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NEC Corporation

Environmental Specifications Pertaining to Procurement Restrictions for the Inclusion of Chemical Substances in Products Ver. 16

(For Suppliers)

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1. Objective

In August 2002, NEC has set “GREEN PROCUREMENT GUIDELINES (FOR SUPPLIERS)” with that declared that it shall give priority to procure environment conscious products from the companies which actively address environmental conservation.

On the other hand, with the considerably changing social environment which surround environmentally conscious products products-related environmental regulations are also expanding.

In particular, EU RoHS directive[*1] that restricts the use of specified substances in electrical and electronic products marketed in the European Union has expanded its scope of substances and similar requirements of the RoHS directive has expanded globally.

In addition, the REACH Regulation[*2] enforced in June 2007 periodically releases information of candidate substances of very high concerns (SVHCs) and list of these substances is expanding, and these substances are specified as substances whose concentration value should be controlled in the products and in case the product contains more than the specified concentration value of these substances, it is made mandatory by the law to provide information necessary for the safe use of the product.

NEC (hereafter including the NEC Group) is determined to conform to the domestic and international legal restrictions of substances in products. Therefore, this guideline defines standard requirements for procuring materials, parts and other products from the suppliers for producing NEC’s electric/electronic products and systems.

2. Scope of Application

In principal these specifications apply to all the materials procured to build NEC products (electric/electronic products and systems) as well as items (such as packaging materials) used for shipping NEC products.

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*1: RoHS Directive:

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. This EU law prohibits the sales of electrical and electronic products exceeding maximum concentration values of specific heavy metals (lead, mercury, cadmium, hexavalent chromium) or bromine flame retardant (PBB and PBDE) in the EU market after July 1, 2006.

The Directive has added the phthalates (DEHP, BBP, DBP and DIBP) to the list of restricted substances by Commission Delegated Directive (EU) 2015/863 of 31 March 2015 amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances

*2: REACH Regulation:

REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH),. This EU law, which took effect in June 1, 2007, establishes a comprehensive system for registration, evaluation, authorization, and restriction of chemicals. Manufactures and importers that will market substances, preparations, and articles in the EU are obliged, for example, to evaluate and register the substances, register and report the substances in the articles, and provide information about the substances in the articles under certain conditions. The article substances for which content information must be provided are known as candidate substances subject to authorization, commonly called SVHCs, which will be made public in a stepwise manner.

3. Timing of Application

When legal enactive date is newly introduced or revised, NEC does not procure materials from six months before the date.

4. Banned Substances

Banned Substances are the chemical substances including impurities which are prohibited to be included in the products intentionally or unintentionally. Table 1 shows the substances which are banned to be utilized for NEC's products.

In principle, NEC does not procure any products containing the "banned substances", thus NEC's suppliers are not allowed to use any of the "banned substances" in Table 1 in the products they sell to NEC. These requirements are concerned with product quality and if a product contains any of the "banned substances" without the consent of NEC, this will be regarded as a quality defect and the supplier shall assume liability for defect warranty as per the contract.

Note 1: In case there are new enforcement or revisions of treaties, laws, regulations, industry standards, etc., there may be temporal unconformities between the new requirements and specifications stated in this guideline. In such cases, new requirements shall be referred and conform to.

Note 2: Region specific chemical substances regulations of the destination country where NEC products are to be delivered, shall be confirmed and complied with.

Table 1 Banned Substances

No.	Name of Substance /Substance Group	Key Applicable Law and Regulation
1	Polychlorinated biphenyls (PCBs)	・Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC ・Japan Law Concerning the Evaluation of Chemical Substances (Class I Specified Chemical Substances)
2	Polychlorinated naphthalenes (more than 2 chlorine atoms)	・Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC ・Japan Law Concerning the Evaluation of Chemical Substances (Class I Specified Chemical Substances)
3	Tributyl tin oxide (TBTO)	・EU REACH Regulation (Annex XVII) Japan Law Concerning the Evaluation of Chemical Substances (Class I Specified Chemical Substances)
4	Shortchain chlorinated paraffins (C10-C13)	・Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC ・Japan Law Concerning the Evaluation of Chemical Substances (Class I Specified Chemical Substances)
5	Ozone depleting substances (specified in Montreal Protocol: Class I)	・Law Concerning the Protection of the Ozone Layer through the Control of Specified Substances and Other Measures ・Montreal Protocol

