



General Bagging Specification

Document Number and Revision: 950-3918-01 Rev 54

Overview

The purpose of this document is to establish the criteria for selecting the appropriate containment method (bag or wrap) and material for all products, parts, components, sub-assemblies and systems.

Audience

Oracle's OEM, EM, JDM, RV and other 3rd party suppliers which are sold by Oracle.

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1. Introduction

1.1. Purpose

- 1.1.1. The purpose of this document is to establish the criteria for selecting the appropriate containment method (bag or wrap) and material for all products, parts, components, sub-assemblies and systems.

1.2. Scope

- 1.2.1. All packaged products, parts, components, sub-assemblies and systems sold by Oracle must be bagged or wrapped with materials that are compliant with the requirements of this specification.
- 1.2.2. This requirement includes all packages designed and manufactured by Oracle, as well as all packaged products and components purchased from Oracle's OEM, EM, JDM, RV and other 3rd party suppliers which are sold by Oracle.

1.3. Reference Documents

- 1.3.1. MIL-PRF-81705E "Barrier materials, flexible, electro-static protective, heat seal-able."
- 1.3.2. ANSI/ESD S541-2008 "Packaging Materials for ESD Sensitive Items"

2. Required level of ESD Product Protection

- 2.1. ESD (Electro-Static-Discharge) protection levels for products to be defined by Oracle's Product/Component Engineer.

3. Containment Method (bag vs wrap)

- 3.1. Small components and sub assemblies shall be bagged (e.g. Blades, FRUs, CRUs, DRUs, and X-options). Any loose items (e.g. screws, hardware) shall be bagged separately.
- 3.2. Medium sized systems shall be wrapped in sheets (in general 1RU systems and above up until a system requires an integrated pallet). These systems are generally contained in a standard style box (RSC, HSC, RTF, etc.)
- 3.3. Larger systems with integrated pallets generally shall use bags.
- 3.4. Other containment methods may be used but must be approved by Oracle Packaging Engineering (e.g. thermoformed tray, conductive corrugated, padded bags, etc.).

4. Material Requirements

- 4.1. Establishing the appropriate packaging material:
- 4.2. The product's or component's ESD sensitivity (as determined in section 2.1), establishes the corresponding required packaging material from level three (highest ESD protection) to level one (no ESD protection).

5. Level Three Protection:

- 5.1. Highly sensitive products/components must use static shielded bags (wrapping with sheets is not acceptable).
- 5.2. Static shielding materials are generally 10^4 ohms must meet MIL-PRF-81705E, type III or ANSI/ESD S541-2008.
- 5.3. Minimum thickness for static shielding bags shall be 3 mil.
- 5.4. Static shielded materials have a metallic appearance.
- 5.5. Static shielding bags may not be required if the Oracle specified package includes a primary/inner package made from Conductive Containers Incorporated, CORSTAT™, conductive corrugated fiber board. Other conductive corrugated fiber board materials may NOT be used without prior written approval from Oracle Packaging Engineering, and they would need to have published electrical properties that meet or exceed CORSTAT™ electrical protection levels.

6. Level Two Protection:

- 6.1. Less static sensitive products/components require materials with static dissipative properties.
- 6.2. Products/components requiring cosmetic protection delivered to a static-free environment must use static dissipative materials if the product/component includes plastics, but may use antistatic material (amine-free) if the product/component does not include plastics.
- 6.3. Static dissipative materials are generally between 10^4 ohms to 10^{10} ohms and must meet MIL-PRF-81705E, type II or ANSI/ESD S541-2008.
- 6.4. Minimum thickness for plastic static dissipative and non ESD materials shall be 2 mil.
- 6.5. All material additives must be permanent, not treated or topically applied and must be amine free.
- 6.6. Material color may vary from geographic regions. Most common colors are pink and blue.

7. Level One Protection:

- 7.1. Non-static sensitive components do not require materials with ESD protection (e.g. rack mount kits, cables, connectors, etc.). This protection requires cosmetic protection from abrasion, scuffing, dusting, and handling and must be bagged or wrapped.
- 7.2. Components that do not require ESD protection and are not delivered to static-free environments can use non-static dissipative or non-antistatic materials.
- 7.3. Material color is generally clear or transparent.

8. VCI Material Requirements

8.1. Description/Definition:

VCI: Vapor Corrosion Inhibitor

VpCI®: Vapor phase Corrosion Inhibitor

VCI films protect metal parts from all types of corrosion including rust, tarnish, stains, white rust, and oxidation for up to 5 years. VCI films and bags replace rust preventatives such as oils and desiccants. It does not contain free amines, phosphates, or halogen-based materials, and is non-toxic and recyclable. Protection against salt, humidity, condensation, moisture, and dissimilar metal corrosion. The VpCI vaporizes and then condenses to metal surfaces in the enclosed package. VpCI® reaches every area of your part, protecting its exterior as well as hard-to-reach interior surfaces. Provides complete product protection during storage as well as domestic and overseas shipments.

