User Guide: EN1107 Supplier Packaging Requirements

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Table of Contents

CS001 User's Guide Template Rev. NR 10/30/08

User Guide: EN1107 Supplier Packaging Requirements

1 General Requirements

1.1 Scope of Document

1.1.1 The requirements of EN1107 shall only be applied to items that fall within a category listed in this document. Items that do not fall into one of the categories below, are outside the scope of this document.

1.1.2 Additionally, within the following numbered sections listed below, COTS (commercial off the shelf) catalog items, without a PCB drawing, are outside the scope of this document:
- Section 2 - Metal Components, except those referenced in 2.1
- Section 3 - Plastic and Rubber Components
- Section 6 - Wire, Cable, and Cable Sheathing

1.2 Packaging Processes

1.2.1 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.

1.2.2 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.

1.3 Packaging Materials

1.3.1 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. Special attention should be paid to re-used packaging with regard to cleaning. PCB does not clean packaging prior to retuning it to the supplier. It is the supplier's responsibility to insure that returned packaging is clean.

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

1.3.2.1 Surface resistivity must be equal to or greater than 1×10^5 but not greater than 1×10^{12} ohms/square in accordance with ASTM D257 or ESD S11.11.

1.3.2.2 Static decay time must be less than 2 seconds in accordance with Federal Test Method Standard 101 Method 4046.

1.3.2.3 The material must be capable of dissipating static charges when grounded without the production of a spark.

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

1.3.4 Electrically Insulating Materials. Packaging materials identified herein as electrically insulating shall have a surface resistivity greater than 1×10^{12} ohms/square in accordance with ASTM D257.

1.3.5 Corrosivity. Materials used for or within unit packages shall be noncorrosive in accordance with Federal Test Method Standard 101 Method 3005.

1.3.6 When very small parts such as pins, crystals, masses, etc., are packed in individual compartmentalized plastic packaging, do not use lids. Use a tray for a lid and this will securely hold the parts in place regardless of future handling/storage of the package.

1.4 Package Marking

1.4.1 Outer packaging as well as intermediate packaging must be labeled. Printed labels are preferred. Packages with handwritten labels may be rejected if the printing is not legible.

1.4.2 The minimum information on each label must include the PCB Piezotronics part number, the manufacturer's part number if different from PCB's number, the quantity of items within the package, and a lot number. On small electronics packaging, such as 2" waffle packs, it may be acceptable to leave the PCB part number off of the label as long as the manufacturer's part number and lot number are present, however prior approval from PCB is required.

1.4.3 At the time of first purchase (PPAP or otherwise) under this requirement document, the supplier must include a written explanation of their lot numbering nomenclature to assist PCB in understanding the encoding of facility, machine, wafer, date, etc. This will allow PCB to more easily resolve and/or contain any material defect issues.

1.4.4 If the package size permits, barcoding of the information in 1.3.2 is preferred. PCB supports code39 and code128 1D barcodes. Alternatively, with prior approval from PCB, 2-D data matrix code containing all of the fields with a space character delimiter may be acceptable for certain materials.

2 Packaging of Metal Components

2.1 Special Components

2.1.1 Any component with a hermetic glass or ceramic seal, such as electrical connectors or electronic headers, is excluded from section 2 only, regardless of metal composition. Such components must comply with section 4.7 for packaging.

2.2 Documentation

2.2.1 Material Certifications and Lot Segregation. All suppliers will provide a copy of material certifications for each item supplied, indicating chemical composition.

2.2.2 If the PCB drawing indicates that Material Lot Segregation is required, a separate certification is required for each lot, and each lot must be packed in a separate unit package.

2.3 Protecting Part Features

2.3.1 Parts that have small, delicate features or parts that have strict surface finish requirements may need to be packaged and delivered in individual compartmentalized plastic packaging to protect those features. Individual packaging is the preferred method for machined parts. For some exceptions to individual packaging, see 2.2.2. Parts that show damage, including marks on surfaces with flatness of finish call outs due to impacts from adjacent parts, will be rejected.