6	Asbestos	・EU REACH Regulation (Annex XVII) ・Industrial Safety and Health Law (Prohibition of Manufacturing and Use)
7	Polychlorinated terphenyls (PCTs)	・EU REACH Regulation (Annex XVII)
8	Dimethyl fumarate	・EU REACH Regulation (Annex XVII)
9	Perfluorooctane sulfonate (PFOS) and its Salts	・Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC ・Japan Law Concerning the Evaluation of Chemical Substances (Class I Specified Chemical Substances)
10	Phenol,2-(2H-benzotriazol-2-yl)-4, 6-bis(1,1-dimethylethyl)	・Japan Law Concerning the Evaluation of Chemical Substances (Class I Specified Chemical Substances)
11	Hexabromocyclododecane	・Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC ・Japan Law Concerning the Evaluation of Chemical Substances (Class I Specified Chemical Substances)
12	Perfluorooctanoic acid (PFOA) and its Salts	・REGULATION (EU) 2019/1021 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20h June 2019 on persistent organic pollutants ・Japan Law Concerning the Evaluation of Chemical Substances (Class I Specified Chemical Substances)
13	Phenol, Isopropylated Phosphate (3:1) (PIP (3:1))	・USA_TSCA
14	Polybrominated diphenyl ethers (PBDEs) [Representative target substances] decaBDE （CAS No.1163-19-5） tetraBDE（Representative CAS No.40088-47-9） pentaBDE（Representative CAS No. 32534-81-9） hexaBDE（Representative CAS No.36483-60-0） heptaBDE（Representative CAS No.68928-80-3）	・REGULATION (EU) 2019/1021 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20h June 2019 on persistent organic pollutants ・RoHS Directive 2011/65/EU ・USA_TSCA ・Japan Law Concerning the Evaluation of Chemical Substances (Class I Specified Chemical Substances)
15	UV-328	・Japan Law Concerning the Evaluation of Chemical Substances (Class I Specified Chemical Substances)
16	Dechlorane Plus	・Japan Law Concerning the Evaluation of Chemical Substances (Class I Specified Chemical Substances)
17	Perfluorohexane sulfonic acid (PFHxS), its salts and PFHxS- related compounds	・REGULATION (EU) 2019/1021 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20h June 2019 on persistent organic pollutants
18	Azocolourants and Azo dyes which form certain aromatic amines	・EU REACH Regulation (Annex XVII)

5. Conditionally Banned Substances

Conditionally Banned Substances are the substances whose concentration values in the products are not permitted to exceed the maximum value defined legally. NEC's conditionally banned substances are shown in Table 2. Appendix 1 shows the examples and descriptions of these substances.

Even impurities shall not contain conditionally banned substances exceeding maximum concentration values described in Table 2. Unless otherwise specified, the values in Table 2 are regarded as the

thresholds. If drawings, specifications or other documents regarding products to be procured include specific thresholds, those specifications are to be used. Note that the supplier has the responsibility to check and guarantee the content and concentration. If any of the products is found to contain conditionally banned substances exceeding maximum concentration values, this will be regarded as a quality defect and the supplier shall assume liability for defect warranty as per the contract.

Note 1: In case there are new enforcement or revisions of treaties, laws, regulations, industry standards, etc., there may be temporal unconformities between the new requirements and specifications stated in this guideline. In such cases, new requirements shall be referred and conform to.

Note 2: Region specific chemical substances regulations of the destination country where NEC products are to be delivered, shall be confirmed and complied with.

Table 2 Restrictions on Conditionally Banned Substances

No.	Name of Substance Group		Major Application or Scope	Threshold Note
1	Cadmium/cadmium compounds	a	All applications (based on RoHS Directive 2011/65/EU)	*1
		b	Batteries (based on EU Battery Regulation (EU) 2023/1542)	*2
		c	Packaging materials (based on EU Packaging and Packaging Waste Directive 94/62/EC)	*3
2	Lead/lead compounds	a	All applications (based on RoHS Directive 2011/65/EU)	*1
		b	Batteries (based on EU Battery Regulation (EU) 2023/1542)	*2
		c	Packaging materials (based on EU Packaging and Packaging Waste Directive 94/62/EC)	*3
3	Mercury/mercury compounds	a	All applications (based on RoHS Directive 2011/65/EU)	*1
		b	Batteries (based on EU Battery Regulation (EU) 2023/1542)	*2
		c	Packaging materials (based on EU Packaging and Packaging Waste Directive 94/62/EC)	*3
		d	The Minamata Convention on Mercury	*7
4	Chromium VI compounds (other than metallic chromium and alloy)	a	All applications (based on RoHS Directive 2011/65/EU)	*1
		b	Packaging materials (based on EU Packaging and Packaging Waste Directive 94/62/EC)	*3
5	Polybrominated biphenyls (PBBs)	a	All applications (based on RoHS Directive 2011/65/EU)	*1
6	(Intentionally left blank)			
7	Bis(2-ethylhexyl) phthalate (DEHP)	a	All applications (based on RoHS Directive 2011/65/EU)	*1
8	Butyl benzyl phthalate (BBP)	a	All applications (based on RoHS Directive 2011/65/EU)	*1
9	Dibutyl phthalate (DBP)	a	All applications (based on RoHS Directive 2011/65/EU)	*1
10	Diisobutyl phthalate (DIBP)	a	All applications (based on RoHS Directive 2011/65/EU)	*1
11	Nickel (scope: components that come into contact with the human body)	a	Especially for components that come into persistent contact with the human body (Based on EU REACH Regulation (Annex XVII))	*6
		b	All excluding the above are exempted.	-
12	Dibutyltin (DBT) compounds	a	All applications (Based on EU REACH Regulation (Annex XVII))	*4
13	Dioctyltin (DOT) compounds	a	All applications (Based on EU REACH Regulation (Annex XVII))	*4
14	Tri-substituted organostannic compounds (tributyl tin compound, triphenyl tin	a	All applications (Based on EU REACH Regulation (Annex XVII))	*4

