



# Lenovo Packaging Specification 41A0612

## Packaging Materials, Essential Requirements *Restricted Heavy Metals and Other Materials of Concern*

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REVISION HISTORY

Rev	Revision Description	Date	Approved by
A0	Creation	22MAY2006	Mo Shayesteh
A1	Version Update	16MAY2010	Sarah Yu
A2	1. Add Rigid Plastic Packaging Containers (RPPC) as Point 6 in 2.0 Requirements on page 7 2. Update web-link to Lenovo's Environment and Packaging Guideline homepage on page 11	03DEC2012	Royal Bai & Karen Li
A3	Update the template with new logo	09APR2018	Royal Bai
A4	Add Chlorine free requirement on page 6,7,8	07DEC2018	Royal Bai
A5	1. Add the requirement of Phthalate and PFAS on page 7,9 2. Add the requirement of Mineral Oil prohibition in packaging on page 7,9	13JUN2023	Royal Bai

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## 1.0 Introduction

### 1.1 Abstract

This specification establishes packaging requirements for Lenovo products, parts and assemblies including those supplied by Contract Manufacturers (CMs), Original Equipment Manufacturers (OEMs), & 3rd party suppliers. It is largely based on European Union Directive 94/62/EC (Article 11) also described as “the essential requirements” and specifically CEN Technical Report 13695-2 (2004) which addresses heavy metals compliance in packaging materials. Where appropriate, Lenovo will establish additional requirements consistent with its environmental objectives and policies.

Important: This specification and related requirements must NOT be confused with similar international directives related to Restrictions on Hazardous Substances (RoHS) for electronic products. These are separate and distinct directives with unique requirements. However, this specification does require compliance with the relevant packaging aspects of the China RoHS regulation which combines packaging and product requirements into one document.

### 1.2 Purpose

This engineering specification identifies the elements and compounds that are restricted in packaging materials, and stipulates their maximum **cumulative** concentration levels in any packaging material or packaging component.

### 1.3 Compliance

Compliance with the requirements herein will be enforced as a condition of purchase per Lenovo purchase contracts, either for the supply of parts or subcomponents or for the purchase of packaging materials for the shipment and distribution of Lenovo products and integrated hardware solutions. When the requirements of this specification conflict with applicable governmental regulations or legislation the more stringent requirements shall take precedence.

### 1.4 Scope and Objectives

1. This Lenovo Engineering specification (ES 41A0612) applies to all packaging used in protecting, handling, or marketing of Lenovo products, parts and supplies including those manufactured by an Original Equipment Manufacturer (OEM), Contract Manufacturer (CM), or 3rd Party vendor.
2. It is important to note that Lenovo separately maintains environmental and / or related requirements for materials, parts and products for use in Lenovo products in other specifications, contracts or procurement documents. Those items are not within the scope of ES 41A0612.

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3. This specification (ES 41A0612) establishes baseline environmental requirements for all packaging materials. ES 41A0612 implements Lenovo's environmental policy objectives and contains some, but not all, major legal requirements for packaging materials. Compliance with the requirements in ES 41A0612 alone may not satisfy the supplier's responsibilities to Lenovo since ES 41A0612 does not encompass all legal environmental requirements in various countries around the world for packaging materials. In general, ES 41A0612 contains restrictions on certain substances and chemicals in packaging. If a packaging component or packaging material is not specifically listed here, but serves the purpose of packaging for protection of the product, then it should be considered within scope unless clearly defined in government legislation or directives to be out of scope:

- Banding / Strapping
- Chipboard
- Coatings\*
- Corrugated Fiberboard
- Cushioning
- Dunnage
- Film / Foil
- Glue\*
- Inks\*
- Labels
- Paper / Paperboard
- Plastic
- Plastic/Foam Cushioning
- Adhesive Tape
- Pallets and Crates of all material constructions (solid wood, plywood, plastic, metal, etc.)
- Hardware items used for assembling packaging (nails, nuts, bolts, screws, etc.)

\* Materials not separable from packaging materials or components

**1.5 Terms and Definitions**

- Cadmium (Cd):** A metallic element sometimes used in plastics manufacture.
- Hexavalent Chromium (Cr6)** Chromates are often used as pigments for photography, and in pyrotechnics, dyes, paints, inks, and plastics. They can also be used for stainless steel production, textile dyes, wood preservation, leather tanning, and as anti-corrosion coatings. It is carcinogenic and corrosive on living tissue.
- Lead (Pb):** A metallic element used in plastics manufacture as a heat stabilizer and in inorganic pigments for opacity. It is a cumulative toxin.
- Mercury (Hg):** A metallic element used in inorganic pigments. It is a neurotoxin.

