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# JOINT INDUSTRY GUIDE

## MATERIAL COMPOSITION DECLARATION GUIDE

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## Table of Contents

<b>1</b>	<b>Introduction .....</b>	<b>3</b>
<b>2</b>	<b>Purpose.....</b>	<b>3</b>
<b>3</b>	<b>Scope .....</b>	<b>3</b>
<b>4</b>	<b>Use of Guide.....</b>	<b>4</b>
<b>5</b>	<b>Materials and Substances.....</b>	<b>5</b>
<b>6</b>	<b>Data Format.....</b>	<b>5</b>
<b>7</b>	<b>Terms and Definitions .....</b>	<b>6</b>
<b>8</b>	<b>Disclaimer.....</b>	<b>7</b>
<b>9</b>	<b>Annexes .....</b>	<b>7</b>
	<b>Annex A: Level A Materials and Substances .....</b>	<b>8</b>
	<b>Annex B: Level B Materials and Substances .....</b>	<b>9</b>
	<b>Annex C: Set of Data Fields .....</b>	<b>10</b>
	<b>Annex D: Example of Material Declaration Form .....</b>	<b>11</b>
	<b>Annex E: Regulatory Information and Examples of Use .....</b>	<b>12</b>
	<b>Annex F: Detailed Chemical lists with CAS-numbers .....</b>	<b>15</b>

## **1 Introduction**

The Electrical and Electronic Equipment (EEE) industry tracks and discloses the material composition of its products due to legal and market requirements. The industry needs to gather information about the composition of products and subparts that are purchased from suppliers for incorporation into final products. This affects the entire supply chain worldwide.

Material composition information allows manufacturers to:

- satisfy legal and regulatory requirements;
- drive improvements in product design; and
- respond to inquiries from customers, product recyclers and other stakeholders.

To obtain material composition data, many manufacturers have developed material declaration questionnaires (also known as “green procurement surveys” or “supply chain questionnaires”) that require suppliers to disclose certain information about the products and subparts they sell. These questionnaires usually take the form of a list of banned or restricted materials and substances that the supplier must certify are not present in the product or subpart. In addition, they often include a separate list of materials and substances that need to be identified when present. Due to the diversity of information requests and formats, it is difficult for suppliers to manage material declaration requests.

Recognizing the challenges that the entire global EEE industry faces from diverse material composition requests, a workgroup composed of representatives from EICTA, EIA and JGPSSI developed this material composition guide.

## **2 Purpose**

This guide establishes the materials and substances to be disclosed by suppliers when those materials and substances are present in products and subparts that are incorporated into EEE. It benefits suppliers and their commercial customers by providing consistency and efficiency to the material declaration process. It promotes the development of consistent data exchange formats and tools that will facilitate and improve data transfer along the entire global supply chain.

## **3 Scope**

This guide applies to products and subparts that are supplied to EEE manufacturers for incorporation into their products. It does not apply to packaging materials, e.g. cardboard, plastic tray.

It covers materials and substances that may be present in the supplied product or subpart. It does not apply to process chemicals, unless those process chemicals constitute part of the finished product or subpart.

It applies to business-to-business transactions. It is not intended to be used by the general public when making purchasing decisions.

This guide contains:

- the set of materials and substances for disclosure;
- the composition amount that requires disclosure (i.e., “Threshold Level”);
- the regulatory requirements that establish threshold levels, where appropriate;
- a recommended set of data fields for information exchange

Note: EIA, EICTA and JGPSSI have discussed the inclusion of an additional set of materials for voluntary disclosure. EIA, EICTA, and JGPSSI agree to consider this proposal during the next revision process.

Although this guide does not preclude companies from inquiring about the presence of additional materials and substances when necessary for their business needs, such requests are outside the scope of this guide.

#### **4 Use of Guide**

The purpose of this section is to provide reporting guidance to suppliers. By following this guide, suppliers will be prepared to meet the majority of their customers’ material composition reporting requirements.

Suppliers should be prepared to report materials and substances to their customers based on Annexes A and B. The recommended set of data fields for reporting purposes is found in Annex C.

When determining whether it is necessary to report a material or substance, the following should be considered:

- When a law exists that sets a threshold for a material or chemical, the concentration levels (ppm) should be determined based on the methodology set forth in that law.
- Where a law does not exist, concentration levels (ppm) should be determined based on the total weight of the product or subpart for which the declaration is being developed.
- If a material or substance is not present or is present below its threshold, it does not need to be reported. A supplier may voluntarily report this information.

If suppliers lack material or substance information that is needed to respond to customer inquiries that are based on this guide, suppliers are expected to use this guide with their own suppliers to obtain the necessary information.

## **5 Materials and Substances**

This guide establishes two categories of materials and substances to be declared. These lists are based on criteria that the industry has determined justify disclosure when these material/substances are present in products or subparts.

### **Criteria for “Level A” Disclosure:**

The “Level A” List is composed of materials and substances that are subject to currently enacted legislation that:

- a) Prohibits their use and/or marketing
- b) Restricts their use and/or marketing
- c) Requires reporting or results in other regulatory effect.

Based upon these criteria, “Level A” materials and substances are listed in Annex A.

### **Criteria for “Level B” Disclosure:**

The “Level B” List is composed of materials and substances that the industry has determined relevant for disclosure because they meet one or more of the following criteria:

- a) Precious materials/substances that provide economic value for end-of-life management purposes
- b) Materials/substances that are of significant environmental, health, or safety interest
- c) Materials/substances that would trigger hazardous waste management requirements
- d) Materials/substances that could have a negative impact on end-of-life management.

Based upon these criteria, “Level B” materials and substances are listed in Annex B.

## **6 Data Format**

This guide establishes the data disclosure framework. The framework contains mandatory data fields as well as optional data fields. Mandatory fields are required at the minimum. Optional fields, which may be needed for business-to-business purposes, can be added, but are not essential. Annex C contains the mandatory and optional data

fields. As the guide is updated and changed, the data format will be modified to reflect these changes.

There are a variety of data format tools that companies can use to implement this guide. These tools could range from a paper form, a computerized spreadsheet, to an xml based e-business solution. This guide does not dictate the use of specific tools. Rather, it establishes the minimum as well as possible optional fields that can be used and allows companies the flexibility to select the tool that best meet their business needs. As a result, companies that choose to use data format tools that contain the mandatory fields but also additional fields not covered by this guide are permissible.