	compound)			
15	Phthalates Group 1 Bis (2-ethylhexyl) phthalate (DEHP) Benzyl butyl phthalate (BBP) Dibutyl phthalate (DBP) Diisobutyl phthalate (DIBP)	a	All applications （Based on EU REACH Regulation（Annex XVII））	*6
16	C9-C14 PFCAs and their salts	a	All applications （Based on EU REACH Regulation（Annex XVII））	*8
17	C9-C14 PFCA-related substances	a	All applications （Based on EU REACH Regulation（Annex XVII））	*9
18	Pentachlorophenol(PCP) and its salts and esters		All applications （Based on EU POPs Regulation（Annex I））	*10
19	Phthalates Group 2 (a) Di-'isononyl' phthalate (DINP) (b) Di-'isodecyl' phthalate (DIDP) (c) Di-n-octyl phthalate (DNOP)		Toys and childcare articles which can be placed in the mouth by children （Based on EU REACH Regulation（Annex XVII））	*11
20	Formaldehyde and formaldehyde-releasing substances		All applications （Based on EU REACH Regulation（Annex XVII））	*12
21	Polycyclic-aromatic hydrocarbons (PAHs) (a) Benzo[a]pyrene (BaP) (b) Benzo[e]pyrene (BeP) (c) Benzo[a]anthracene (BaA) (d) Chrysen (CHR) (e) Benzo[b]fluoranthene (BbFA) (f) Benzo[j]fluoranthene (BjFA) (g) Benzo[k]fluoranthene (BkFA) (h) Dibenzo[a,h]anthracene (DBAhA)		Rubber or plastic components that come into direct as well as prolonged or short-term repetitive,contact with the human skin or the oral cavity. （Based on EU REACH Regulation（Annex XVII））	*13

*1 : The threshold of cadmium is 100 ppm (0.01wt %). The threshold of lead, mercury, chromium VI, PBB, PBDE, DEHP, BBP, DBP, or DIBP is 1000 ppm (0.1wt %).
: The applications not listed in Table 2 shall be based on the Annex to the RoHS Directive.
: Please refer the latest information of Annex III and IV of EU RoHS directive for the exemptions.
: NEC will only accept the exempted products/parts no later than six months prior to expiry date of exemptions.
: Duly consult the concerned division of NEC and allow enough time for preparing the alternatives before discontinuing the deliveries of particular products.

*2 : The threshold of cadmium is 20 ppm (0.002wt %). The threshold of mercury is 5 ppm (0.0005wt %). The threshold of lead is 100 ppm (0.01wt %).
: Denominator in calculating concentration is total weight of batteries.

*3 : The threshold of the total weight of cadmium, lead, mercury, and chromium VI is 100 ppm (0.01wt %).

*4 : The threshold of the concentration of the tin element of an article with respect to the weight is 1000 ppm (0.1wt %).

*5 : The threshold of Azo Dyes is 30ppm (0.003wt %), which applies to textiles and leather in direct and prolonged contact with skin.

*6 : The substances shall not be added intentionally.

*7 : The threshold of single or the total weight of four substances is 1000 ppm (0.1wt %).
: As mentioned in Section 3, NEC will not accept products containing these substances from January 7th, 2020.
: This Convention restricts the manufacturing of specific products containing mercury.

*8

*9 : The threshold of the total weight of C9-C14 PFCAs and their salts is 25 ppb. Reference substances are listed in Appendix 1.

*10 : The threshold of the total weight of C9-C14 PFCA- related substances is 250ppb. Reference substances are

listed in Appendix 1.

*11 : The threshold is 5 mg/kg (0,0005 % by weight)

*12 : The threshold is individually or in any combination of the phthalates in a concentration 0.1 % by weight

*13 : The threshold is 0,080 mg/m3 for articles other than furniture and wood-based articles

*14 : The threshold is 1 mg/kg (0,0001 % by weight) of any of PAHs.

6. Managed Substances

Managed substances are the substances of very high concern (SVHCs) as defined by EU REACH regulation. NEC's managed substances are the SVHCs listed in Declarable Substances List defined by IEC62474.

6.1 Providing Information about presence or absence of SVHCs

- Presence of SVHCs in the articles shall be determined and following steps should be taken:
  (1) Supplier shall report without fail if the concentration value exceeds 0.1wt % in an article.
  (2) Supplier shall report the concentration value to the best of its knowledge if the concentration value is lower or equal to 0.1wt %.
  (3) If a SVHC is added, supplier shall immediately confirm the concertation value and report as per (1) or (2) above.

6.2 Report format for providing information on presence of SVHCs

- In case products are substances and preparations : Use chemSHERPA-CI format, or other formats are also accepted
- In case products are articles: Use chemSHERPA-AI format, or other formats are also accepted.
  * Reporting the compliance information is mandatory.