8.2. Material: Cortec® Corporation VCI VpCI® – 126 (or equivalent with approval of Oracle Packaging Engineering)

8.3. Mechanical Properties

Property		Test Method	Units	VpCI®-126		
Thickness		ASTM D6988	mil (µm)	2.0 (50)	4.0 (100)	6.0 (150)
Breaking Factor	MD	ASTM D882	lbs/in (N/m)	9.3 (1629)	18.4 (3226)	18.9 (3306)
	TD			9.5 (1665)	18.7 (3277)	18.3 (3196)
Tensile Strength at Break	MD	ASTM D882-02	psi (MPa)	4759 (32.812)	4424 (30.502)	3184 (21.953)
	TD			4603 (31.737)	4357 (30.040)	3110 (21.443)
Elongation at Break	MD	ASTM D882-02	%	607	779	770.4
	TD			676.3	835	833.7
Yield Strength	MD	ASTM D882-02	psi (MPa)	1528 (10.535)	1334 (9.198)	794 (5.474)
	CD			1576 (10.866)	1610 (11.101)	1425 (9.825)
Tear Strength	MD	ASTM D1922-06a	mN	3755.3	11159.9	15853
	CD			7965.7	15413.5	20279.2
Dart Drop Impact Resistance		ASTM D1709-04, Test Method A	grams	347.4	790	753.3

8.4. Packaging and Storage: To ensure best product performance, store in original packaging, indoors, and out of direct sunlight at 40-100 °F (4-38 °C). Shelf life: 2 years

8.5. Metals Protected:

- Aluminum
- Galvanized Steel
- Carbon Steel
- Silicon Steel
- Stainless Steel
- Copper
- Brass
- Cast Iron

9. Containment Requirements

- 9.1. Bag or sheet size is defined by product/component size and needs. Manufacturing may be consulted in selection of size.
- 9.2. Whenever possible, use the smallest amount of material that adequately protects the product.
- 9.3. Bag style defined by product/component shape and manufacturing needs.
- 9.4. Bag closure defined by product/component needs.
- 9.5. All cosmetic surfaces must be covered.
- 9.6. ESD bags to be securely closed to prevent bag from opening and allowing direct contact with product/component. Method of closure must not introduce an ESD charge.
- 9.7. Thin foam materials can replace standard plastic sheets/bags in level two or level one applications. Thin foam, must not impact the performance of the packaging system. Replacement of level two materials must meet the ESD requirements as stated in 4.3.3.
- 9.8. Thin foam material must be used with discretion as it tends to puncture and propagate tearing and thus is not recommended with components with sharp edges or protrusions.

10. Definitions

- 10.1. **Systems:** A high level assembly that can run independently and is fully enclosed with sheet metal (server, workstation, hub, library, etc...)
- 10.2. **Sub assembly/components:** Lower level assemblies that require a system to function, generally these are FRU's, DRU's, CRUs or component X-Options (IE; power supplies, mother boards, blades, etc...)
- 10.3. **Static Shielding:** Metallized plastic material that has a reference surface resistance of $<10^4$ ohms (specific requirements are defined in the listed specifications in 1.3).
- 10.4. **Static Dissipative:** Plastic material that has a reference surface resistance between 10^4 ohms to 10^{10} ohms. (specific requirements are defined in the listed specifications in 1.3).

10.5. **Antistatic** (Low Charging Material): Antistatic materials with low charging properties do not meet product ESD protection requirements. These materials may be utilized to reduce the risk of ESD triboelectrification events and must be amine free.

10.6. **ESD**: Electro-static-Discharge.

10.7. **Bags**: Materials that are formed or manufactured to allow for one area entry.

10.8. **Sheet/Wraps**: Materials that have no seams or scores.

10.9. **Static Generators**: Materials that will generate a static discharge (e.g. some plastic labels or tape).

10.10. **Plastics**: Materials for sheets and/or bags typically made from polyethylene or polypropylene.

10.11. **Padded Bag**: A padded bag often called “Jiffy Bag” is composed of inner and outer paper layers with a padded middle layer composed of recycle paper fibers and post consumer waste material.

10.12. **Closure**: The method of closing a bag; self-locking “zip lock”, pressure sensitive tape, or have plastic/paper label are most common.

10.13. **VCI**: Vapor Corrosion Inhibitor

Revision History

REV	ECO	DESCRIPTION	DATE
50	WO 21623	Eng Release per ECO	8/17/01
51	WO 42357	Revised to include sheets and ANSI specs	1/27/10
52	E0000874	Change to Oracle Format and add clarification in Section 3.1	11/12/10
53	E58127	Added section 5.5. Update to Redwood format	10/11/22
54	E63205	Add VCI requirements	9/23/24

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