Annex D contains an example of a simple material declaration request that contains only the mandatory fields. This represents the minimum that must be required to meet this guide. Annex D also references additional material declaration tools.

## **7 Terms and Definitions**

For the purposes of this guide the following definitions apply:

**Product:** The item that the respondent is supplying (e.g., assembly, subassembly, component, raw material).

**Subpart:** A sub-unit of a product.

**Material:** A material is made up of one or more substances (e.g., copper alloy is a material, which in turn is made up of a number of defined substances, copper, nickel, silver, etc.).

**Substances:** Substances are chemical elements and their compounds. CAS numbers are provided for these substances where known.

**Intentionally added:** Deliberate use in the formulation of a product or subpart where its continued presence is desired to provide a specific characteristic, appearance or quality. If listed materials or substances are contained in products or subparts purchased by supplier and are incorporated, such materials/substances must be disclosed if the supplier has knowledge (or with reasonable inquiry should have knowledge) of the presence of such materials or substances.

**Threshold level:** Concentration level, which defines the limit, above which the presence of a substance or material in a product or subpart must be declared based on the requirements of this guide.

## **8 Disclaimer**

Although this guide and its annexes contain references to legal citations and regulatory limits for certain listed materials, these citations and regulatory limits should not be relied upon for compliance purposes. The annexes also provide examples of expected use and regulatory restrictions and prohibitions relating to the materials and substances. The examples are for reference only and do not constitute a comprehensive reference to all uses, regulations and prohibitions and should not be used for compliance purposes. Please contact legal counsel for specific compliance requirements. Any use of this guide, other than uses that are consistent with its stated purpose, are neither sanctioned nor endorsed by EIA, EICTA or JGPSSI. Furthermore, where materials and substances are listed in this guide, their listing does not infer or constitute an industry judgment as to their environmental or health impacts.

## **9 Annexes**

**Annex A:** Level A Materials and Substances

**Annex B:** Level B Materials and Substances

**Annex C:** Set of Data Fields

**Annex D:** Example of Material Declaration Form

**Annex E:** Regulatory Information and Examples of Use

**Annex F:** Detailed Chemical list with CAS-numbers

## Annex A: Level A Materials and Substances

For “Level A” materials and substances, the threshold levels are set by the law that bans or restricts their use. Therefore, assessment as to whether the threshold level has been met must be based on the relevant legal requirements. If international law establishes a new threshold for ban or restriction purposes, this threshold will be revised accordingly. For laws that allow the presence of certain materials or substances in amount lower than a certain “part per million” (ppm) threshold, companies should use the “ppm methodology” that is established by that law in order to determine whether disclosure is necessary. Reporting below the threshold is allowed, but not required.

“Intentionally Added” means the deliberate use in the formulation of a product or subpart where its continued presence is desired in the final product or subpart to provide a specific characteristic, appearance, or quality.

If a material/substance is intentionally added, then it needs to be reported regardless of its content level. If material/substance is otherwise present, then its threshold level applies.

Where metals are listed in Annex A, they require reporting of the metal in the metal alloys, e.g. Lead/Lead Compounds also includes reporting of the Lead content in the Lead alloy.

Note: Materials/substances are listed by group. However, in some cases only a subset are regulated, please refer to Annexes E and F for details.

Material/Substance	Threshold level
Asbestos	Intentionally added
Azo colorants <sup>1)</sup>	Intentionally added
Cadmium /Cadmium Compounds	75 ppm or Intentionally added
Hexavalent Chromium/Hexavalent Chromium Compounds	1000 ppm or Intentionally added
Lead/Lead Compounds	1000 ppm or Intentionally added
Mercury/Mercury Compounds	1000 ppm or Intentionally added
Ozone Depleting Substances (CFCs, HCFCs, HBFCs, carbon tetrachloride, etc.)	Class I: Intentionally added Class II – HCFCs: 1000 ppm
Polybrominated Biphenyls (PBBs)	1000 ppm or Intentionally added
Polybrominated Diphenylethers (PBDEs)	1000 ppm or Intentionally added
Polychlorinated Biphenyls (PCBs)	Intentionally added
Polychlorinated Naphthalenes (more than 3 chlorine atoms)	Intentionally added
Radioactive Substances	Intentionally added
Shortchain Chlorinated Paraffins	Intentionally added
Tributyl Tin (TBT) and Triphenyl Tin (TPT)	Intentionally added
Tributyl Tin Oxide (TBTO)	Intentionally added

<sup>1)</sup> Applicable to products and subparts that may come into direct contact with human skin.



## Annex B: Level B Materials and Substances

For “Level B” materials and substances, the default threshold level is 1000 ppm based upon the weight of the product or subpart being declared. Reporting below the threshold is allowed, but not required.

Where metals are listed in Annex B, they require reporting of the metal in the metal alloys, e.g. Copper/Copper Compounds also includes reporting of the Copper content in the Copper alloy.

Note: Materials/substances are listed by group. Please refer to Annexes E and F for details.

<b>Material/Substance</b>	<b>Threshold level</b>
Antimony/Antimony Compounds	1000 ppm
Arsenic/Arsenic Compounds	1000 ppm
Beryllium/Beryllium Compounds	1000 ppm
Bismuth/ Bismuth Compounds	1000 ppm
Brominated Flame Retardants (other than PBBs or PBDEs)	1000 ppm
Copper/Copper Compounds	1000 ppm
Gold/Gold Compounds	1000 ppm
Magnesium	1000 ppm
Nickel/Nickel Compounds <sup>1)</sup>	1000 ppm
Palladium/Palladium Compounds	1000 ppm
Phthalates	1000 ppm
Selenium/Selenium Compounds	1000 ppm
Silver/Silver Compounds	1000 ppm
Vinyl Chloride Polymer (PVC)	1000 ppm

- 1) Nickel alloys are not reportable.  
Nickel and nickel compounds must be reported when used in applications where nickel compounds are likely to result in prolonged skin exposure (e.g., an outer enclosure for a portable electronic product designed to be carried). Use of nickel or nickel compounds in components and parts designed to be located inside the outer enclosure of a product need not be reported.