6.3 Suggestion: Items in Scope of the Report providing the presence of SVHCs

- Items for which NEC requires the investigation information

7. Calculation of Concentration

7.1 Conditionally Banned Substances by EU RoHS directive

As per RoHS directive, concentration of conditionally banned substances shall be managed per "Part" of a product.

Part means a homogenous material of uniform composition throughout that cannot be mechanically separated into different materials. The concentration value in each part of the product should be lower than the specified threshold. Please refer Appendix 2 for concrete example of "Part."

The concentration value is calculated with mass of homogeneous material (part) including conditionally banned substances as denominator and mass of conditionally banned substances in homogeneous material as numerator. However, in case the conditionally banned substances are metallic compounds, mass of only the metallic element will be taken as numerator}

7.2 "Banned Substances" and "Conditionally Banned Substances" by directives other than EU RoHS}

Apart from the Banned Substances by RoHS mentioned in Table 1 and conditionally banned substances in Table 2, supplier shall also comply with requirements set by other regulations for individual substances and calculate the concentration accordingly.

7.3 Managed Substances

The concentration of SVHCs defined by EU REACH regulation is not managed by homogeneous material (part) but by article constituting the products. When the concentration of any of the SVHCs contained in an article exceeds 0.1wt %, the supplier of the article is obliged to provide appropriate

information for the recipient of the article to use it safely. Concentration is calculated by using the minimum unit mass of the article containing SVHC that constitutes the product as the denominator and the mass of SVHC contained in the article as the numerator. When different articles contain SVHCs, the concentration of each SVHC in all the articles must be controlled.
When the products are exported to the EU together with packaging materials such as boxes, the packaging materials are treated as individual items and the concentrations of SVHC in these items must also be controlled.

8. Request for Guarantee Submission

NEC may ask supplier to submit a guarantee document certifying that none of the products supplied contains “banned substances” and “conditionally banned substances” more than the threshold. The submitted guarantee should be approved by the supplier’s representative. Even if a warranty was not submitted, the supplier can’t be excused from the liability of defect guarantee.
For managed substances, NEC does not require the supplier to submit a guarantee as proof that the substance does not exceed the threshold.

9. Analysis Measurement

9.1 Banned Substances and Conditionally Banned Substance

NEC may perform acceptance test for the procured products to analyze and measure the restricted substances and substance groups. Further, NEC can also request suppliers to perform these analysis and measurements. In case, result (including the analysis result obtained by NEC's customer) of these analysis prove that product contains more value of banned substances than the threshold, NEC will ask the suppliers to conduct a thorough investigation to determine the cause (this includes pursuit of liability for defect warranty).}

9.2 Managed Substances

In principle, NEC does not require suppliers to conduct analyses and measurements for “managed substances”.

10. Exemption

In case NEC has agreed upon certain exemption in writing or by other means, further if documents like drawings, specification etc. clarify the exemptions, those specifications hereof shall not apply.

11. Revision

The modifications made to specifications shall be posted on the NEC Website (NEC Partners Site) regularly. However, specifications are subject to change without prior notice. Therefore, supplier must confirm for updates with the ordering department.

[Revision History]

***Revision to Ver. 2** (December 2004)

- Overall revision, broadening the scope of inclusion.
- In line with this revision, the title was changed from "Standards for Procurement Restriction on Substances Prohibited by the RoHS Directive" to "Standards Pertaining to Procurement Restrictions for the Inclusion of Chemical Substances in Products."

***Revision to Ver. 3** (July 2008)

- Minor amendment to sentences in Article1 and 2.
- Amended Battery Directive in Table 2.

***Revision to Ver. 4** (April 2010)

- Overall revision, to include the description of "managed substances."
- Revised Table 1, "Banned Substances."
- Added Table 4, "Framework for Defining Managed Substances."

***Revision to Ver. 5** (February 2014)

- Revised Table 1, "Banned Substances."
- Revised indicative lists in Appendix 1 in line with substance lists of IEC62464

***Revision to Ver. 6** (January 2015)

- Added a description for "Expiry dates of exemptions to the substance restriction requirements under the RoHS Directive as applied to NEC products" in Table 3.

***Revision to Ver. 6.1** (February 2015)

- Corrected typos

***Revision to Ver. 7** (June 2016)

- Revised Table 1, "Polychlorinated naphthalenes (more than 2 chlorine atoms)"
- Added Table 1 and 2, "DEHP, DBP, BBP, DIBP."
  Conditionally banned substances for the supply of products to NEC is one year prior to the date of enforcement by the EU RoHS Directive. After 22 July 2018, only products below the threshold can be supplied.

***Revision to Ver. 8** (April 2017)

- Revised Table 1 and 2, "Tri-substituted organostannic compounds (tributyltin compound, triphenyltin compound)"
- Revised Table 2, "Azocolourants and Azo dyes which form certain aromatic amines)" Application, scope and threshold are changed.
- Revised Appendix 1, "Conditionally Banned Substance."
- 5.2 Survey format is changed to chemSHERPA-CI/chemSHERPA-AI from MSDSplus/AIS.
- 6.2 Changed the unit of content concentration, which is the criterion for providing information on controlled substances

***Revision to Ver. 9** (July 2019)

- Added Section 3 "Timing of Application" and revised all the numbering.
- Revised Key Applicable Law and Regulation of PFOS in Table 1 from EU REACH（Annex XVII）to Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29

April 2004 on persistent organic pollutants and amending Directive 79/117/EEC.

