

# Packaging Materials, Essential Requirements

## Restricted Heavy Metals and Other Substances of Very High Concern (SVHC's), Packaging Material Data Collection and Reporting

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5897660 Pg 1 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L80800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	P11779 Jan2018
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## Table of Contents

1.0 Introduction	4
1.1 Abstract	4
1.2 Purpose	4
1.3 Scope and Objectives	4
2.0 Requirements	5
3.0 Supplier Responsibility	10
4.0 IBM Responsibility	11
Appendix A: Compliance Reporting Structure	13
Appendix B: Packaging Environmental Compliance Reporting Process	14
Appendix C: References and Related Documents	15
Appendix D: Terms and Definitions	16

Description of Key Changes (new additions colored blue for convenience)	EC	Date
<ul style="list-style-type: none"> <li><b>Added</b> 11 new REACH Substances of Very High Concern (SVHC) candidates as well as add some additional CAS numbers to the entries for Anthracene and Hexabromocyclododecane (HBCDD). <b>Removed</b> a substance that was previously on the REACH SVHC candidate list but was removed by ECHA (European Chemical Agency). Removed was Cyclododecane (CAS No. 294-62-2).</li> <li><b>Moved</b> the restrictions on halogenated flame retardants into a separate entry to avoid confusion regarding heavy metals restrictions. There are firm legal restrictions on heavy metals in packaging per EU Directive 94/62/EC (ref. Section 2.0(a)) but not presently for flame retardants (refer to section 2.0 (b)). However, since these are substances of concern, we do not want them to appear in packaging regardless.</li> <li><b>Added</b> new restrictions regarding desiccants (refer to section 2.0(g))</li> <li><b>Modified</b> responsibility statements as it relates to IBM Procurement (refer to section 4.0)</li> </ul>	L80800B	12-2009
<ul style="list-style-type: none"> <li><b>Added</b> 3 new REACH Substances of Very High Concern (SVHC) candidates that have a possible connection to packaging materials. Refer to Section 2.0(h) <b>Deleted</b> 3 REACH SVHC's which have no known connection with packaging. These included <ul style="list-style-type: none"> <li>5-tert-butyl-2,4,6-trinitro-m-xylene (musk xylene) CAS Number: 81-15-2</li> <li>Aluminosilicate, Refractory Ceramic Fibers, CLP Index No: 650-017-00-8</li> <li>Coal tar pitch, high temperature, CAS Number: 65996-93-2</li> </ul> </li> <li>Add California Toxics in Packaging regulation to the references and to section 2.0(a)ii.</li> </ul>	L80800E	6-2010
<ul style="list-style-type: none"> <li><b>Added</b> 8 new REACH substances of very high concern (SVHC) candidates.</li> <li><b>Tagged</b> 8 SVHC's as PROHIBITED since they are now on the REACH Authorization list.</li> <li><b>Added</b> requirements for California Rigid Plastic Packaging Container (RPPC) Law</li> <li><b>Added</b> statement regarding responsible sourcing of wood and paper based packaging materials.</li> <li><b>Added</b> restrictions regarding wood preservatives including creosote, mercury and arsenic.</li> </ul>	L80800G	4-2011
<ul style="list-style-type: none"> <li><b>Added</b> REACH Annex XVII substances with potential ties to packaging materials.</li> <li><b>Added</b> table 2 to list the 22 substances now on the REACH authorization list (prohibited)</li> <li><b>Added</b> table 3 which now has all the reportable REACH SVHC's and SVHC candidates</li> <li><b>Added</b> EPS restrictions in section (2.0)</li> <li><b>Added</b> list of Japanese (METI) restricted substances (section 2,0 (16))</li> <li><b>Added</b> clarifying statements and links associated with the CEN standards (13428-32) which support EU Directive 94/62/EC "Packaging Essential Requirements" (2.0)</li> <li><b>Added</b> restrictions related to packaging volume ratio and layers applicable to software disks (2.0)</li> <li><b>Added</b> rules and guidance related to California Rigid Plastic Packaging Containers (RPPC's), pg 5-6</li> <li>Removed section 1.4 and replaced it with a longer list of terms and definitions shown in Appendix D</li> </ul>	L80800M	11-2013
<ul style="list-style-type: none"> <li><b>Added</b> new REACH SVHC Candidates</li> <li><b>Expanded</b> the Annex XIV Authorization List Substances (now 31 in total), <b>Moved</b> requirements that are only applicable to wooden packaging to the IBM Specification 37L8024</li> </ul>	P62512	10-2014
<ul style="list-style-type: none"> <li>1) Added Toxic Substances Control Act (TSCA) significant new use rules (SNURs). 2) Revised the file to remove the specific REACH and TSCA substance tables and point to external listings of the restricted and reportable substances. 3) Removed restriction on Phthalates per proposal from Denmark (now revoked).</li> </ul>	P62536	3-2015

5897660 Pg 2 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L80800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	P11779 Jan2018
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<ul style="list-style-type: none"><li>Updated the TSCA Article SNUR Table and the links within it and...</li><li>Added chlorine bleaching restrictions for paper based packaging per EPEAT (ref. NSF/ANSI 426-2017) and...</li><li>Added TCEP and TDCPP as examples of restricted flame retardants</li><li>Added a reminder about color changing humidity indicator cards due to cobalt dichloride restrictions (a SVHC)</li></ul>	P11779	1-2018
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5897660 Pg 3 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L90800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	<a href="#">P11779</a> Jan2018
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# 1. Introduction

## 1.1. Abstract

This specification establishes requirements on packaging materials (including reporting) for IBM products, parts and assemblies including those supplied by OEM/CM suppliers. It is largely based on European Union Directive 94/62/EC (Article 11) and all amendments (2004/12/EC) also described as “the essential requirements” and specifically CEN Technical Report 13695-2 (2004) which addresses heavy metals content in packaging materials. Where appropriate, IBM will establish additional requirements consistent with its environmental objectives and policies.