## Annex C: Set of Data Fields

#	Category	Data field	Status	Description
1	DECLARATION	Date (timestamp)	Mandatory	The declaration contains a date and time identifier.
		Declaration note	Optional	Additional information about the declaration may be added
2	INFORMATION SENDER	Company Name	Mandatory	The company name.
		DUNS	Optional	Dun &Bradstreet's Data Universal Numbering System. <a href="http://www.dnb.com">http://www.dnb.com</a> The D&B D-U-N-S Number is the standard for keeping track of the world's businesses. Its unique nine-digit code helps identify and link more than 60 million companies worldwide.
		Address	Optional	The address of company.
		Contact person	Optional	The contact person at the company.
		Email-address	Optional	Email-address for the contact person
3	PRODUCT/ SUBPART	Product/Subpart Name	Mandatory	The item that the respondent is supplying (e.g., assembly, subassembly, component, raw material). A sub-part refers to a sub-unit of a product.
		Product /Subpart Number	Mandatory	The supplier product number
		Information Receiver Product /Subpart Number	Optional	The customer product number
		Product /Subpart Total Mass (g)	Mandatory	Grams of the Product/Subpart Total mass.
		Product /Subpart Information	Optional	Additional information about the product/subpart. This object is needed for ensuring e.g. RoHS-compliance by identifying sub-part or location
4	MATERIAL/ SUBSTANCE	Material/Substance Name	Mandatory	A material is made up of one or more substances (e.g., copper alloy is a material, which in turn is made up of a number of defined substances, copper, nickel, silver, etc.). Substances are chemical elements and their compounds.
		CAS-number or ISO Number	Optional	Chemicals Abstract Service Numbering System. <a href="http://chemfinder.camsoft.com/">http://chemfinder.camsoft.com/</a> ISO International Standards number for identifying material/substance e.g. as in the case of brominated flame retardants.
		Material/Substance Mass (g)	Mandatory	Grams of Material/Substance mass.
		Material/Substance (ppm or %)	Optional	Parts per million, ppm,, or weight percentage of Material/Substance mass
		Material/Substance Information	Mandatory*)/ Optional	Location/application information. This object may be needed for ensuring e.g. RoHS-compliance. *) Mandatory when declaring Level A materials/substances
		Material/Substance Note	Optional	Additional information about the material/substance. If applicable, additional information about radioactivity, e.g. radioactivity isotope name and code, max activity Level (MBq), typical activity level (MBq),

## Annex D: Example of Material Declaration Form

Below you will find one example of a material declaration that is based on this guide. This represents the most basic form containing only mandatory data fields.

### SAMPLE MATERIAL DECLARATION DATA SHEET

**Date:** 03/09/11

**Company Name:** Any Company

**Product Name:** Integrated Circuit

**Product Number:** 001

**Product Total Mass (g):** 0.717 g

Material/Substance Name	Material/Substance Mass (g)	Material/Substance Information
Antimony	0.01166	
Silver	0.05636	
Copper	0.21834	
Lead	0.001715	Solder Plating
Gold	0.0047	

For other examples of material declarations solutions, see:

<http://home.jeita.or.jp/eps/>  
<http://www.rosettanet.org>

## Annex E: Regulatory Information and Examples of Use

The following chart outlines legal and regulatory citations for Level A Materials and Substances and examples of use of both Level A and Level B Materials and Substances in the EEE industry.

Material/ Substance	Legal and Regulatory Information	Examples of Use
Asbestos	76/769/EEC (83/478/EEC; 85/610/EEC; 87/217/EEC; 91/659/EEC; 99/77/EEC).	Brake lining pad, insulator, filler, abrasive, insulator, filler, pigment, paint, talc, adiabatic material
Azo Colorants	76/769/EEC (2002/61/EEC; 2003/03/EEC), トイッ日用品規制	Pigment, dyes, colorant
Cadmium/ Cadmium Compounds	デンマーク カドミウム含有製品の販売、輸入、製造の禁止に関する 1992 年 12 月 23 日第 1199 法定命令, 76/769/EEC (91/338/EEC; 91/157/EEC·93/86/EEC; 2000/53/EEC (EU/ELV); 2002/95/EC (EU/RoHS); 94/62/EEC; 米国包装材重金属規制	Pigment, anti-corrosion surface treatment, electric and electronic materials, 光学材料 (optical material), 安定剤 (stabilizer), めっき材料 (plating), 樹脂用顔料 (pigment for resin), 光学ガラス用蛍光剤 (fluorescent), 電極 (electrode), はんだ材料 (solder)(electric contact), 接点 (contact point), 亜鉛めっき (zinc plating), 塩ビ安定剤 (stabilizer for PVC)
Hexavalent Chromium/ Hexavalent Chromium Compounds	2000/53/EC (EU/ELV), 2002/95/EC (EU RoHS), 94/62/EEC, 米国包装材重金属規制	顔料 (pigment), 塗料 (paint), インキ(ink), 触媒 (catalyst), めっき (plating), 防食表面処理 (anti-corrosion surface treatment), 染料 (dye), 塗料乾燥剤 (paint dryer), 表面処理 (surface treatment), クロメート処理 (chromate treatment), 塗料密着性向上 (paints adhesion enhancement), 防錆 (anti corrosion)
Lead/Lead Compounds	76/769/EEC (+86/677/EEC), 91/157/EEC, 93/86/EEC, 2000/53/EC(EU/ELV), 2002/95/EC (EU/RoHS), 94/62/EEC, 米国包装材重金属規制	ゴム硬化剤 (rubber hardener), 顔料(pigment), 塗料 (paint), 潤滑剤 (lubricant), プラスチック安定剤 (plastic stabilizer), 電池材料 (materials for battery), 快削合金材料 (free-machining alloy)(free-cutting steels), 光学材料 (optical materials), X線遮蔽 (X-ray shielding in CRT glass), 電気はんだ材料(electrical solder material), メカはんだ材料 (mechanical solder materials), ゴム加硫剤 (curing agent)(vulcanizing agent), 強誘電体材料 (ferroelectrics), 樹脂安定剤 (resin stabilizer), めっき材料 (plating), 合金成分 (metal alloy), 樹脂添加剤 (resin additives)
Mercury/ Mercury Compounds	76/769/EEC, 86/677/EEC, 91/157/EEC (+98/101/EEC), 2000/53/EC (EU/ELV), 2002/95/EC (EU/RoHS), 94/62/EEC, 米国包装材重金属規制	蛍光材料 (fluorescent bulb), 電気接点材料(contact point material), 着色顔料(pigment), 腐食防止剤 (anti-corrosion), 高効率発光体 (high-efficiency phosphor), 抗菌処理 (antibacterial treatment)
Ozone Depleting Substances	オゾン層保護法、モントリオール議定書、米国、1990 年大気浄化法第 611 条, 76/769/EEC (94/60/EEC; 97/64/EEC )	冷媒 (refrigerant), 発泡剤 (foaming agent), 消火剤 (extinguishant), 洗浄剤 (solvent cleaner)
Polybrominated Biphenyls (PBBs)	2002/95/EEC (EU/RoHS), (トイッイテシ法令)	難燃剤 (flame retardant)
Polybrominated Diphenylethers (PBDEs)	2002/95/EC(EU/RoHS), (トイッイテシ法令) pentaBDE, octaBDE⇒ 76/769/EEC (+2003/11/EC)	難燃剤 (flame retardant)

