Sensitive Marking.** Packages containing parts sensitive to damage from electrostatic discharge shall be marked or labeled to clearly show the sensitive nature of the parts contained. The applicable label requirements of MIL-STD-129 or EIA Standard RS-471 are preferred; however, other distinctive labels of a similar nature are acceptable.

3.8 **Workmanship.** The packaging, packing, electrostatic discharge protection, and marking shall be of uniform good quality and free from defects that will impair service life and appearance.
4.0 QUALITY ASSURANCE PROVISIONS

4.1 Inspection Responsibility. When this specification is invoked on TRW purchase orders, the supplier is responsible for the performance of all inspection requirements as necessary to ensure conformance to this specification. TRW reserves the right to perform any inspection where such inspections are deemed necessary to assure that materials and processes conform to prescribed requirements.

4.2 Acceptance Inspection Procedures. Inspection shall be as specified herein. Shipments which do not conform to the requirements specified herein may be rejected.

4.3 Visual Examination. Packages shall be examined to verify that the package, packaging materials, orientation of parts, and container markings are in accordance with the requirements specified in Section 3 of this specification.

4.4 Certification. The supplier shall provide certification that the packaging methods and materials used conform to the requirements of this specification. The supplier’s standard certificate of compliance issued with each product shipment will be interpreted to include compliance to the requirements of this specification.

5.0 PREPARATION FOR DELIVERY

Not applicable

6.0 NOTES

6.1 Intended Use. This specification is intended to be specified on TRW purchase orders for electronic parts as general requirements for packaging in multi-compartment plastic carriers compatible with automated assembly equipment. The requirements contained herein may also be used by TRW packaging activities. When used internally within TRW, the requirements of paragraphs 3.5 and 3.6 may not be required.

6.2 Suggested Source. A possible source for plastic carriers described herein is Fluoroware Inc. (Telephone number: 612-448-8181).

6.3 Changes from Previous Issue. A vertical line in the right margin is used in this revision to identify the location of changes with respect to the previous issue.