In addition, it includes the reporting requirements for substances of very high concern (SVHC’s) candidates as they are referred to in the REACH Regulation in the European Union. Articles, including packaging, that contain >0.1% by weight of an SVHC candidate are subject to communication requirements and may be subject to notification requirements under REACH.

What is REACH? - A European regulation on the **Registration, Evaluation, Authorization and Restrictions of Chemicals** which has been in effect since June 1, 2007. The goal is the harmonization of the legislation on chemicals throughout the EU. It does not only apply to chemicals, but also to chemical substances in preparations and in articles.

With this edition we also introduce the US EPA Toxic Substances Control Act (TSCA) and the related Significant New Use Rules (SNURs) associated with that (see section 2(14)).

Important: This specification and related requirements must NOT be confused with Restrictions on Hazardous Substances (RoHS) for electronic [products](#). These are separate and distinct directives with unique requirements.

## 1.2. Purpose

This engineering specification (ES 5897660):

- a) Identifies the elements and compounds that are restricted in **packaging materials** and stipulates their maximum **cumulative** concentration levels.
- b) Details the reporting obligations for compliance with the legal requirements (for example, information regarding participation in consortia and available collection and recycling systems to fund take back and recycling schemes, and other similar requirements)..
- c) Compliance with the requirements herein will be enforced as a condition of purchase per IBM purchase contracts, Statements of Work (SOWs) and/or Standard Goods Agreements either for the supply of parts or sub components or for the purchase of packaging materials for the shipment and distribution of IBM products and integrated solutions. If the requirements of this specification conflict with applicable governmental regulations or legislation, the more stringent requirements shall take precedence.

## 1.3. Scope and Objectives

1. This IBM Engineering specification (ES 5897660) applies to all packaging materials used in protecting, handling, or marketing of IBM products, parts and supplies including those manufactured

5897660 Pg 4 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L80800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	P11779 Jan2018
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by an Original Equipment Manufacturer (OEM), or Contract Manufacturer (CM) even if not specifically referenced in other detailed packaging specifications.

2. It is important to note that IBM separately maintains environmental and / or related requirements for materials and parts for use in IBM products in other specifications, contracts or procurement documents. Those items are not within the scope of ES 5897660.
3. This specification (ES 5897660) establishes baseline environmental requirements for all packaging materials. ES 5897660 implements IBM's environmental policy objectives and contains some, but not all, major legal requirements for packaging materials. Compliance with the requirements in ES 5897660 alone may not satisfy the supplier's responsibilities to IBM since ES 5897660 does not encompass all legal environmental requirements in various countries around the world for packaging materials. In general, ES 5897660 contains restrictions on certain substances and chemicals in packaging. If a packaging component or sub component is not specifically listed here, but serves the purpose of packaging for protection of a part or product, then it should be considered within scope unless clearly defined in government legislation or related directives to be out of scope. Below is a (non exhaustive) list of packaging components and subcomponents. Refer as well to the definitions in section 1.4.

**Packaging Components**

- Banding / Strapping
- Chipboard
- Corrugated Fiberboard
- Dunnage and Wrapping Materials
- Foam Cushioning
- Film / Foil
- Paper / Paperboard
- Pallets and Crates of all material constructions (solid wood, plywood, plastic, metal, etc.)
- Thermoformed clamshells and cushions

**Packaging Sub components**

- Coatings
- Glue
- Inks
- Labels
- Adhesive Tape
- Hardware: nails, nuts, bolts, screws, and so on

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## 2. Requirements

1. No packaging component or packaging sub component used for IBM parts or products shall contain **lead (Pb), cadmium (Cd), mercury (Hg), hexavalent chromium (Cr6)**, or as part of its final composition in excess of a **sum concentration level of 100ppm** (0.01%) by weight. Compliance methodology for testing and/or calculating heavy metal content is in CEN Report CR 13695-2:2004.

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

a. All packaging components and sub components (as defined in section 1.3) must comply with the 100ppm limits individually. That way, no matter how much or how many are used, in any combination, it would be impossible for the overall concentration to exceed 100ppm in the final package assembly.

b. Per California's Toxics in Packaging regulation, there shall be **no intentional introduction** of any of the restricted substances (regardless of amount) into packaging components and sub components for the purpose of achieving a specific desired function, performance or appearance. Certifications of this may be required.

2. Do not use **halogenated (including brominated) flame retardants** in packaging materials. Examples of these include **but are not limited to PBB** (Polybrominated biphenyl), **PBDE** (Polybrominated

5897660 Pg 5 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L80800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	P11779 Jan2018
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diphenyl ether), **TBBPA** (Tetrabromobisphenol A), **TCEP** (tris(2-carboxyethyl)phosphine) and **TDCPP** (tris(1,3-dichloro-2-propyl) phosphate).

3. Do not use **Polyvinyl Chloride (PVC)** for packaging components and sub components. The most common uses of PVC in packaging are flexible wraps and semi-rigid trays. Exception: PVC may be used for destructible tamper evident labels if equivalent performance cannot be achieved with alternative materials. Such labels are sometimes used for document authenticity and the amount of PVC used in this way is extremely small.