Polychlorinated Biphenyls (PCBs)	化審法(第一種特定), 76/769/EEC	絶縁油 (insulation oil), 潤滑油(lubricant oil), 電気絶縁媒体 (electrical insulation medium), 溶剤(solvent), 電解液 (electrolytic solution)
Polychlorinated Naphthalenes (more than 3 chlorine atoms)	化審法(第一種特定)	潤滑油 (lubricant), 塗料 (paint), プラスチック安定剤 (stabilizer) (電気的特性(electricity), 耐焰性( flame-resistant), 耐水性 (water-resistant), 電気絶縁媒体 (insulator), 難燃剤( flame retardant)
Radioactive substances	原子炉等規制法	光学特性 (optical properties) (トリウム)
Shortchain Chlorinated Paraffins	76/769/EEC (+2002/45/EC), (トイタ イオン 法令)	塩ビ可塑剤 (plasticizer for PVC), 難燃剤(flame retardant)
Tributyl Tin (TBT) and Triphenyl Tin (TPT)	化審法(第二種特定) (Japanese law)	安定剤 (stabilizer), 酸化・老化防止剤(anti-oxidizer, 防菌・防カビ剤(antibacterial and antifungal agents), 防汚剤 (antifoulant)
Tributyl Tin Oxide (TBTO)	化審法(第一種特定) (Japanese law)	防腐剤 (antiseptic), かび防止剤 (antifungal agent), 塗料 (paint), 顔料 (pigment), 防汚顔料 (antistaining)
Antimony/ Antimony Compounds	Not applicable. Level B Material/Substance	顔料 (pigment), 塗料 (paint), 触媒 (catalyst), 鉛フリーはんだ材料 (lead free solder), 安定剤 (stabilizer), n型ドーパント, 難燃剤 (flame retardant), 重合触媒 (catalyst)
Arsenic/ Arsenic Compounds	Not applicable. Level B Material/Substance	顔料 (pigment), 塗料 (paint), 染料 (dye), ガラスの消泡剤 (antifoamer for glass), III-V 族半導体基板 (GaAs), 難燃剤 (flame retardant)
Beryllium/ Beryllium Compounds	Not applicable. Level B Material/Substance	セラミックス原料 (ceramics), 合金(metal alloy)(copper-beryllium alloy), 触媒(catalyst), 時効硬化特性合金材料 precipitation hardening alloy, バネ用合金材料 (copper-beryllium alloy for spring), はんだ (solder)
Bismuth/ Bismuth Compounds	Not applicable. Level B Material/Substance	鉛フリーはんだ材料 (lead free solder), はんだ材料 (solder)
Brominated Flame Retardants (other than PBBs or PBDEs)	Not applicable. Level B Material/Substance	難燃剤 (flame retardant), パッケージ成形封止(package molding sealing)
Copper/ Copper Compounds	Not applicable. Level B Material/Substance	防食表面処理 (anti-corrosion treatment), 導体印刷ペースト材料 (conductive paint, 電気・電子材料 (electric and electronic materials), 合金材料 (metal alloy), 顔料 (pigment), 染顔料 (dye and pigment), めっき材料 (plating materials), 配線 (wiring)
Gold/ Gold Compounds	Not applicable. Level B Material/Substance	めっき (plating), 表面処理 (surface treatment), 電気・電子材料 (electric and electronic materials), 半導体材料(semiconductors), 光学材料 (optical materials), 接点 (contact point)
Magnesium	Not applicable. Level B Material/Substance	合金 (metal alloy), 光学材料 (optical material), 光学薄膜材料 (optical thin film), 構造用材料 (structural material), アルミ合金(aluminum alloy), ジュラルミン系), マグネシウム合金 (magnesium alloy), 脂肪酸塩 (fatty acid salts)

Nickel/ Nickel Compounds	Not applicable. Level B Material/Substance	顔料 (pigment), 塗料 (paint), 光学薄膜材料(optical thin film)(reflection coating), 電池材料 (battery materials), 導体印刷ペースト材料 (conductive materials), 半導体材料(semiconductors), 表面処理 (surface treatment), 磁性薄膜材料 (magnetic thin film), めっき (nickel plating), 電極(electrode), 触媒 (catalyst), 合金 (alloy)
Palladium/ Palladium Compounds	Not applicable. Level B Material/Substance	はんだ部品表面処理 (electric plating for solder parts), 導体印刷ペースト材料(conductive paint), 無電解めっき触媒(catalyst for electroless deposition)
Phthalates	Not applicable. Level B Material/Substance	可塑剤 (plasticizer), 染料 (dye), 顔料(pigment), 塗料 (paint), インキ (ink), 接着剤 (adhesive), 潤滑剤 (lubricant)
Selenium/ Selenium Compounds	Not applicable. Level B Material/Substance	感光体 (photoreceptor), 顔料(pigment), 塗料(ink), 触媒 (catalyst), 酸化剤 (oxidizer), 半導体材料 (semiconductor material), 受光素子 (light receiving element), 光電セル(photo cell)
Silver/ Silver Compounds	Not applicable. Level B Material/Substance	めっき(plating), 電気・電子材料 (electric and electronic materials), 導体印刷ペースト材料 (conductive paint), 光学材料(optical materials), 電気接点材料 (contact point materials), はんだ材料(solder material)
Vinyl Chloride Polymer (PVC)	Not applicable. Level B Material/Substance	電気絶縁性 (for insulation use), 耐薬品性(heat resistance use), 透明性(transparency), 被覆材 (sheath material)

## Annex F: Detailed Chemical lists with CAS-numbers

These lists are not comprehensive; they represent examples of chemicals with known CAS numbers. Where a product or sub-part contains related substance and meet reporting criteria, this information should be reported.