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**Methyl Bromide (aka Bromomethane)**

A volatile gas that is used for fumigation of wooden packaging to combat pests (insects). Methyl Bromide is a concern because it is material of concern since it is an ozone depleting substance.

**Halogenated or Brominated Flame Retardants**

Polybrominated Biphenyls (PBB's) and Polybrominated Biphenyl Ethers (PBDE's). These have been used for fire retardation in plastics and therefore may find their way into reusable or durable plastic items used for packaging. Although not specifically restricted by the EU Packaging Directive, they should not be used in Lenovo Packaging materials.

**OEM / CM**

Original Equipment Manufacturer / Contract Manufacturer. Companies that may be involved in building Lenovo products, parts or subcomponents for Lenovo products.

**Package**

A container providing a means of marketing, protecting, or handling a product; including a unit package, an intermediate package, and a transport shipping container as defined in EU Directive 94/62/EC

**3rd Party Manufacturer**

A company that provides an auxiliary product not supplied by the primary manufacturer.

**Packaging Components**

Packaging materials which can be easily separated by hand or by simple mechanical means during the waste management process.

Examples of Packaging Components:

- Inserts
- Cushions
- Cartons
- Adhesive Tape and Labels adhered to cartons or other materials
- Banding/Strapping
- Clips

**Packaging Subcomponents**

They are considered to be a part of the packaging material or packaging component to which they are permanently attached.

Examples of packaging subcomponents:

- Inks printed on cartons or other packaging materials
- Nails, screws and other hardware used in pallets and crates
- Staples used in the Manufacturer's Joint of a Carton
- Coatings placed on packaging materials

**Elemental Chlorine Free (ECF)**

Packaging material produced with pulp that has been bleached using a chlorine derivative such as chlorine dioxide (ClO<sub>2</sub>), but without the use of elemental chlorine (Cl).

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*Engineering Specification*

**Processed Chlorine Free**

Packaging material produced with pulp from virgin and/or recycled content that has been bleached without any type of chlorine, or that has not been bleached at all. Recycled content may have originally been bleached with chlorine or chlorine derivatives.

**Totally Chlorine Free (TCF)**

Packaging material produced with pulp from virgin content that has been bleached without any type of chlorine, or that has not been bleached at all.

**PFAS**

Per- and Polyfluoroalkyl Substances (*chemicals*)

**Mineral oil**

A liquid by-product of refining crude oil to make gasoline and other petroleum products. The World Health Organization classifies untreated or mildly treated mineral oils as group 1 carcinogens to humans; highly refined oils are classified as group 3.

**MOAH**

Mineral Oil Aromatic Hydrocarbons, consists of aromatic partially hydrogenated and highly alkylated compounds.

**MOSH**

Mineral Oil Saturated Hydrocarbons, consists of saturated aliphatic and cyclic hydrocarbons.

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## 2.0 Requirements

1. No packaging material or packaging component used for Lenovo parts or products shall contain lead (Pb), cadmium (Cd), mercury (Hg), hexavalent chromium (Cr6), or brominated flame retardants (including PBB, PBDE, TBBA, TBBPA, and HBCDD) as part of its final composition in excess of a sum concentration level of 100ppm (0.01%) by weight.

Example: If a packaging component or material is analyzed and found to have 10ppm of lead, 20ppm of Cadmium, and 80ppm of Hexavalent Chromium then this material would not be compliant since the sum concentration is 110ppm (over the 100ppm limit).

2. All packaging subcomponents (as defined in section 1.5) must comply with the 100ppm limits individually. That way, no matter how many of them are used, and in any combination, it would be impossible for the overall concentration to exceed 100ppm in the final package assembly.
3. There shall be no intentional introduction of any of the restricted substances for the purpose of achieving a specific desired function, performance or appearance. Regardless of whether a restricted substance was intentionally used, the final composition amount is what matters.

Example: It is possible that Cr6 is used in the sheet metal manufacturing process; however, when the sheet metal is completed, it has less than 100ppm of Cr6 in its final composition. Therefore, this would be compliant.