4. Do not use any **fully Halogenated Chlorofluorocarbons (CFC's) or Hydrogenated Chlorofluorocarbons (HCFC's)** in the manufacture of packaging. These substances have been used as expansion agents for plastic foams and are known to be Class I or Class II atmospheric ozone depleting substances. CFC's and HCFC's had previously been prohibited for IBM packaging since 1990 via specification 1041126. That specification (1041126) is now obsolete, and its requirements replaced entirely by this mention herein.

**5. Rigid Plastic Packaging Containers (RPPC's):**

All containers meeting California's definition of a RPPC must be made from at least 25% post consumer recycled content (PCRC) unless otherwise exempted or compliant by alternative methods as defined by California. A RPPC is defined as a container which is capable of holding between 8 fluid oz. (237 cm<sup>3</sup>) and 5 gal. (18297 cm<sup>3</sup>) and is made primarily of plastic (may have cap, lid, label, handle, hinges, and other incidental packaging elements made of non-plastic material and additives such as pigments, colorants, fillers, and stabilizers that are part of the plastic polymer compound); sold holding a product; maintains its shape while holding product; capable of at least one closure, including but not limited to closure occurring during the production or manufacturing process. The container need not be used for liquids or powders to meet the definition of a RPPC. Exemptions include containers designed and qualified for use with hazardous materials. See Appendix C for references.

*Important Note: IBM Business units should endeavor to use containers that are exempt from the requirements of the RPPC regulations, even if they are otherwise compliant with this regulation. Intended use of any RPPC's as defined by California for IBM parts or products to be sold by IBM in California, regardless of origin, must be reviewed and approved by ISC Corporate Packaging, ISC Packaging Engineering, ISC Procurement and IBM Legal Counsel.*

6. Do not use materials which contain the biocide **Dimethyl Fumarate (DMF)** (CAS Number 624-49-7) in concentrations greater than 0.1mg/kg. This substance is a skin irritant and is banned in the European Union if above the stated threshold. The purpose of DMF is to retard mold growth and is known to be an ingredient in some types of silica gel desiccants or on its own in 100% concentrations.

When desiccants are deemed necessary, use **ONLY** naturally occurring<sup>1</sup>, non-chemically modified<sup>2</sup> CLAY type desiccants (e.g. Bentonite / Montmorillonite). All other types of desiccants should NOT be used including **Silica Gel, Molecular Sieve, Calcium Chloride** or any other type without prior approval from IBM Packaging Engineering.

*Note: if the purpose of using desiccant is solely to prevent corrosion on metallic surfaces, there are non-desiccant solutions for this which can also be considered which may also be more effective. Contact IBM Packaging Engineering for guidance on these alternatives.*

<sup>1</sup> **Naturally occurring** means a naturally occurring substance as such, unprocessed or processed only by manual, mechanical or gravitational means, by dissolution in water, by flotation, by extraction with water, by steam distillation or by heating solely to remove water, or which is extracted from air by any means.

<sup>2</sup> **Non-chemically modified** means a substance whose chemical structure remains unchanged, even if it has undergone a chemical process or treatment, or a physical mineralogical transformation, for instance to remove impurities.

5897660 Pg 6 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L80800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	P11779 Jan2018
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**7. Requirements for Packaging of Computer Software Disks (CD's, DVD's):** Must meet both the volume ratio and maximum number of packaging layers as described below.

**a) Volume Ratio:** Packaging volume ratio for software disks must be  $\leq 1$  derived as follows;

The Packaging Volume Ratio equals the Packaging Volume (PV) divided by the Allowable Packaging Volume (APV) (**Packaging Volume Ratio = PV/APV**), where:

PV = the minimum cubic volume of the packaging surrounding a designated product (not including handles, fasteners, string, shrink wrap, etc. attached to a box).

APV = the total combined volume of the volume of each unit product multiplied by its respective necessary space coefficient below (**APV =  $\Sigma$  Volume of unit product  $\times$  Necessary space Coefficient**), where:

Unit product = disks or pack of disks, manuals, game book, etc.

Necessary space coefficients = 3.1 (for single material packaging and 2.7 for non-single Material packaging).

**b) Packaging Layers:** No more than 3 layers. Examples: Jewel Case, shrink film, box. Or, Tyvek® sleeve, jiffy bag, box. Or, sleeve, stiffener, padded envelope.

**8. Packaging Recoverability:** To comply fully with EU Directive 94/62/EC and its amendments, all packaging must meet the requirements of EN 13427:2004 (see title below). This umbrella standard mandates that all packaging comply with EN 13428:2004 (source reduction) and at least one of the four alternatives for recovery which are summarized below (EN 13429, EN 13430, EN 13431, or EN 13432).