Asbestos/Asbestos Materials	CAS-number
Asbestos and Asbestos Materials	1332-21-4
Actinolite	77536-66-4
Amosite (Grunerite)	12172-73-5
Anthophyllite	77536-67-5
Chrysotile	12001-29-5
Crocidolite	12001-28-4
Tremolite	77536-68-6

Azo Colorants	CAS Numbers
4-Aminobiphenyl	92-67-1
Benzidine	92-87-5
4-Chloro-o-toluidine	95-69-2
2-Naphthylamine	91-59-8
o-Aminoazotoluene	97-56-3
5-Nitro-o-toluidine	99-55-8
4-Chloroaniline	106-47-8
4-methoxy-m-phenylenediamine	615-05-4
4,4'-Diaminodipheylmethane	101-77-9
3,3'-Dichlorobenzidine	91-94-1
3,3'-Dimethoxybenzidine	119-90-4
3,3'-Dimethylbenzidine	119-93-7
4,4'-methylenedi-o-toluididne	838-88-0
p-Cresidine	120-71-8
4,4'-Methylene-bis-(2-chloro-anilene)	101-14-4
4,4'-Oxydianilene	101-80-4
4,4'-Thiodianiline	139-65-1
o-Toluidine	95-53-4
4-Methyl-m-phenylenediamine	95-80-7
2,4,5-Trimethylaniline	137-17-7
o-Anisidine	90-04-0
4-amino azobenzene	60-09-03

Cadmium/Cadmium Compounds	CAS Numbers
Cadmium	7440-43-9
Cadmium oxide	1306-19-0
Cadmium sulfide	1306-23-6
Cadmium chloride	10108-64-2
Cadmium sulfate	10124-36-4
Other cadmium compounds	-

**Chromium VI and its Compounds****CAS Numbers**

Chromium	7440-47-3
Chromium (VI) oxide	1333-82-0
Barium chromate	10294-40-3
Calcium chromate	13765-19-0
Chromic acetate	1066-30-4
Chromium trioxide	1333-82-0
Lead (II) chromate	7758-97-6
Sodium chromate	7775-11-3
Sodium dichromate	10588-01-9
Strontium chromate	7789-06-2
Potassium dichromate	7778-50-9
Potassium chromate	7789-00-6
Zinc chromate	13530-65-9
Other hexavalent chromium compounds	-

**Lead/Lead Compounds****CAS Numbers**

Lead	7439-92-1
Lead (II) sulfate	7446-14-2
Lead (II) carbonate	598-63-0
Lead hydrocarbonate	1319-46-6
Lead acetate	301-04-2
Lead (II) acetate, trihydrate	6080-56-4
Lead phosphate	7446-27-7
Lead selenide	12069-00-0
Lead (IV) oxide	1309-60-0
Lead (II,IV) oxide	1314-41-6
Lead (II) sulfide	1314-87-0
Lead (II) oxide	1317-36-8
Lead (II) carbonate basic	1319-46-6
Lead hydroxidcarbonate	1344-36-1
Lead (II) phosphate	7446-27-2
Lead (II) chromate	7758-97-6
Lead (II) titanate	12060-00-3
Lead sulfate, sulphuric acid, lead salt	15739-80-7
Lead sulphate, tribasic	12202-17-4
Lead stearate	1072-35-1
Other lead compounds	-

**Mercury /Mercury Compounds****CAS Numbers**

Mercury	7439-97-6
Mercuric chloride	33631-63-9
Mercury (II) chloride	7487-94-7
Mercuric sulfate	7783-35-9
Mercuric nitrate	10045-94-0
Mercuric (II) oxide	21908-53-2
Mercuric sulfide	1344-48-5
Other mercury compounds	-

**Ozone Depleting Substances/Isomers\*****CAS Numbers**

Trichlorofluoromethane (CFC 11)	75-69-4
Dichlorodifluoromethane (CFC12)	75-71-8



Chlorotrifluoromethane (CFC 13)	75-72-9
Pentachlorofluoroethane (CFC 111)	354-56-3
Tetrachlorodifluoroethane (CFC 112)	76-12-0
Trichlorotrifluoroethane (CFC 113)	354-58-5
1,1,2 Trichlorotrifluoroethane	76-13-1
Dichlorotetrafluoroethane (CFC 114)	76-14-2
Monochloropentafluoroethane (CFC 115)	76-15-3
Heptachlorofluoropropane (CFC 211)	422-78-6 135401-87-5
Hexachlorodifluoropropane (CFC 212)	3182-26-1
Pentachlorotrifluoropropane (CFC 213)	2354-06-5 134237-31-3
Tetrachlorotetrafluoropropane (CFC 214)	29255-31-0
1,1,1,3-Tetrachlorotetrafluoropropane	2268-46-4
Trichloropentafluoropropane (CFC 215)	1599-41-3
1,1,1-Trichloropentafluoropropane	4259-43-2
1,2,3-Trichloropentafluoropropane	76-17-5
Dichlorohexafluoropropane (CFC 216)	661-97-2
Monochloroheptafluoropropane (CFC 217)	422-86-6
Bromochlorodifluoromethane (Halon 1211)	353-59-3
Bromotrifluoromethane (Halon 1301)	75-63-8
Dibromotetrafluoroethane (Halon 2402)	124-73-2
Carbon Tetrachloride (Tetrachloromethane)	56-23-5
1,1,1, - Trichloroethane (methyl chloroform) and its isomers except 1,1,2-trichloroethane	71-55-6
Bromomethane (Methyl Bromide)	74-83-9
Bromodifluoromethane and isomers (HBFC's)	1511-62-2

\*Please note: These materials may contain isomers that are not listed here. Isomers with CAS numbers have been included when available.