- Added Perfluorooctanoic acid (PFOA) and its Salts and EU REACH ((Annex XVII)) as Key Applicable Law and Regulation in Table1.
- Also added EU REACH legal requirements enacted in July 2020 and NEC's target date not to
- procure the products containing PFOA and its salts.
- Revised the number of substance group of Table 1 after adding PFOA and its salts.
- Deleted information of four phthalates defined by EU RoHS directive as effective date has been already past.
- Deleted Table 3 as the exempted date has been already past.
- Revised the explanation of conditionally banned substances and deleted Table 4 and supplemental explanation on *1-8.
- Revised the explanation of concentration calculation.

***Revision to Ver. 10** (October 2021)

- Added Phenol, Isopropylated Phosphate (3:1) (PIP (3:1)) and Bis(pentabromophenyl) ether (decabromodiphenyl ether) (DecaBDE) as Key Applicable Law and Regulation in Table1.

***Revision to Ver. 11** (September 2022)

- Added C9-C14 PFCAs and their salts in Table2.
- Added reference substances list of C9-C14 PFCAs and their salts in Appendix 1.
- Added C9-C14 PFCAs- related substances in Table2.
- Added reference substances list of C9-C14 PFCA-related substances in Appendix 1.

***Revision to Ver. 12** (November 2023)

- Added "b Batteries" to "Major Application or Scope" in Table 2 No.2.
- Updated b for "Major Application or Scope" in Table 2 No.1 and No.3 to "EU Battery Regulation".

***Revision to Ver. 13** (August 2024)

- Added Pentachlorophenol（PCP）and its salts and esters in Table 2.
- Added Phthalates Group 2 in Table 2.
- Added Formaldehyde and formaldehyde-releasing substances in Table 2.
- Added Polycyclic-aromatic hydrocarbons (PAHs) in Table 2.

***Revision to Ver. 14** (January 2025)

- Added UV-328 in Table 1
- Added Dechlorane Plus in Table 1

***Revision to Ver. 15** (April 2025)

- Added Perfluorohexane sulfonic acid (PFHxS), its salts and PFHxS- related compounds to Table 1.
- "Azo dyes and pigments which form certain aromatic amines" was moved from Table 2 to Table 1 and changed to banned substances.

***Revision to Ver. 16** (May 2026)

- Change 'DecaBDE' to 'PBDEs' in Table 1. Add 'REGULATION (EU) 2019/1021' and 'RoHS

Directive 2011/65/EU' to the 'Key Applicable Law and Regulation' in Table 1.

- Delete 'Polybrominated diphenyl ethers (PBDEs)' in Table 2.
- Delete 'Table of Polybrominated Diphenyl Ethers (PBDEs)' in Appendix 1

[Appendix 1] Conditionally Banned Substance

The following list shows citation in the DSL of IEC 62474. For the latest information, please refer Reference Substance List (RSL) at the following IEC62474 website.

http://std.iec.ch/iec62474/iec62474.nsf/Index?open&q=042318

Table of Cadmium/Cadmium Compounds

Name	CAS No.
Cadmium	7440-43-9
Cadmium oxide	1306-19-0
Cadmium sulfide	1306-23-6
Cadmium chloride	10108-64-2
Cadmium sulfate	10124-36-4 31119-53-6

Table of Lead/Lead Compounds

Name	CAS No.
Lead	7439-92-1
Lead (II) sulfate	7446-14-2
Lead (II) carbonate	598-63-0
Lead hydrocarbonate	1319-46-6
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 (II) phosphate	7446-27-7
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
Lead (II) chromate	7758-97-6
Lead chromate molybdate sulphate red	12656-85-8
Lead sulfochromate yellow	1344-37-2
Lead perchlorate	13637-76-8

Table of Mercury/Mercury Compounds

Name	CAS No.
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
Perchloric acid, mercury(2+) salt	7616-83-3

Table of Chromium VI Compounds

Name	CAS No.
Barium chromate	10294-40-3
Calcium chromate	13765-19-0
Sodium chromate	7775-11-3
Sodium dichromate	10588-01-9 7789-12-0
Strontium chromate	7789-06-2
Potassium dichromate	7778-50-9
Potassium chromate	7789-00-6
Zinc chromate	13530-65-9

Table of Polybrominated Biphenyls (PBBs)

Name	CAS No.
Polybrominated Biphenyls	59536-65-1
Dibromobiphenyl	92-86-4
2-Bromobiphenyl	2052-07-5
3-Bromobiphenyl	2113-57-7
4-Bromobiphenyl	92-66-0
Tribromobiphenyl	59080-34-1
Tetrabromobiphenyl	40088-45-7
Pentabromobiphenyl	56307-79-0
Hexabromobiphenyl	59080-40-9
hexabromo-1,1-biphenyl	36355-01-8
Firemaster FF-1	67774-32-7
Heptabromobiphenyl	35194-78-6
Octabromobiphenyl	61288-13-9
Nonabiphenyl	27753-52-2
Decabromobiphenyl	13654-09-6