4. Do not use Methyl Bromide for fumigation purposes. Exceptions to this policy are allowed only if MB is specifically mandated by law and no other remedy is available (example Heat Treatment or alternative materials that do not require treatment). However, there is no requirement to measure packaging materials or components for the presence of Methyl Bromide in its construction.
5. Do not use Polyvinyl Chloride (PVC) for packaging applications. While PVC is inert, its use in disposable packaging is a concern to many clients and therefore Lenovo has elected to not use PVC for packaging applications. The most common uses of PVC in packaging is flexible wraps and semi-rigid trays.
6. California's Rigid Plastic Packaging Container (RPPC) Regulations place improvement requirements on qualifying RPPC packaging. RPPC is defined as containers that are entirely made of plastic, have a volume of at least eight fluid ounces (237 cubic centimeters), can maintain their shape while holding a product, are capable of multiple reclosures and are sold with an attached or unattached lid or cap. Containers or blister packaging that cannot be reclosed, flexible packaging that does not maintain its shape while holding a product, and plastic boxes that have at least one side not made of plastic are not considered RPPC. It is Lenovo's position that RPPC not be used for products shipped into California without prior approval from Lenovo's Packaging and Environmental Affairs teams. Lenovo's Packaging and Environmental Affairs teams must review the packaging to determine if it meets the current requirements of the law and if improvements can be made in future generations of the packaging in order to maintain compliance to the law.
7. Do not use elemental chlorine as a bleaching agent to bleach virgin or recovered fibers used in product packaging. The use of recovered fibers that were previously bleached is acceptable. Lenovo's requirement for product packaging to be either elemental chlorine free (ECF), totally chlorine free (TCF) or processed chlorine free meets the requirements.

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- 8. Phthalates on Phthalates Precautionary List shall not be intentionally added to any package or packaging component. The sum of the combined concentrations of phthalates shall not exceed 100 ppm (w/w).

Phthalates shall not be intentionally added to any package or packaging component. The sum of the combined concentrations of Ortho-Phthalates listed on Biomonitoring California Designated Chemicals shall not exceed 100 ppm (w/w).

PFAS from OECD's Toward a New Comprehensive Global Database of Per- and Polyfluoroalkyl Substances (PFASs) shall not be intentionally added to any package or packaging component. The sum of the combined concentrations of total fluorine present in any packaging component shall not exceed 100 ppm by weight.

- 9. Mineral oils containing substances that disrupt the recycling of packaging waste paper or restrict the use of recycled materials because of the risk of these substances to human health.

The French Ministry of Ecological Transition published an Order, pursuant to article 112 of the AGEC law on mineral oils, which prohibits the use of mineral oils in packaging and printed materials distributed to the public. This order is effective from 01 January 2023 and restricts the following two types of mineral oils:

- Mineral oil aromatic hydrocarbons (MOAH) consisting of 1 to 7 aromatic cycles.
- Mineral oil saturated hydrocarbons (MOSH) consisting of 16 to 35 carbon atoms.

The Order also defines the mass concentration thresholds starting from 2023, above which the restrictions apply. Until 31 December 2024, the ban on the use of mineral oils applies when the mass concentration in the ink of MOAH is greater than 1%.

From 01 January 2025, the ban on the use of mineral oils applies to:

- MOAH, where the mass concentration in ink of these substances is greater than 0.1 % or is up to a limit of one part per million (ppm) for compounds of 3 to 7 aromatic cycles.
- MOSH, where the mass concentration in ink of these substances is greater than 0.1 %.

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### 3.0 Supplier Responsibility

This specification is applicable to suppliers of packaging materials and packaging components to Lenovo, their suppliers, and vendors performing work on contract for Lenovo.

1. Suppliers of packaging materials and components, who are distributors and not manufacturers, shall ensure that their source manufacturers are in compliance with this specification.
2. Suppliers of packaging materials and components, who are manufacturers, shall ensure that their source manufacturers and materials suppliers are in compliance with this specification. Suppliers of packaging materials and components must provide Lenovo with certification documentation ensuring compliance with this specification.
3. OEM suppliers who distribute or remarket Lenovo logo products, parts or supplies must provide Lenovo with certification documentation ensuring compliance with this specification.
4. Lenovo may request compliance certifications and test data from its first tier suppliers. A web based tool will be established for this purpose and will be communicated separately. Those suppliers in turn will need to request certifications and data from their suppliers and so on as many tiers as necessary to get to the first source manufacturer of the packaging material or packaging component (see section 3.1).
5. The certification process itself is subject to change based on industry norm or convention. For instance, if standardized methods for compliance certification are adopted universally, then this method shall be adopted herein as part of this specification.
6. Blanket Commodity Certifications are allowed as per the description that follows. For instance, Supplier A makes only corrugated fibreboard materials. They have tested their process and determined that all of their corrugated materials meet the requirements of this specification. They may submit a blanket certification covering all corrugated fibreboard materials purchased by Lenovo or its OEM partners on our behalf. A separate certification for each carton part number is not required. This is a practical approach considering that there are far fewer packaging commodities than there are individual packaging components. However, at the Government and Client level, they want to know that a specific product they are purchasing from Lenovo is in compliance. Therefore, extrapolation from packaging commodity compliance to product compliance is presumed when every individual packaging commodity is certified by the Supplier(s) to be in compliance.