<b>Hydrochlorofluorocarbons/ Isomers*</b>	<b>CAS Numbers</b>
Dichlorofluoromethane (HCFC 21)	75-43-4
Chlorodifluoromethane (HCFC 22)	75-45-6
Chlorofluoromethane (HCFC 31)	593-70-4
Tetrachlorofluoroethane (HCFC 121)	134237-32-4
1,1,1,2-tetrachloro-2-fluoroethane (HCFC 121a)	354-11-0
1,1,2,2-tetracloro-1-fluoroethane	354-14-3
Trichlorodifluoroethane (HCFC 122)	41834-16-6
1,2,2-trichloro-1,1-difluoroethane	354-21-2
Dichlorotrifluoroethane(HCFC 123)	34077-87-7
Dichloro-1,1,2-trifluoroethane	90454-18-5
2,2-dichloro-1,1,1-trifluoroethane	306-83-2
1,2-dichloro-1,1,2-trifluoroethane (HCFC-123a)	354-23-4
1,1-dichloro-1,2,2-trifluoroethane (HCFC-123b)	812-04-4
2,2-dichloro-1,1,2-trifluoroethane (HCFC-123b)	812-04-4
Chlorotetrafluoroethane (HCFC 124)	63938-10-3
2-chloro-1,1,1,2-tetrafluoroethane	2837-89-0
1-chloro-1,1,2,2-tetrafluoroethane (HCFC 124a)	354-25-6
Trichlorofluoroethane (HCFC 131)	27154-33-2;(134237-34-6)
1-Fluoro-1,2,2-trichloroethane	359-28-4
1,1,1-trichloro-2-fluoroethane (HCFC131b)	811-95-0
Dichlorodifluoroethane (HCFC 132)	25915-78-0
1,2-dichloro-1,1-difluoroethane (HCFC 132b)	1649-08-7
1,1-dichloro-1,2-difluoroethane (HFCF 132c)	1842-05-3

1,1-dichloro-2,2-difluoroethane	471-43-2
1,2-dichloro-1,2-difluoroethane	431-06-1
Chlorotrifluoroethane (HCFC 133)	1330-45-6
1-chloro-1,2,2-trifluoroethane	1330-45-6
2-chloro-1,1,1-trifluoroethane (HCFC-133a)	75-88-7
Dichlorofluoroethane(HCFC 141)	1717-00-6; (25167-88-8)
1,1-dichloro-1-fluoroethane (HCFC-141b)	1717-00-6
1,2-dichloro-1-fluoroethane	430-57-9
Chlorodifluoroethane (HCFC 142)	25497-29-4
1-chloro-1,1-difluoroethane (HCFC142b)	75-68-3
1-chloro-1,2-difluoroethane (HCFC142a)	25497-29-4
Hexachlorofluoropropane (HCFC 221)	134237-35-7
Pentachlorodifluoropropane (HCFC 222)	134237-36-8
Tetrachlorotrifluoropropane (HCFC 223)	134237-37-9
Trichlorotetrafluoropropane (HCFC 224)	134237-38-0
Dichloropentafluoropropane, (Ethyne, fluoro-) (HCFC 225)	127564-92-5; (2713-09-9)
2,2-Dichloro-1,1,1,3,3-pentafluoropropane(HCFC 225aa)	128903-21-9
2,3-Dichloro-1,1,1,2,3-pentafluoropropane (HCFC 225ba)	422-48-0
1,2-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC 225bb)	422-44-6
3,3-Dichloro-1,1,1,2,2-pentafluoropropane (HCFC 225ca)	422-56-0
1,3-Dichloro-1,1,2,2,3-pentafluoropropane (HCFC 225cb)	507-55-1
1,1-Dichloro-1,2,2,3,3-pentafluoropropane(HCFC 225cc)	13474-88-9
1,2-Dichloro-1,1,3,3,3-pentafluoropropane (HCFC 225da)	431-86-7
1,3-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC 225ea)	136013-79-1
1,1-Dichloro-1,2,3,3,3-pentafluoropropane(HCFC 225eb)	111512-56-2
Chlorohexafluoropropane (HCFC 226)	134308-72-8
Pentachlorofluoropropane (HCFC 231)	134190-48-0
Tetrachlorodifluoropropane (HCFC 232)	134237-39-1
Trichlorotrifluoropropane (HCFC 233)	134237-40-4
1,1,1-Trichloro-3,3,3-trifluoropropane	7125-83-9
Dichlorotetrafluoropropane (HCFC 234)	127564-83-4
Chloropentafluoropropane (HCFC 235)	134237-41-5
1-Chloro-1,1,3,3,3-pentafluoropropane	460-92-4
Tetrachlorofluoropropane (HCFC 241)	134190-49-1
Trichlorodifluoropropane (HCFC 242)	134237-42-6
Dichlorotrifluoropropane (HCFC 243)	134237-43-7
1,1-dichloro-1,2,2-trifluoropropane	7125-99-7
2,3-dichloro-1,1,1-trifluoropropane	338-75-0
3,3-Dichloro-1,1,1-trifluoropropane	460-69-5
Chlorotetrafluoropropane (HCFC 244)	134190-50-4
3-chloro-1,1,2,2-tetrafluoropropane	679-85-6
Trichlorofluoropropane (HCFC 251)	134190-51-5
1,1,3-trichloro-1-fluoropropane	818-99-5
Dichlorodifluoropropane (HCFC 252)	134190-52-6
Chlorotrifluoropropane (HCFC 253)	134237-44-8
3-chloro-1,1,1-trifluoropropane (HCFC 253fb)	460-35-5
Dichlorofluoropropane (HCFC 261)	134237-45-9
1,1-dichloro-1-fluoropropane	7799-56-6
Chlorodifluoropropane (HCFC 262)	134190-53-7
2-chloro-1,3-difluoropropane	102738-79-4
Chlorofluoropropane (HCFC 271)	134190-54-8
2-chloro-2-fluoropropane	420-44-0

\*Please note: These materials may contain isomers that are not listed here. Isomers with CAS numbers have been included when available.