Table of Azocolorants and Azo dyes Which Form Certain Aromatic Amines

Name	CAS No.
Biphenyl-4-ylamine	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'-methylenedianiline	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-toluidine	838-88-0
6-methoxy-m-toluidine	120-71-8
4,4'-methylene-bis(2-chloroaniline)	101-14-4
4,4'-oxydianiline	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	60-09-3

Table of Tri-substituted organostannic compounds

Name	CAS No.
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 ((9-11) salt	18380-71-7 18380-72-8 47672-31-1 94850-90-5
Triphenyltin chloroacetate	7094-94-2
Tributyltin methacrylate	2155-70-6
Bis (tributyltin) fumalate	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 (c=8) acrylate, methyl methacrylate and tributyltin methacrylate	67772-01-4
Tributyltin sulfamate	6517-25-5
Bis (tributyltin) maleate	14275-57-1
Tributyltin chloride	1461-22-9 7342-38-3
Tributyltin cyclopentane carbonate=mixture	85409-17-2
Tributyltin-1, 2,3,4,4a, 4b, 5,6,10,10a-decahydro-7-isoplopyl-1, 4a-dimethyl-1-	26239-64-5
Other tri-substituted organostannic compounds	—

Table of Dibutyltin (DBT) compounds

Name	CAS No.
Dibutyltin oxide	818-08-6
Dibutyltin diacetate	1067-33-0
Dibutyltin dilaurate	77-58-7
Dibutyltin maleate	78-04-6
Other dibutyltin compounds	—

Table of Dioctyltin (DOT) compounds

Name	CAS No.
Dioctyl Tin Oxide	870-08-6
Dioctyltin dilaurate	3648-18-8
Other Dioctyltin compounds	—

Table of C9-C14 PFCAs and their salts

Name	CAS No.
Undecanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,11-henicosafluoro-	2058-94-8
Perfluorononan-1-oic acid, sodium salt	21049-39-8
Dodecanoic acid, 2,2,3,3,4,4,5,5,6,6,7, 7,8,8,9,9,10,10,11,11,12,12,12-tricosafluoro-	307-55-1
Ammonium nonadecafluorodecanoate	3108-42-7
Decanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-nonadecafluoro-	335-76-2
Nonanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,9-heptadecafluoro-	375-95-1
Tetradecanoic acid, 2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,14-heptacosafluoro-	376-06-7
Sodium nonadecafluorodecanoate	3830-45-3
Perfluorononan-1-oic acid, ammonium salt	4149-60-4
Tridecanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,13-pentacosafluoro-	72629-94-8