CEN Standard	Title: Note: These standards must be purchased (copyright)	Comments
13427:2004	Packaging – Requirements for the use of European Standards in the field of packaging and packaging waste	This is the umbrella standard
13428:2004	Packaging - Requirements specific to manufacturing and composition – Prevention by source reduction	This standard applies to all packaging regardless of the recovery type
13429:2004	Packaging – Reuse	Recovery option 1 (usually n/a to IBM)
13430:2004	Packaging - Requirements for packaging recoverable by material recycling	Recovery option 2 (most common for IBM packaging where recycling infrastructure exists)
13431:2004	Packaging - Requirements for packaging recoverable in the form of energy recovery, including specification of minimum interior calorific value	Recovery option 3 (second most common for IBM packaging). To meet this standard the energy value of the packaging material must exceed 5MJ/kg. (Plastics = 40 MJ/Kg, Paper/Wood=15 MJ/kg)
13432:2004	Packaging - Requirements for packaging recoverable through composting and biodegradation – Test scheme and evaluation criteria for the final acceptance of packaging	Recovery option 4 (usually n/a to IBM)

**9. Expanded Polystyrene (EPS) Restrictions:** EPS is prohibited in sales packaging in the following applications when package volume is less than or equal to 40000 cm<sup>3</sup> : Note: Since ARCEL® is stamped as resin type “6” with regard to recycling symbols it is also considered EPS for this purpose.

- a) monitors** (exclusive of the monitors with key board connectors, but without video signal connectors, the monitors integrated with a personal computer, and the monitors with 2 picture tubes or more),
- b) printers** (subject to the printer requiring the rated consumption electricity of 600W or less, exclusive of the printer solely intended for bar codes, receipts, pass books, labels and graphics),
- c) photo copiers**

5897660 Pg 7 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L80800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	P11779 Jan2018
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- d) **direct current power supply** (including a combined DC and AC power supply, subject to a rated capacity of 1KVA or less),
- e) **uninterruptible power supply** (with a rated capacity of 5KVA or less),
- f) **scanners, money counting machines, electronic scales, and cash registers**

**10. REACH Annex XVII Restricted Substances:** The substances shown in REACH Annex XVII are prohibited. Refer to link below for full listing, uses and allowances as defined by ECHA. REACH Annex XVII is therefore a part of this specification. Known potential uses in packaging for these substances are wood preservatives, plasticizers, biocides, adhesives, and paper. This is not all inclusive and is meant only for reference.

<http://www.REACH-compliance.eu/english/REACH-ME/engine/sources/REACH-annexes/launch-annex17.html>

Refer to ECHA website for official substance names, CAS Numbers, EC Numbers and related allowances or restrictions.

**11. REACH Annex XIV Authorization List:** The substances shown in REACH Annex XIV are prohibited from use in packaging materials in amounts greater than 0.1% w/w of the article.

For the official list and related requirements refer to the following ECHA website:

<http://echa.europa.eu/addressing-chemicals-of-concern/authorisation/recommendation-for-inclusion-in-the-authorisation-list/authorisation-list>

Potential uses of Annex XIV substances in packaging include inks, pigments, paints, adhesives, biocides, preservatives (for wood), plasticizers, coatings, and curing agents for polyurethanes. This list is not all inclusive and is intended solely for reference. Refer to ECHA website for official substance names, CAS Numbers and related allowances or restrictions.

**12. REACH Substances of Very High Concern (SVHC) Candidates:** Packaging components used for IBM that contain more than 0.1% by weight (>1000ppm) of any of the substances of very high concern (SVHC) candidates listed in the following ECHA website are subject to communications requirements, and in some cases to notification requirements under REACH. All packaging components that contain more than 0.1% by weight of any of these substances must be reported to IBM procurement. The report should include a list of the IBM part numbers affected, the name and CAS number of the SVHC candidate and % by weight used within the article (packaging component). Refer to Appendix B for reporting process details.

*Important: It is IBM's intention to avoid the use of SVHC candidates entirely for packaging applications or at least avoid them in concentrations above 0.1% (>1000ppm). However, they are not expressly prohibited at this time until we learn more about viable substitutes (if necessary) and the effect this will have on material availability, cost and performance. SVHC's which are placed on the REACH Authorization list are strictly prohibited in concentrations above 0.1% w/w.*

The current candidate list of REACH SVHC as published by the European Chemicals Agency is located at: <http://echa.europa.eu/candidate-list-table>

Please check the web site for updates since this list is subject to change.

If a SVHC is present in a packaging component or material at or above the reporting concentrations, the Supplier must provide a customer communication to IBM meeting the requirements of Article 33 of the EU REACH Regulation when the Deliverable is procured by IBM in the European Union. Please provide a copy of this communication to the author of this specification. Information about REACH can be found at the European Chemicals Agency website [www.echa.europa.eu](http://www.echa.europa.eu).

### 13. Other Restricted Substances

5897660 Pg 8 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L90800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	P11779 Jan2018
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The substances listed in table 1 may not be intentionally added regardless of origin or destination and are reportable if they are.

<b>Table 1: Other Restricted Substances in Packaging.</b> Reference: Japanese Law No. 17 concerning the Evaluation of Chemical Substances and Regulation of their Manufacture. ( <a href="http://www.meti.go.jp/english/policy/mono_info_service/kagaku/chemical_substances/Kashintree.html">http://www.meti.go.jp/english/policy/mono_info_service/kagaku/chemical_substances/Kashintree.html</a> )		
<b>Description / Name</b>	<b>CAS Number(s)</b>	<b>Potential Uses in Packaging (not all inclusive)</b>
Monomethyl – tetrachlorodiphenyl Methane	76253-60-6	None found
Monomethyl-dichloro-diphenyl Methane	81161-70-8	None found
Hexachlorobutadiene	87-68-3	None found
Polychlorobiphenyls and derivatives (PCBs)	1336-36-3	None found
Polychloroterphenyls and derivatives (PCTs)	61788-33-8	None found
Polychlorinated Naphthalenes (PCNs)	70776-03-3	None found
Radioactive substances	All	None found
Asbestos Fibers	All	None found