**Polybrominated Biphenyls (PBBs)****CAS Numbers**

Bromobiphenyl and its ethers	2052-07-5 (2-Bromobiphenyl) 2113-57-7 (3-Bromobiphenyl) 92-66-0 (4-Bromobiphenyl) 101-55-3 (ether)
Decabromobiphenyl and its ethers	13654-09-6 1163-19-5 (ether)
Dibromobiphenyl and its ethers	92-86-4 2050-47-7 (ether)
Heptabromobiphenylether	68928-80-3
Hexabromobiphenyl and its ethers	59080-40-9 36355-01-8 (hexabromo-1,1'-biphenyl) 67774-32-7 (Firemaster FF-1) 36483-60-0 (ether)
Nonabromobiphenylether	63936-56-1
Octabromobiphenyl and its ethers	61288-13-9 32536-52-0 (ether)
Pentabromobidphenyl ether (note: Commercially available PeBDPO is a complex reaction mixture containing a variety of brominated diphenyloxides.	32534-81-9 (CAS number used for commercial grades of PeBDPO)
Polybrominated Biphenyls	59536-65-1
Tetrabromobiphenyl and its ethers	40088-45-7 40088-47-9 (ether)
Tribromobiphenyl ether	49690-94-0

**Polychlorinated Biphenyls (PCBs)****CAS Numbers**

Polychlorinated Biphenyls	1336-36-3
Aroclor	12767-79-2
Chlorodiphenyl (Aroclor 1260)	11096-82-5
Kanechlor 500	27323-18-8
Aroclor 1254	11097-69-1
Terphenyls	26140-60-3

**Polychlorinated Naphthalenes****CAS Numbers**

Polychlorinated Naphthalenes ( $C_{10}H_{6-8}Cl_{1-3}$ )	70776-03-3
Other polychlorinated Naphthalenes ( $C_{10}H_{6-8}Cl_{1-3}$ )	-

**Radioactive Substances****CAS Numbers**

Uranium	-
Plutonium	-
Radon	-
Americium	-
Thorium	-
Cesium	7440-46-2
Strontium	7440-24-6
Other radioactive substances	-

**Shortchain Chlorinated Paraffins****CAS Numbers**

Chlorinated paraffins (C10-13)	85535-84-8
Other Short Chain Chlorinated Paraffins	-

<b>Tributyl Tin, Triphenyl Tin and oxides</b>	<b>CAS Numbers</b>
Bis(tri-n-butyltin) oxide	56-35-9
Triphenyltin N,N'-dimethyldithiocarbamate	1803-12-9
Triphenyltin fluoride	379-52-2
Triphenyltin acetate	900-95-8
Triphenyltin chloride	639-58-7
Triphenyltin hydroxide	76-87-9
Triphenyltin fatty acid salts (C=9-11)	47672-31-1
Triphenyltin chloroacetate	7094-94-2
Tributyltin methacrylate	2155-70-6
Bis(tributyltin) fumarate	6454-35-9
Tributyltin fluoride	1983-10-4
Bis(tributyltin) 2,3-dibromosuccinate	31732-71-5
Tributyltin acetate	56-36-0
Tributyltin laurate	3090-36-6
Bis(tributyltin) phthalate	4782-29-0
Copolymer of alkyl acrylate, methyl methacrylate and tributyltin methacrylate(alkyl; C=8)	-
Tributyltin sulfamate	6517-25-5
Bis(tributyltin) maleate	14275-57-1
Tributyltin chloride	1461-22-9
Mixture of tributyltin cyclopentanecarboxylate and its analogs (Tributyltin naphthenate)	-
Mixture of tributyltin 1,2,3,4,4a,4b,5,6,10,10a-decahydro-7-isopropyl-1,4a-dimethyl-1-phenanthlenecarboxylate and its analogs (Tributyltin rosin salt)	-
Other Tributyl Tins & Triphenyl Tins	-

<b>Antimony/Antimony Compounds</b>	<b>CAS Numbers</b>
Antimony (metallic)	7440-36-0
Antimony trioxide	1309-64-4
Antimony pentoxide	1314-60-9
Antimony trichloride	10025-91-9
Sodium antimonate	15432-85-6
Other antimony compounds	-

<b>Arsenic/Arsenic Compounds</b>	<b>CAS Numbers</b>
Arsenic	7440-38-2
Gallium arsenide	1303-00-0
Calcium arsenate	7778-44-1
Calcium arsenite	27152-57-4
Arsenic pentoxide	1303-28-2
Arsenic trioxide	1327-53-3
Potassium arsenite	10124-50-2
Potassium arsenate	7784-41-0
Lead arsenate	3687-31-8
Other arsenic compounds	-

<b>Beryllium/Beryllium Compounds</b>	<b>CAS Numbers</b>
Beryllium	7440-41-7
Beryllium-aluminum alloy	12770-50-2
Beryllium chloride	7787-47-5
Beryllium fluoride	7787-49-7
Beryllium hydroxide	13327-32-7
Beryllium oxide	1304-56-9
Beryllium phosphate	13598-15-7
Beryllium sulfate	13510-49-1
Beryllium sulfate tetrahydrate	7787-56-6
Beryl ore	1302-52-9
Other beryllium compounds	-

<b>Bismuth/Bismuth Compounds</b>	<b>CAS Numbers</b>
Bismuth	7440-69-9
Bismuth trioxide	1304-76-3
Bismuth nitrate	10361-44-1
Other bismuth compounds	-

<b>Brominated Flame Retardants (other than PBBs or PBBEs)</b>	<b>CAS Numbers</b>
Brominated flame retardant which comes under notation of ISO 1043-4 code number FR(14) [Aliphatic/alicyclic brominated compounds]	-
Brominated flame retardant which comes under notation of ISO 1043-4 code number FR(15) [Aliphatic/alicyclic brominated compounds in combination with antimony compounds]	-
Brominated flame retardant which comes under notation of ISO 1043-4 code number FR(16) [Aromatic brominated compounds excluding brominated diphenyl ether and biphenyls]	-
Brominated flame retardant which comes under notation of ISO 1043-4 code number FR(17)	-