Table of C9-C14 PFCA-related substances

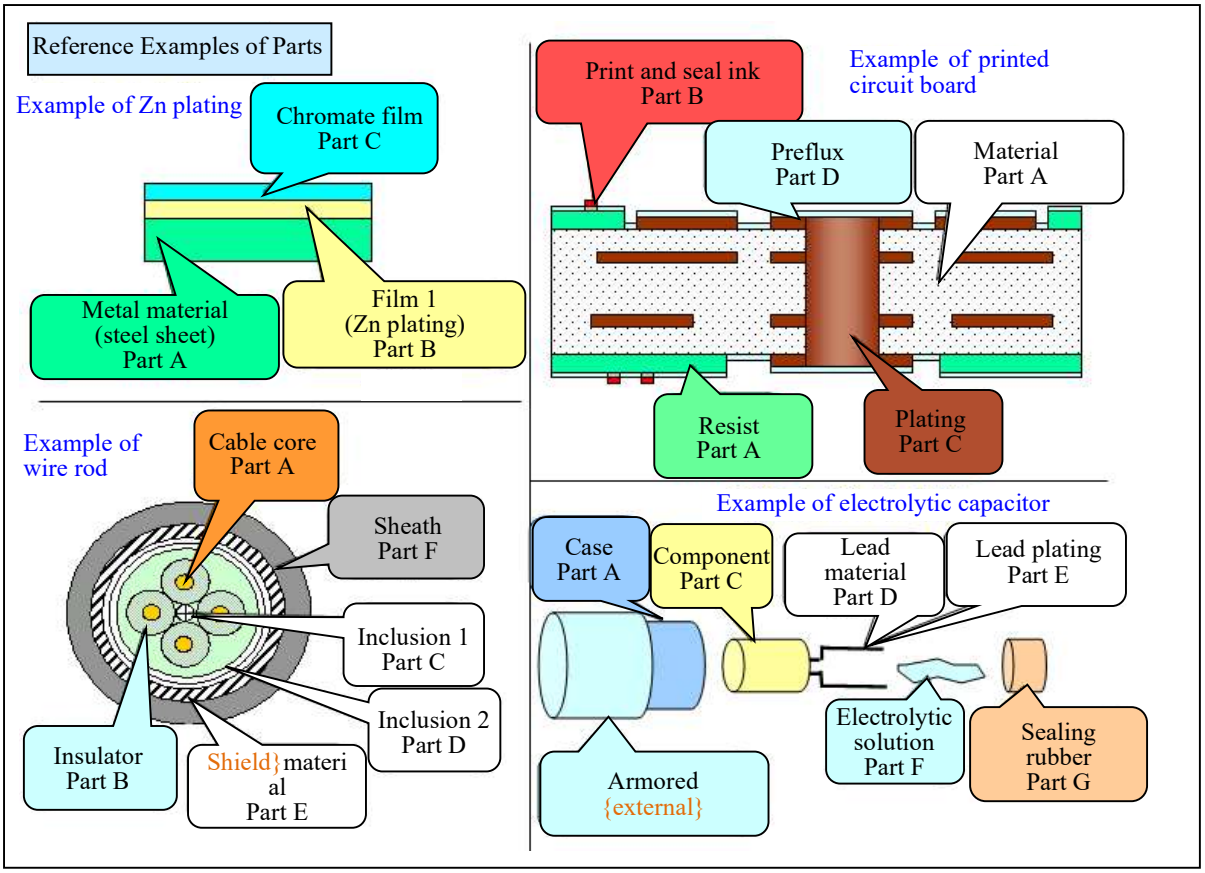
Name	CAS No.
Dodecanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,12,12,12-docosafluoro-11-(trifluoromethyl)-	16486-96-7
Undecanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11-eicosafluoro-	1765-48-6
Tetradecanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,14,14,14-hexacosafluoro-13-(trifluoromethyl)-	18024-09-4
Undecanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11-eicosafluoro-, potassium salt	307-71-1
Decanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,10,10,10-octadecafluoro-9-(trifluoromethyl)-, ammonium salt	3658-63-7
Ammonium tricosafluorododecanoate	3793-74-6
Dodecanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,12,12,12-docosafluoro-11-(trifluoromethyl)-, compd. With ethanamine (1:1)	68015-87-2
2-Propenoic acid, 2-methyl-, C10-16-alkyl esters, polymers with 2-hydroxyethyl methacrylate, Me methacrylate and perfluoro-C8-14-alkyl acrylate	125328-29-2
2-Propenoic acid, 2-methyl-, C10-16-alkyl esters, polymers with 2-hydroxyethyl methacrylate, Me methacrylate and gamma-omega perfluoro-C8-14-alkyl acrylate	129783-45-5
2-Propenoic acid, dodecyl ester, polymers with Bu (1-oxo-2-propenyl)carbamate and gamma-omega-perfluoro-C8-14-alkyl acrylate	144031-01-6
Dodecanoyl fluoride, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,12,12,12-docosafluoro-11-(trifluoromethyl)-	15811-52-6
4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,15,15,15-tetracosafluoro-2-211etrieve-14-(trifluoromethyl)pentadecyl acrylate	16083-87-7
2-Propenoicacid,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,12-heneicosafluorododecylester	17741-60-5
Bis[3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,12-henicosafluorododecyl] hydrogen phosphate	1895-26-7
Dodecane, 1,1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10-heneicosafluoro-12-iodo-	2043-54-1
2-Propenoic acid, 2-methyl-, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,12-heneicosafluorododecyl ester	2144-54-9
Tetradecane, 1,1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12-pentacosafluoro-14-iodo-	30046-31-2
Undecane, 1,1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11-tricosafluoro-11-iodo-	307-50-6