#### 14. Toxic Substances Control Act (TSCA) Restricted Substances (US EPA)

IBM requests that for each item supplied to IBM that meets the U.S. EPA definition of an article as provided in 40 CFR 720.3(c), a determination be made which identifies with certainty any substance subject to a Significant New Use Rule (SNUR) **in which the US EPA has made inapplicable the article exemption**. Upon finding that an article supplied to IBM contains a listed substance, (1) provide written notification of such to IBM; (2) discuss with IBM Procurement the availability of alternate items or compliance requirements. In lieu of listing each TSCA SNUR substance within this spec, refer to the online links provided in the summary table below:

Substances that are not identified with a CAS number may not be required to be evaluated by the supplier unless the supplier is aware that the chemical substance is present in the product, and thus should notify IBM of its presence.

Summary listing of chemical substances subject to a SNUR in which the article exemption has been made inapplicable:

<b>Description:</b>	<b>Online References:</b>
Toluene Diisocyanate Chemical Substances	<a href="https://www.gpo.gov/fdsys/pkg/FR-2015-01-15/pdf/2015-00474.pdf">https://www.gpo.gov/fdsys/pkg/FR-2015-01-15/pdf/2015-00474.pdf</a>
Benzidine Based Chemical Substances	<a href="https://www.gpo.gov/fdsys/pkg/CFR-2017-title40-vol33/xml/CFR-2017-title40-vol33-sec721-1660.xml">https://www.gpo.gov/fdsys/pkg/CFR-2017-title40-vol33/xml/CFR-2017-title40-vol33-sec721-1660.xml</a>
Long Chain Perfluoroalkyl Carboxylate (LCPFAC) Chemical Substances	<a href="http://www.gpo.gov/fdsys/pkg/FR-2015-01-21/pdf/2015-00636.pdf">http://www.gpo.gov/fdsys/pkg/FR-2015-01-21/pdf/2015-00636.pdf</a>
Certain Polybrominated Diphenylethers	<a href="https://www.regulations.gov/document?D=EPA-HQ-OPPT-2010-1039-0001">https://www.regulations.gov/document?D=EPA-HQ-OPPT-2010-1039-0001</a>

#### 15. Bleaching Restrictions for Paper Based Packaging

5897660 Pg 9 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L80800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	P11779 Jan2018
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As a general principle, all paper based packaging used for IBM deliverables should be **unbleached**. This includes corrugated fiberboard, envelopes, wrapping materials, pads, dividers, dunnage and any other type of protective packaging made from paper. If for some unforeseen reason bleaching was required for a particular application or to meet a special client requirement then the process would have to be done in such a way that it meets the definition of one of these three:

- **totally chlorine free (TCF), or**
- **elemental chlorine free (ECF), or**
- **processed chlorine free (PCF).**

The supplier will be expected to declare which definition applies for any given application. Please note that an estimated 95-98% of all paper based packaging worldwide now meets the ECF definition (per the American Forest and Paper Association). TCF is unusual and only available in some Northern European countries. See the definitions section for more information.

### 16. Color Changing Labels containing Cobalt Dichloride

Beware when specifying the use of color changing labels such as humidity indicator cards (HIC's) since these have been associated with the chemical **cobalt dichloride** which is restricted. There are other technologies which achieve the same purpose without employing the use of this specific SVHC. Note: HIC's or other color changing labels employing cobalt dibromide, copper dichloride, or copper dibromide are acceptable at this time.

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## 3. Supplier Responsibility

This specification is applicable to suppliers of packaging materials to IBM, their suppliers, and vendors performing work for IBM.

Suppliers of packaging materials, who are distributors and not manufacturers, shall ensure that their source manufacturers are in compliance with this specification.

Suppliers of packaging materials, who are manufacturers, shall ensure that their source manufacturers and materials suppliers are in compliance with this specification. Suppliers of packaging materials, must provide IBM with certification documentation ensuring compliance with this specification.

ODM / OEM suppliers who develop, manufacture, distribute or re-market IBM logo products, parts or supplies must provide IBM with certification documentation ensuring compliance with this specification.

IBM will request compliance certifications and test data from its first tier packaging suppliers. A web based tool (ESI Packaging) has been established for this purpose and will be communicated separately. Refer to Appendices A and B for compliance reporting process requirements.

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 (see Appendix A).

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.

Blanket packaging commodity certifications are allowed as per the description that follows. For instance, Supplier A makes only corrugated fiberboard 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 fiberboard materials purchased by IBM or its OEM/CM partners on our behalf. A separate certification for each carton part number is not required.

5897660 Pg 10 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L90800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	P11779 Jan2018
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This is a practical approach considering that there are far fewer packaging commodities than there are individual packaging components. Conversely, if the testing demonstrates that the material is NOT compliant, then we will need to know all IBM part numbers that are affected by the non-compliant material.

At the Government and Client level, they may want to know that the packaging of a specific product they are purchasing from IBM is in compliance. Therefore, extrapolation from packaging commodity compliance to a product's package compliance is presumed when every individual packaging commodity is certified by the Supplier(s) to be in compliance.