2.3.2 Parts such as connector pins and contacts, typical with diameters of 1/8" or less, do not need to be placed into individual compartmentalized plastic packaging unless otherwise required by engineering. These are typically plated parts. Bulk bag packaging is acceptable, for these parts, unless the parts are found to be susceptible to being damaged while being transported in bags. Damage would include things such as bending, breaking, warping, chipped plating, etc. See 2.2.3 if parts are susceptible to damage.

2.3.3 Protection is required for parts that may be susceptible to bending, breaking, or warping by utilizing proper packaging such as "book style" packages. Un-lined corrugated containers are not acceptable.

2.3.4 The following table shows PCB preferred containers for small parts. Any metal part that can fit within one of the listed pocket sizes should be shipped in one of these containers. Information on these containers can be found at www.rimcoplastics.com. If the company name is marked in indelible ink, PCB will return empty containers to the supplier. (See section 1.2.1)

Part No.	Cavity Qty.	Cavity Shape	Cavity Size	Outside Dimension	Material
RIM-004	11	Round	Ø2.5 x 1	11.5 x 8.38 x 1.06	Anti-static PVC
RIM-006	12	Round	Ø2 x 1	11.5 x 8.38 x 1.06	Anti-static PVC
RIM-010	20	Rectangular	2.19 x 1.31 x 1	11.5 x 8.38 x 1.13	Anti-static PVC
RIM-016	35	Square	1.38 x 1.38 x .88	11.5 x 8.38 x 1	Anti-static PVC
RIM-018	50	Oval	1.38 x .94 x .75	11.5 x 8.38 x .75	Anti-static PVC
RIM-020	96	Round	Ø.63 x .44	10.88 x 7.38 x .5	Anti-static PVC
RIM-026	20	Round	Ø1.63 x .63	11.5 x 8.38 x .75	Anti-static PVC
RIM-028	10	Rectangular	4.38 x 1.44 x .5	11.5 x 8.38 x .5	Anti-static

CS001 User's Guide Template Rev. NR 10/30/08

					PVC
RIM-033	30	Square	.75 x .75 x .63	5 x 6 x .63	Anti-static PVC
RIM-045	14	Rectangular	4 x 1.31 x 1.25	11.5 x 8.38 x 1.25	Anti-static PVC
RIM-046	8	Rectangular	6 x 1.38 x .88	11.5 x 8.38 x 1	Anti-static PVC
RIM-059	100	Round	Ø.31 x .25	10.88 x 7.38 x .5	Anti-static PVC
RIM-064	20	Round	Ø1.75 x 1.56	11.5 x 8.38 x 2	Anti-static PVC
RIM-066	13	Oblong	6.5 x .75 x .63	11.5 x 8.38 x 1	Anti-static PVC
RIM-072	36	Rectangular	2.63 x .75 x .75	11.5 x 8.38 x 1	Anti-static PVC
RIM-085	15	Rectangular	2.5 x 2.0 x 2.25	11.5 x 8.38 x 2.25	Anti-static PVC
RIM-100	100	Oval	1 x .63 x .44	11.5 x 8.38 x .75	Anti-static PVC

3 Packaging of Plastic and Rubber Components

3.1 Requirements

3.1.1 The requirements for plastic and rubber components are still under development. Existing suppliers should continue to use their current packaging, but should refer to section 1, General Requirements, and periodically check this document for updates.

4 Packaging of Electronic Components

4.1 Bare Die Components

4.1.1 All bare die components must be packaged and delivered in a standard 2"x2" waffle pack.

4.1.2 The waffle pack material must be static dissipative per section 1.2.2. The material must be black in color to facilitate picking with a vision based system. All other materials, such as inserts, spacers, etc. used in the packaging of the components must be static dissipative.

4.1.3 Subsequent to first article delivery, die orientation in the pocket, pocket size, pocket depth, and pocket x/y step must not change without notification prior to parts arriving at PCB.

4.1.4 Pocket walls must have a minimum of 15º chamfer to allow for pickup tool to remove die.

4.1.5 Waffle packs must be free of any residue or contamination, including residue from cleaning agents, visible or not. See section 1.1.2.

4.1.6 All die must be oriented in the same direction in the pockets. Pocket size must not permit die to rotate past 45°. Pocket depth must not permit die to flip over, however pockets must be deep enough to prevent die damage during handling with cover in place.