Dodecane, 1,1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12-pentacosafluoro-12-iodo-	307-60-8
Tetradecane, 1,1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14-nonacosafluoro-14-iodo-	307-63-1
Dodecane, 1,1,1,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12-tetracosafluoro-12-iodo-2-	3248-61-1
Tetradecane, 1,1,1,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14-octacosafluoro-14-iodo-2-	3248-63-3
Pentadecane,1,1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15-hentriacontafluoro-15-iodo-	335-79-5
Tridecane, 1,1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13-heptacosafluoro-13-iodo-	376-04-5
1-Tetradecanol, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,14-pentacosafluoro-	39239-77-5
Decane, 1,1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10-heneicosafluoro-10-iodo-	423-62-1
2-Propenoic acid, 2-methyl-, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,16,16,16-nonacosafluorohexadecyl ester	4980-53-4
3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,14,14,14-tetracosafluoro-13-(trifluoromethyl)tetradecyl acrylate	52956-82-8
Nonane, 1,1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9-nonadecafluoro-9-iodo-	558-97-4
2-Propenoic acid, 2-methyl-, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,14-pentacosafluorotetradecyl ester	6014-75-1
1-Hexadecanol, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,16,16,16-nonacosafluoro-	60699-51-6
4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,13,13,13-icosafluoro-2-hydroxy-12-(trifluoromethyl)tridecyl dihydrogen phosphate	63295-27-2
4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,15,15,15-tetracosafluoro-2-hydroxy-14-(trifluoromethyl)pentadecyl dihydrogen phosphate	63295-28-3
2-Propenoic acid, 2-methyl-, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,12-heneicosafluorododecyl ester, polymer with 3,3,4,4,5,5,6,6,7,7,8,8,9,9, 10,10,10-heptadecafluorodecyl 2-methyl-2-propenoate, methyl 2-methyl-2-propenoate,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,14-pentacosafluorotetradecyl 2-methyl-2-propenoate and 3,3,4,4,5,5,6,6, 7,7,8,8,8-tridecafluorooctyl 2-methyl-2-propenoate	65104-45-2
Undecane, 1,1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9-nonadecafluoro-11-iodo-	65510-56-7
Tetradecanoyl fluoride, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,14,14,14-hexacosafluoro-13-(trifluoromethyl)-	68025-62-7
2H-Pyran, 2,2,3,3,4,4,5,5,6-nonafluorotetrahydro-6-(nonadecafluorononyl)-	68155-54-4
Alkyl iodides, C4-20, gamma-omega-perfluoro	68188-12-5
Fatty acids, C7-13, perfluoro	68333-92-6
Alkyl iodides, C10-12, gamma-omega-perfluoro	68390-33-0
Phosphonic acid, perfluoro-C6-12-alkyl derivs.	68412-68-0
Phosphinic acid, bis(perfluoro-C6-12-alkyl)derivs.	68412-69-1
1-(carboxylatomethyl)-1-(2-hydroxyethyl)-4-(2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-nonadecafluoro-1-oxodecyl)piperazinium	71356-38-2
Fatty acids, C7-13, perfluoro, ammonium salts	72968-38-8
3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,12,12,12-icosafluoro-11-(trifluoromethyl) dodecyl methacrylate	74256-14-7
3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,14,14,14-tetracosafluoro-13-(trifluoromethyl)tetradecyl methacrylate	74256-15-8
2-Propenoic acid, gamma-omega-perfluoro-C8-14-alkyl esters	85631-54-5
2-Propenoic acid, perfluoro-C8-16-alkyl esters	85681-64-7
1-Dodecanol, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,12-heneicosafluoro-	865-86-1
Alkyl iodides, C6-18, perfluoro	90622-71-2

Amides, C7-19, α-ω-perfluoro-N,N-bis(hydroxyethyl)	90622-99-4
Fatty acids, C7-19, perfluoro	91032-01-8
Phosphinic acid, bis(perfluoro-C6-12-alkyl) derivs., aluminum salts	93062-53-4
1,1'-[oxybis[(1-methylethylene)oxy]]bis[4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,15-pentacosafluoropentadecan-2-ol]	93776-00-2
(2-carboxylatoethyl)(dimethyl)[3-[(4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13, 14,14,15,15,15-pentacosafluoro-2-hydroxypentadecyl)amino]propyl] ammonium	93776-12-6
(2-carboxylatoethyl)[3-[(4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,13-henicosafluoro-2-hydroxytridecyl)amino]propyl dimethylammonium	93776-13-7
(2-carboxylatoethyl)(dimethyl)[[[4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,15,15,15-tetracosafluoro-2-hydroxy-14-(trifluoromethyl)pentadecyl]amino]propyl]mmonium	93776-15-9
bis(2-hydroxyethyl)methyl(4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,15-pentacosafluoro-2-hydroxypentadecyl)ammonium iodide	93776-16-0
[4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,13-henicosafluoro-hydroxytridecan-1-yl][bis(2-hydroxyethyl)]methylammonium iodide	93776-17-1
4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,13-henicosafluoro-2-hydroxytridecyl dihydrogen phosphate	94158-70-0
bis(2-hydroxyethyl)methyl[4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,15,15,15-tetracosafluoro-2-hydroxy-14-(trifluoromethyl)pentadecyl] ammonium iodide	94159-76-9
1-[[3-(dimethylamino)propyl]amino]-4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,15-pentacosafluoropentadecan-2-ol	94159-79-2
1-[[3-(dimethylamino)propyl]amino]-4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,13-henicosafluorotridecan-2-ol	94159-80-5
1-[[3-(dimethylamino)propyl]amino]-4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,15,15,15-tetracosafluoro-14-(trifluoromethyl)pentadecan-2-ol	94159-82-7
1-[[3-(dimethylamino)propyl]amino]-4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,13,13,13-icosafluoro-12-(trifluoromethyl)tridecan-1-ol	94159-83-8
4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,15-pentacosafluoro-2-hydroxypentadecyl dihydrogen phosphate	94200-42-7
4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,16,16,17,17,17-nonacosafluoro-2-hydroxyheptadecyl dihydrogen phosphate	94200-43-8
Diammonium 4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,13-henicosafluoro-2-hydroxytridecyl phosphate	94200-46-1
Diammonium 4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,15-pentacosafluoro-2-hydroxypentadecyl phosphate	94200-47-2
Diammonium 4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,16,16,17,17,17-nonacosafluoro-2-hydroxyheptadecyl phosphate	94200-48-3
Diammonium 4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,13,13,13-icosafluoro-2-hydroxy-12-(trifluoromethyl)tridecyl phosphate	94200-50-7
Diammonium 4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,15,15,15-tetracosafluoro-2-hydroxy-14-(trifluoromethyl)pentadecyl phosphate	94200-51-8

(End of Appendix 1)

[Appendix 2] Parts Examples



(End of Appendix 2)