As specified in IBM Procurement Agreements, Statements of Work (SOWs) and Standard Goods Agreements, Suppliers are obligated to provide packaging material types and amounts. For example, corrugated paper, EPS [expanded polystyrene], wood, and so on used in their package assemblies for each product contained in any IBM Customer Solution put on the market or shipped directly to a Customer. Details on how this data can be provided can be found on the following web site link

<http://www-03.ibm.com/procurement/proweb.nsf/ContentDocsByTitle/United+States~Information+for+suppliers#packaging>

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

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## 4. IBM Responsibility

1. The appropriate Procurement and/or Engineering organizations having purchasing or design responsibility (respectively) for IBM, OEM, CM built products, supplies, and packaging materials will establish audit processes (with support of IBM Corporate Environmental Affairs, Corporate Packaging and IBM Corporate Audit if necessary) to ensure and track compliance with this specification.
2. IBM Production: This responsibility includes the packaging for IBM produced products or shipments from IBM plants in packaging designed and procured directly by IBM. The IBM buyer responsible for the direct purchase of packaging materials will ensure that their suppliers are registered on ESI Packaging (see Appendix B) and are fulfilling their obligations to provide the necessary data and certifications of compliance in a form that allows IBM to meet its legal and reporting obligations.
3. OEM / CM Procurement: This responsibility includes the packaging for OEM / CM products, parts and supplies. The IBM buyer responsible for the OEM / CM relationship must ensure that their suppliers are fulfilling their obligations to provide the necessary data and certifications of compliance in a form that allows IBM to meet its legal and reporting obligations.
4. Services and Solutions (IGS) Procurement: When IBM procures products by another manufacturer to bundle with IBM Logo products for sale to a client, IBM may then be considered liable for compliance of the entire sales offering including the non-IBM logo items. The IBM buyer responsible for bringing these non-IBM logo products into the solution must ensure that their suppliers are fulfilling their obligations to provide the necessary data and certifications of compliance in a form that allows IBM to meet its legal and reporting obligations.

Refer to Appendix A for an illustrated example

Example 1: IBM sells a complete IT solution to a client which involves IBM servers as well as third party (non-IBM Logo) printers, computers, and software. Technically, since IBM brought the solution to market, IBM 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, Services (IGS) PROCUREMENT is responsible

5897660 Pg 11 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L80800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	P11779 Jan2018
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for obtaining a certification from the supplier(s) for their respective pieces of equipment, for instance, a Lexmark printer or Lenovo Think Pad.

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 would 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 IBM requirements for individual packaging sub components (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 immediately.*

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 material or packaging supply organizational structure.

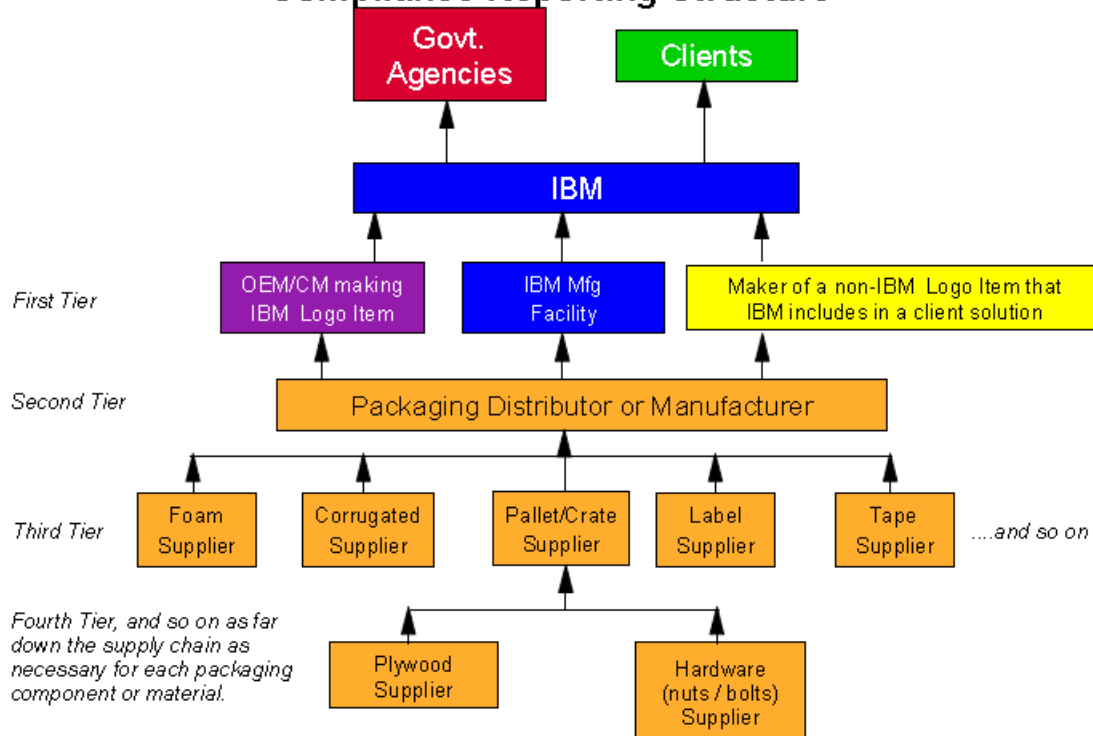
Therefore, it is simply necessary to perform the testing using generally accepted industry methods and document the way it was conducted and the results. Furthermore, those documented results must be available upon request in the event of an audit. IBM will require proactive affirmation of compliance status, to be re-certified on an annual basis, and the scope by which that certification applies (type of material, where used, and so on). See Appendix B for compliance reporting process requirements.