Suppliers should contact Lenovo Purchasing at the appropriate manufacturing or distribution location with any questions concerning this specification.

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## 4.0 Lenovo Responsibility

Refer to Appendix A for an illustrated example

1. Packaging Procurement and/or Packaging Engineering organizations having design specification or purchasing responsibility for Lenovo / CM built products, supplies, packaging materials, and packaging components will establish audit processes to ensure and track compliance with this specification.
2. OEM Procurement: This responsibility includes the packaging for OEM products, parts and supplies because the regulations consider Lenovo to be responsible if Lenovo is the importer of record.
3. Assigned GCMs within Lenovo are responsible in all instances where Lenovo is the final importer of record, including third party goods. For instance, if Lenovo procures products from another manufacturer (3rd Party Manufacturer) to bundle with Lenovo Logo products for sale to a client, Lenovo may then be considered liable for compliance of the entire sales offering including the non-Lenovo logo'd items.

*Example 1: Lenovo sells a complete solution to a client which involves Lenovo computers as well as third party (non-Lenovo Logo) printers and software. Technically, since Lenovo brought the solution to market, Lenovo is considered to be responsible with regard to EU Directive 94/62/EC compliance for the entirety including the third party products. In this case, IGS PROCUREMENT is responsible for obtaining a certification from the supplier(s) for their respective pieces of equipment, for instance, a Lexmark printer or Microsoft Software.*

*Example 2: Several tiers down the supply chain of a packaging commodity a wood crate with permanent metal fasteners are audited for compliance purposes. As those fasteners cannot be removed by hand or by simple mechanical means they are considered part of the package, e.g. crate. In this case, some calculations would be required to determine the relative weight of the fasteners compared to the wood in order to determine compliance status.*

- *Outcome 1: Calculations determine that the overall crate is below 100ppm even though the permanent fasteners were found to be above 100ppm individually. As a consequence, the crate could be deemed legally compliant according to EU Directive 94/62/EC; however, a mitigation plan to bring the permanent fasteners into compliance with the 100ppm limit would be required to meet Lenovo requirements for individual packaging subcomponents (per Section 2.a).*
- *Outcome 2: Calculations determined that the crate would exceed the 100ppm limit for heavy metals. In this case, the entire crate would NOT be eligible for shipment and alternative packaging would have to be put into place.*

See Figure in Appendix A for explanation of the general approach. Scope is not limited only to those commodities illustrated; it applies to any packaging component or material or packaging supply organizational structure.

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## *Engineering Specification*