[Aromatic brominated compounds excluding brominated diphenyl ether and biphenyls) in combination with antimony compounds]	
Brominated flame retardant which comes under notation of ISO 1043-4 code number FR(22) [Aliphatic/alicyclic chlorinated and brominated compounds]	-
Brominated flame retardant which comes under notation of ISO 1043-4 code number FR(42) [Brominated organic phosphorus compounds]	-
Poly(2,6-dibromo-phenylene oxide)	69882-11-7
Tetra-decabromo-diphenoxy-benzene	58965-66-5
1,2-Bis(2,4,6-tribromo-phenoxy) ethane	37853-59-1
3,5,3',5'-Tetrabromo-bisphenol A (TBBA)	79-94-7
TBBA, unspecified	30496-13-0
TBBA-epichlorhydrin oligomer	40039-93-8
TBBA-TBBA-diglycidyl-ether oligomer	70682-74-5
TBBA carbonate oligomer	28906-13-0
TBBA carbonate oligomer, phenoxy end capped	94334-64-2
TBBA carbonate oligomer, 2,4,6-tribromo-phenol terminated	71342-77-3
TBBA-bisphenol A-phosgene polymer	32844-27-2
Brominated epoxy resin end-capped with tribromophenol	139638-58-7
Brominated epoxy resin end-capped with tribromophenol	135229-48-0
TBBA-(2,3-dibromo-propyl-ether)	21850-44-2
TBBA bis-(2-hydroxy-ethyl-ether)	4162-45-2
TBBA-bis-(allyl-ether)	25327-89-3
TBBA-dimethyl-ether	37853-61-5
Tetrabromo-bisphenol S	39635-79-5
TBBS-bis-(2,3-dibromo-propyl-ether)	42757-55-1
2,4-Dibromo-phenol	615-58-7
2,4,6-tribromo-phenol	118-79-6
Pentabromo-phenol	608-71-9
2,4,6-Tribromo-phenyl-alltl-ether	3278-89-5
Tribromo-phenyl-allyl-ether, unspecified	26762-91-4
Bis(methyl)tetrabromo-phtalate	55481-60-2
Bis(2-ethylhexyl)tetrabromo-phtalate	26040-51-7
2-Hydroxy-propyl-2-(2-hydroxy-ethoxy)-ethyl-TBP	20566-35-2
TBPA, glycol-and propylene-oxide esters	75790-69-1
N,N'-Ethylene -bis-(tetrabromo-phthalimide)	32588-76-4
Ethylene-bis(5,6-dibromo-norbornane-2,3-dicarboximide)	52907-07-0
2,3-Dibromo-2-butene-1,4-diol	3234-02-4
Dibromo-neopentyl-glycol	3296-90-0
Dibromo-propanol	96-13-9
Tribromo-neopentyl-alcohol	36483-57-5
Poly tribromo-styrene	57137-10-7
Tribromo-styrene	61368-34-1
Dibromo-styrene grafted PP	171091-06-8
Poly-dibromo-styrene	31780-26-4
Bromo-/Chloro-paraffins	68955-41-9
Bromo-/Chloro-alpha-olefin	82600-56-4
Vinylbromide	593-60-2
Tris-(2,3-dibromo-propyl)-isocyanurate	52434-90-9
Tris(2,4-Dibromo-phenyl) phosphate	49690-63-3
Tris(tribromo-neopentyl) phosphate	19186-97-1
Chlorinated and brominated phosphate ester	125997-20-8

Pentabromo-toluene	87-83-2
Pentabromo-benzyl bromide	38521-51-6
1,3-Butadiene homopolymer, brominated	68441-46-3
Pentabromo-benzyl-acrylate, monomer	59447-55-1
Pentabromo-benzyl-acrylate, polymer	59447-57-3
Decabromo-diphenyl-ethane	61262-53-1
Tribromo-bisphenyl-maleinimide	59789-51-4
Brominated trimethylphenyl-lindane	59789-51-4
Other Brominated Flame Retardants	-
Hexabromo-cyclo-dodecane (HBCD), unspecified	3194-55-6
Tetrabromo-chyclo-octane	31454-48-5
1,2-Dibromo-4-(1,2 dibromo-methyl)-cyclo-hexane	3322-93-8
TBPA Na salt	25357-79-3
Tetrabromo phthalic-anhydride	632-79-1

#### **Copper/Copper Compounds**

#### **CAS Numbers**

Copper	7440-50-8
Copper sulfate	7758-98-7
Cupric carbonate	1184-64-1
Cupric oxide	1317-38-0
Copper sulfide	1317-40-4
Other copper compounds	-

#### **Gold/Gold Compounds**

#### **CAS Numbers**

Gold	7440-57-5
Gold oxide	1303-58-8
Gold cyanide	506-65-0
Gold (III) chloride	13453-07-1
Gold (III) bromide	10294-28-7
Other gold compounds	-

#### **Magnesium**

#### **CAS Numbers**

Magnesium	7439-95-4
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#### **Nickel/Nickel Compounds**

#### **CAS Numbers**

Nickel	7440-02-0
Nickel acetate	373-02-4
Nickel carbonate	3333-67-3
Nickel carbonyl	13463-39-3
Nickel hydroxide	12054-48-7 or 11113-74-9
Nickelocene	1271-28-9
Nickel oxide	1313-99-1
Nickel subsulfide	12035-72-2
Other nickel compounds	-

#### **Palladium/Palladium Compounds**

#### **CAS Numbers**

Palladium	7440-05-3
Palladium (II) chloride	7647-10-1
Palladium (II) bromide	13444-94-5
Palladium (II) iodide	7790-38-7
Palladium (II) oxide	1314-08-5
Other palladium compounds	-

<b>Phthalates</b>	<b>CAS Numbers</b>
Di-"isonyl" phthalate (DINP)	28553-12-0
Bis (2-ethylhexyl) phthalate (DEHP)	117-81-7
Dibutyl phthalate (DBP)	84-74-2
Di- "isodecyl" phthalate (DIDP)	26761-40-0
Bis(n-octyl) Phthalate (DNOP)	117-84-0
Butyl benzyl phthalate (BBP)	85-68-7

<b>Selenium/Selenium Compounds</b>	<b>CAS Numbers</b>
Selenium and materials	7782-49-2
Hydrogen selenide	7783-07-5
Sodium selenide	1313-85-5
Selenium dioxide	7446-08-4
Sodium selenate	10112-94-4
Dimethyl selenide	593-79-3
Selenium oxide	12640-89-0
Other selenium compounds	-

<b>Silver /Silver Compounds</b>	<b>CAS Numbers</b>
Silver	7440-22-4
Silver (I) fluoride	7775-41-9
Silver (II) fluoride	7783-95-1
Silver (I) chloride	7783-90-6
Silver (I) bromide	7785-23-1
Silver (I) iodide	7783-96-2
Silver (I) oxide	20667-12-3
Silver (I) peroxide	25455-73-6
Silver (II) oxide	1301-96-8
Silver nitrate	7761-88-8
Silver acetate	563-63-3
Silver sulfate	10294-26-5
Silver cyanide	506-64-9
Other silver compounds	

<b>Chlorinated Polymers</b>	<b>CAS Number</b>
Vinyl chloride polymer (PVC)	9002-86-2