4.1.7 Die must be free of any adhesive or other residue that would result in difficulty removing die from pocket, including residue from "blue tape".

4.1.8 Pockets must be filled without gaps beginning in the upper left and running left to right, top to bottom. Corner notch will denote upper left.

4.2   Hybrid Substrates (Thin and Thick Film)

4.2.1   Substrates that are supplied in singulated form are to be packaged in 2"x2" waffle packs.

4.2.2   The waffle pack material is per the preference of the supplier, as long as it is able to meet all of the requirements in section 1 of this document.

4.2.3   The waffle pack pocket size must be such that both the X and Y dimension are at least 0.030" larger than the substrate in that dimension. For non-rectangular substrates, The pockets must be such that the 0.030" relief exists on opposing sides, not across corners. Additionally, the pocket size must not be so large in either dimension that the substrate can rotate past 45°.

4.2.4   The waffle pack pocket depth must be such that the substrate cannot flip upside down once the lid is on.

4.2.5   Substrates that are supplied panelized are to be stacked and wrapped such that individual substrates are protected from being broken out of the panels.

4.2.6   Any rejected parts on panelized substrates are to be inked out on the top side of the substrate. If paint is used, any color is acceptable. If permanent marker is used, black is the only acceptable color.

4.3   Wire Bondable Components

4.3.1   Wire bondable components other than bare die or substrates are to be packaged and delivered in 2"x2" waffle packs.

4.3.2   The waffle pack material must be static dissipative per section 1.2.2. The material must be black in color to facilitate picking with a vision based system.

4.3.3   Subsequent to first article delivery, Pocket size and pocket x/y step must not change without notification prior to parts arriving at PCB.

4.3.4   Pockets must be filled without gaps beginning in the upper left and running left to right, top to bottom. Corner notch will denote upper left.

4.3.5　Pocket size must not permit components to rotate past 45°. Pocket depth must not permit components to flip over, however pockets must be deep enough to prevent components damage during handling with cover in place.

4.3.6　Components and waffle pack must be free of any adhesive or other residue that would result in difficulty removing component from pocket.

4.4　Surface Mount Components (SMT)

4.4.1　The requirements for many surface mounted components are not developed yet. Except for those specific items described in 4.4.2, existing suppliers should continue to use their current packaging, but periodically check this document for updates.

4.4.2　If the manufacturer's part number calls for packaging in waffle pack, a 2"x2" waffle pack is to be used. The waffle pack material must be static dissipative per section 1.2.2. The material must be black in color to facilitate picking with a vision based system.

4.4.2.1 Subsequent to first article delivery, Pocket size and pocket x/y step must not change without notification prior to parts arriving at PCB.

4.4.2.2 Pockets must be filled without gaps beginning in the upper left and running left to right, top to bottom. Corner notch will denote upper left.

4.5　Through-Hole Components

4.5.1　The requirements for Through-Hole components are still being developed. Existing suppliers should continue to use their current packaging, but should refer to section 1, General Requirements, and periodically check this document for updates.

4.6　Panel Mounted Components

4.6.1　The requirements for panel mounted components are still being developed. Existing suppliers should continue to use their current packaging, but should refer to section 1, General Requirements, and periodically check this document for updates.

4.7　Components With Hermetic Glass or Ceramic Seals

4.7.1　This section is directed at items such as electronic component headers, electrical feedthroughs, hermetic cable connectors, and any other items that use glass or ceramic to achieve an insulating hermetic seal around an electrical pin or pathway.

4.7.2　These Components must be packaged such that the pins are not bent, nicked, or otherwise damaged during shipment and storage. Heavier items may need to be packaged in individual pockets such as those found in vacuum formed trays. It may be possible to package lighter items (such as TO style electronic headers) in small bulk

containers, containing no more than 100pc each. However, the supplier is responsible for insuring that the items arrive undamaged.

    4.7.3 Any item, such as TO style electronic headers, that are meant to accept solid state electronic devices, must be provided in packaging that meets the ESD dissipative material requirements in 1.2.2, This requirement applies to all related packaging material, including any spacers, cushioning foam, etc. Labels must be paper or dissipative plastic.