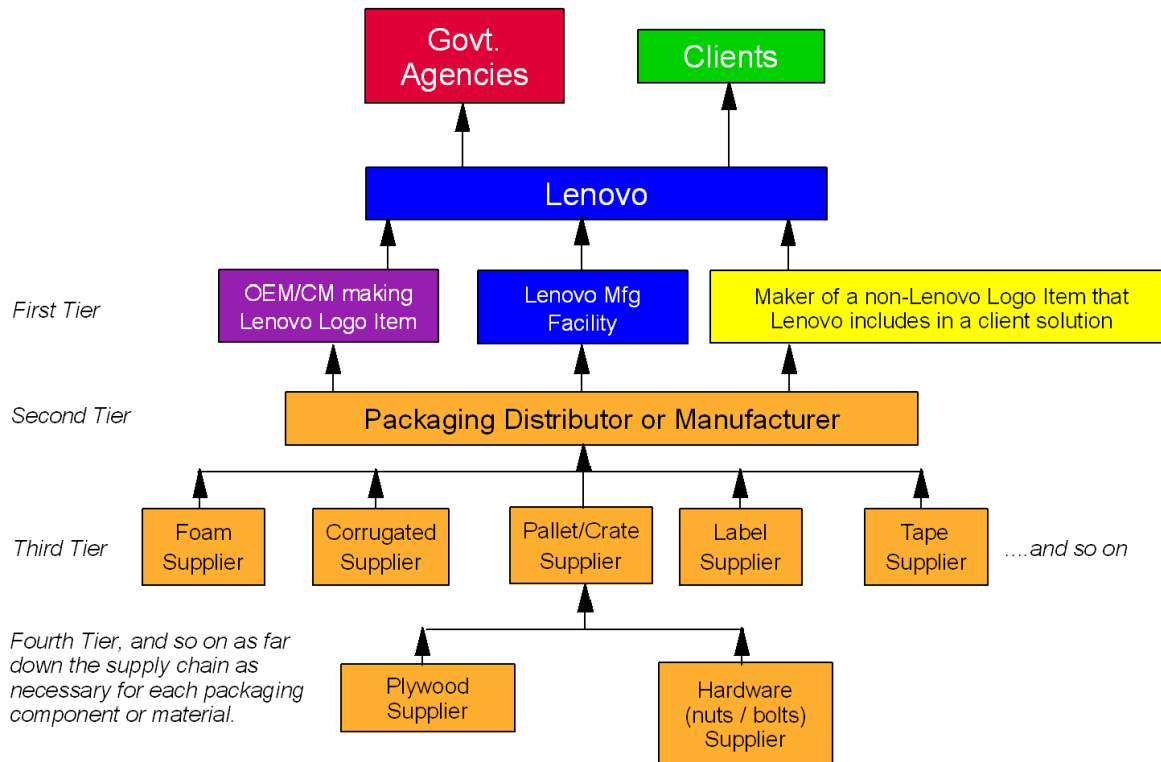
Important: At this time there are no officially sanctioned or standardized certification forms or specific testing methods established for compliance with the EU 94/62/EC Directive. Therefore, it is simply necessary to perform the testing using generally accepted industry methods and document the way it was conducted and the results. Furthermore, those documented results must be available upon request in the event of a process audit. Lenovo will require proactive affirmation of compliance status, to be recertified on an annual basis, and the scope by which that certification applies (type of material, where used, and so on). See Appendix B for example.

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# Appendix A: Compliance Reporting Structure

## Packaging Essential Requirements Restricted Heavy Metals Compliance Reporting Structure



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## Appendix B: Certification of Compliance

Click here or visit this web page for full details  
<https://www.lenovo.com/us/en/sustainability-resources/>

**Summary of Questions:** This summary is provided for convenience. Full details are contained in the referenced Lenovo Engineering Specifications and related regulatory requirements.

**Mandatory Questions:**

1. Does your packaging material/design manufacturing process EXCLUDE intentionally introduced restricted toxins (Lead, Cadmium, Hexavalent Chromium, Mercury, and brominated flame retardants and have a sum concentration of these substances less than 100ppm (<0.01%) by weight? Yes (Compliant) or No (Not compliant)
2. Are the packaging materials/designs you manufacture for use on *nonreusable* packaging for Lenovo products recyclable? Yes (Compliant) or No (Not compliant)
3. Are the packaging materials/designs you manufacture for use on Lenovo products separable by hand and without special tools? Yes (Compliant) or No (Not compliant)
4. Are your plastic packaging materials sufficiently marked to augment separation and recycling? Yes (Compliant) or No (Not compliant)
5. Do the packaging materials/designs you manufacture for use on Lenovo products meet or exceed the specified (Post Consumer) recycled content per CPG Guidelines? Yes (Compliant) or No (Not compliant)
6. Is all wooden packaging heat treated and marked per Lenovo Spec 41A0609 (and therefore compliant with ISPM-15)? Yes (Compliant) or No (Not compliant)

**Bonus Questions:** These are often required by clients and may be required in some countries.

7. Are the packaging materials/designs you manufacture for use on Lenovo products reusable?
- 8a. Do you offer a post-use Take Back option for your packaging materials? Yes / No
- 8b. If yes, is this available at no cost to the end customer? Yes / No
9. Please explain any significant source reductions that may have been implemented or use this section to explain if a noncompliance to any EPEAT criteria was justified on the basis of a significant source reduction. Example: a 90% source reduction was achieved but this resulted in the materials becoming commingled and therefore not compliant with question 3 above.

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## Appendix C: References and Related Documents

Document Number	Description
EU Directive 94/62/EC (1994), Article 11	European Parliament and Council Directive on Packaging and Packaging Waste
EU Directive 2004/12/EC GA21-9261-x (latest)	Addendum to EU Directive 94/62/EC Packaging and Handling, Supplier and Interplant Requirements (Lenovo's General Packaging Requirements)
IEEE 1680.1-2018	IEEE Standard for Environmental and Social Responsibility Assessment of Computers and Displays
<b>GEC-COC-2022</b>	<b>Reduction of Chemicals of Concern</b>
<b>The AGECE law</b>	<b>Article 112</b>

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