5897660 Pg 12 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L80800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	P11779 Jan2018
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## Appendix A: Compliance Reporting Structure

### Packaging Essential Requirements Heavy Metals, SVHC Candidates and other restricted or reportable substances Compliance Reporting Structure



5897660 Pg 13 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L80800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	P11779 Jan2018
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## Appendix B: Packaging Environmental Compliance Reporting Process

IBM uses the web based Electronic Supplier Interlock (ESI) system for obtaining packaging content and related environmental compliance data from suppliers. The following steps are required to complete the process.

### ESI Packaging – Registration Process

In order to access the ESI Packaging web site, suppliers must first establish a user ID and Password via the IBM Registration process through the Global Procurement Supply Portal. Suppliers will not be able to access this web site without an ID and password.

#### Step 1. Tutorial (optional but recommended)

A presentation available at the following web site will help guide users through the web based process for acquiring a user ID and password for the purpose of getting registered on ESI Packaging. This is in the same web location that this specification resides.

<http://www.ibm.com/procurement/proweb.nsf/ContentDocsByTitle/United+States~Information+for+suppliers#packaging>

#### Step 2. Obtaining a User ID and Password

Before supplier representatives can enroll as a user of ESI Packaging, first go to the IBM Registration site and obtain a user identification and password. Enter the Supply Portal web site at:

<Http://www.ibm.com/procurement/esi>

#### Step 3. Requesting Access to ESI Packaging

After acquiring a user ID and password, reenter the Supply Portal web site at the following web site and follow the instructions shown in the tutorial file or as guided within ESI:

<http://www.ibm.com/procurement/esi>

#### Step 4. Enter all required packaging and compliance data.

Select the appropriate form from the navigator list on the left side of your screen (Environmental Compliance, Pkg. Product Information, etc.) Enter packaging content data and respond to the compliance certification survey. This serves as our paper trail to ensure compliance with this specification and therefore all applicable laws and regulations affecting packaging referenced in this specification.

5897660 Pg 14 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L80800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	P11779 Jan2018
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## Appendix C: References and Related Documents

Document	Description
EU Directive 94/62/EC (1994), Article 11 (and all amendments to it)	European Parliament and Council Directive on Packaging and Packaging Waste
EU Directive 2004/12/EC	Addendum to EU Directive 94/62/EC
GA21-9261-x (latest level) PN 31L5345 (1)	Packaging and Handling, Supplier and Interplant Requirements (IBM's General Packaging Requirements)
EPEAT Criteria	Electronic Products Environmental Assessment Tool
REACH Regulation EC/1907/2006	Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)
REACH Annex XVII	<a href="http://www.REACH-compliance.eu/english/REACH-ME/engine/sources/REACH-annexes/launch-annex17.html">http://www.REACH-compliance.eu/english/REACH-ME/engine/sources/REACH-annexes/launch-annex17.html</a>
REACH Authorization List	<a href="http://echa.europa.eu/addressing-chemicals-of-concern/authorisation/recommendation-for-inclusion-in-the-authorisation-list/authorisation-list">http://echa.europa.eu/addressing-chemicals-of-concern/authorisation/recommendation-for-inclusion-in-the-authorisation-list/authorisation-list</a>
IBM Specification 37L8024 (1)	Wooden Packaging -- Materials Selection, Treatment and Marking Requirements
California Health and Safety Code 25214.11-25214.26	Also known as "The California Toxics in Packaging Prevention Act" <a href="http://www.dtsc.ca.gov/ToxicsInPackaging/index.cfm">http://www.dtsc.ca.gov/ToxicsInPackaging/index.cfm</a>
California Rigid Plastic Packaging Container Law	<a href="http://www.calrecycle.ca.gov/Plastics/RPPC/">http://www.calrecycle.ca.gov/Plastics/RPPC/</a> and <a href="http://www.cawrecycles.org/issues/rppc">http://www.cawrecycles.org/issues/rppc</a>
EU Commission Decision 2009/251/EC	Dimethyl Fumarate (DMF) <a href="http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:074:0032:0034:EN:PDF">http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:074:0032:0034:EN:PDF</a>
EU Commission Decision 2009/425/EC amending Directive 76/769/EEC	Organostannic Compounds: <a href="http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:138:0011:0013:EN:PDF">http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:138:0011:0013:EN:PDF</a>
CEN Report CR 13695-1:2000	Packaging – Requirements for measuring and verifying the four heavy metals and other dangerous substances present in packaging, and their release into the environment, Part 1.
CEN Report CR 13695-2:2004	Packaging – Requirements for measuring and verifying the four heavy metals and other dangerous substances present in packaging, and their release into the environment, Part 2.
Japanese Law No. 117 (1973) and amended by Law No. 49 (2003)	Law concerning the Evaluation of Chemical Substances and Regulation of their Manufacture ( <a href="http://www.meti.go.jp/english/policy/mono_info_service/kagaku/chemical_substances/Kashintree.html">http://www.meti.go.jp/english/policy/mono_info_service/kagaku/chemical_substances/Kashintree.html</a> )
Toxic Substances Control Act (TSCA)	<a href="http://www2.epa.gov/compliance/toxic-substances-control-act-tsca-compliance-monitoring">http://www2.epa.gov/compliance/toxic-substances-control-act-tsca-compliance-monitoring</a>
NSF/ANSI 426-2017	<a href="#">Environmental Leadership and Corporate Social Responsibility Assessment of Servers . . .</a> This is the standard that underpins the EPEAT requirements for server products.
(1) These specifications can be accessed from the following web page: <a href="http://www-03.ibm.com/procurement/proweb.nsf/ContentDocsByTitle/United+States~Information+for+suppliers#packaging">http://www-03.ibm.com/procurement/proweb.nsf/ContentDocsByTitle/United+States~Information+for+suppliers#packaging</a>	