5 Packaging of Electronic Sub-Assemblies (PC Board Assemblies)

5.1   Requirements

    5.1.1 Multiple assemblies reporting to a single master part number must be individually packaged and labeled, then placed in a common ESD package with proper labeling. The ESD package shall contain all required labeling information when the assembly is too small to do so.

    5.1.2 PC board assemblies must be placed in ESD protective packaging (bags, cases, boxes, etc.). Each package must contain the following information: PCB part number with revision level, name of manufacturer (supplier) and a traceable serial number (manufacture date, lot#, batch#, etc.).

    5.1.3 Any uninstalled component(s) shall be packaged, labeled and placed in a common package with the assembly. Securely attaching the packaged component(s) to the assembly package is acceptable.   (e.g.- stapling)

    5.1.4 Always package assemblies with consideration for potential damage during shipment. Protective inserts, dividers, foam, bubble wrap, etc. should be used when applicable.

6 Packaging of Wire, Cable, and Cable Sheathing

6.1   Requirements

    6.1.1 The requirements for wire, cable, and cable sheathing are still under development. Existing suppliers should continue to use their current packaging, but should refer to section 1, General Requirements, and periodically check this document for updates.

7 Packaging of Ceramic, Glass, Mica and Crystal Components

7.1   Requirements

    7.1.1 The requirements for ceramic and crystal components are still under development. Existing suppliers should continue to use their current packaging, but should refer to section 1, General Requirements, and periodically check this document for updates.

7.2 Mica Washers / Wafers

7.2.1 Mica parts are to be packaged in "notebook" style packaging: each wafer / washer to be packaged between a sheet of paper to protect parts from scratches.

8 Packaging of Enclosures and Chassis

8.1 Requirements

8.1.1 The requirements for enclosures and chassis are still under development. Existing suppliers should continue to use their current packaging, but should refer to section 1, General Requirements, and periodically check this document for updates.

9 Packaging of Electrodes

9.1 Requirements

9.1.1 When "notepad packaging" requirements are specified on the drawing, packaging can be interleaved in un-specified notepad paper or stacked together between paper. Requirement is electrodes are sandwiched between paper, electrode cannot be damaged or fall out of packaging during shipment. Single sheets of paper with foam over the last sheet of paper will ensure electrodes stay in place. Tape shut plastic case ensuring it never opens during shipping.

10 Packaging of Hybrid Microelectronic Assemblies

10.1 Definition of Hybrid Microelectronics

10.1.1 PCB considers as assembly to be a hybrid microelectronic assembly if the components are assembled onto a thick or thin film ceramic substrate, or if it has bare die regardless of the substrate material used.

10.2 Requirements

10.2.1 Hybrid Assemblies with no exposed wirebonds must be packaged and delivered in a standard 4"x4" waffle pack with appropriate pocket size.

10.2.2 Assemblies with exposed wirebonds must be packaged and delivered in a container with an internal gel to hold the assembly down. The minimum Tak level of the gel must be Tak 8. If there is more than one assembly per container, they must be spaced such that each assembly can be removed safely without damaging surrounding assemblies.

10.2.3 The following table contains the recommended gel box for each hybrid assembly. Equivalent boxes from other manufacturers may be used with approval from PCB engineering.

User Guide: EN1107 Supplier Packaging Requirements

PCB Assembly Number	Gel Box Part Number	Box Manufacturer
78641-01	AD-1135C-00-X8	GELPAK

10.2.4 Additional Electro-mechanical Complexity

10.2.4.1 If the hybrid substrate is attached to another component such as a TO type header or a MLCC housing, the assemblies mush be packed in such a way to capture the assembly during handling and prevent damage to exposed wirebonds. In the case of TO type headers, pushing the header pins into foam is not acceptable if there are exposed wirebonds.

10.2.4.2 If the assembly is more complex, as above, but does not have exposed wirebonds or fragile features it may be inserted into foam or use a similar method as long as the parts are prevented from moving around and hitting against each other.

10.2.5 The container material (waffle pack or gel pack) must be static dissipative per section 1.2.2. All other materials, such as inserts, spacers, etc. used in the packaging of the components must be static dissipative.