5897660 Pg 15 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L90800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	P11779 Jan2018
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## Appendix D: Definitions and Key Terms

**Article** - an object which during production is given a special shape, surface, or design which determines its function to a greater degree than does its chemical composition. *This definition is from EU Regulation 1907/2006 concerning the Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH).*

**Article (US)** (per 40 CFR 720.3(c)) – “means a manufactured item (1) which is formed to a specific shape or design during manufacture, (2) which has end use function(s) dependent in whole or in part upon its shape or design during end use, and (3) which has either no change of chemical composition during its end use or only those changes of composition which have no commercial purpose separate from that of the article except that fluids and particles are not considered articles regardless of shape or design”.

**Chlorine bleaching related restrictions (adapted from NSF/ANSI 426-2017) and EPEAT requirements applicable only to paper based packaging materials. The following definitions are relevant only to materials which are bleached. For materials that are inherently unbleached (IBM’s basic requirement) then this is not applicable.**

**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. TCF material is rare, typically only found in Scandinavian countries and it requires more energy and trees to produce an equivalent amount of product as compared with ECF.

**Elemental Chlorine Free (ECF)** -- Packaging material produced with pulp from virgin content that has been bleached using a chlorine derivative such as chlorine dioxide (ClO<sub>2</sub>) but without the use of elemental chlorine (Cl), or has not been bleached with chlorine compounds.

**Processed Chlorine Free (PCF)** -- 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.

**Homogeneous Material** – means one material of uniform composition throughout or a material, consisting of a combination of materials that cannot be disjointed or separated into different materials by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes. This definition is from EU Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

**Intentionally Added** – means that a substance is deliberately utilized in the formulation of a material or part where its continued presence is desired in the final product to provide a specific characteristic, appearance or quality.

**OEM / CM / ODM** - Original Equipment Manufacturer / Contract Manufacturer / Original Design Manufacturer. These are companies that may be involved in building IBM logo products, parts or subassemblies.

5897660 Pg 16 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L80800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	P11779 Jan2018
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**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. All the individual items that compose a package are considered packaging components.

**Packaging Components** – Packaging materials which can be easily separated by hand or by simple mechanical means.

**Packaging Sub-Components** -- Packaging materials which generally cannot be easily separated by hand or by simple mechanical means. They are considered to be a part of the packaging component to which they are permanently attached

**Parts** - fabricated Materials, components, devices, and assemblies.

**Preparation** - a mixture or solution composed of two or more substances, for example paint, lubricant or ink. This definition is from EU Regulation 1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).

**Products** - stand alone, final assemblies including complete machines supplied by an original equipment manufacturer (OEM).

**RoHS** - an acronym for European Union Directive 2011/65/EU on the Restriction of the use of certain Hazardous Substances in electrical and electronic equipment and subsequent amendments.

*Guidance Note: The aforementioned RoHS Directive does not apply to packaging materials. However, most of the same substances are restricted by other Packaging Directives at levels which may differ from the product RoHS Directive.*

**REACH** - an acronym for European Commission Regulation Number 1907/2006 concerning the Registration, Evaluation, Authorization, and Restriction of Chemicals.

**Substance** - a chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition. This definition is from EU Regulation 1907/2006 concerning the Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH). Substance includes such examples as ethanol and metals. Note: metals are included here not in the form of a part or product such as a heat sink or sheet metal cover but as a metal such as aluminum or aluminum alloy. Substance goes beyond a pure chemical compound defined by a single molecular structure. The definition of substance includes different constituents such as impurities. Also note the word “substance” is used throughout this specification, only the “Substance” with a capital letter refers to this specific definition.

**Substance(s) of Very High Concern (SVHC)**

1. Substances meeting the criteria for classification in accordance with EU Directive 67/548/EEC:
  - Carcinogenic category 1 or 2
  - Mutagenic category 1 or 2
  - Toxic for reproduction category 1 or 2;

5897660 Pg 17 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L80800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	P11779 Jan2018
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2. Substances which are persistent, bio accumulative and toxic (PBT) or very persistent and very bio accumulative (vPvB) in accordance with the criteria set out in Annex XIII of the EU REACH Regulation;
3. Substances- such as those having endocrine disrupting properties or those having PBT properties or vPvB properties which do not fulfill the criteria of 2 above - for which there is scientific evidence of probable serious effects to human health or the environment which give rise to an equivalent level of concern to those of other substances listed in 1 or 2 and which are identified on a case-by-case basis in accordance with the procedure set out in Article 59 of REACH. This definition is from the EU REACH Regulation, Article 57.

**SNUR:** Significant New Use Rule as defined by the US EPA per TSCA regulations.

**TSCA:** Toxic Substances Control Act. This regulation is applicable within the US and administered by the US Environmental Protection Agency (EPA).

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5897660 Pg 18 of 18	840682T Dec1991	C25116 Jun1993	F84029C Nov2000	G48433 Jun2006	G48655 Aug2006	L81024 Aug2008	L80800A Apr2009	L80800B Dec2009	L80800E Jun2010	L80800G Apr2011	L80800M Nov2013	P62512 Oct2014	P62536 Mar2015	<a href="#">P11779</a> <a href="#">Jan2018</a>
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