

**Guidelines for Chemical Substances
Contained in Products
【Semiconductors】**

Version 14.2

February 03, 2025

**Fuji Electric Co., Ltd.
Semiconductors Business Group**

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Foreword

Fuji Electric Co., Ltd. has promoted to provide the products and techniques contributing to the protection of the global environment, to reduce environmental impact in the life cycle of a product, to lighten the environmental impact by our business activities, to contribute to the construction of a sustainable recycling community.

It is necessary to procure the parts and the materials that are ecologically friendly and cause less environmental impacts for achieving it. So we are tackling the promotion of Green procurement actively.

Fuji Electric Co., Ltd. Semiconductors Business Group (our company, hereinafter) wants to realize these with our suppliers to issue these guidelines and revise it.

Your understanding and cooperation are earnestly requested.

1. Purpose

Purpose of these guidelines is, on chemical substances contained in the parts and the materials delivered to our company, having our suppliers comply with these guidelines, to establish the management system and to acquire necessary information from our suppliers.

2. Scope

1) Applicable suppliers

Suppliers that deliver parts, materials, packaging materials, subsidiary materials, and so on for the production of semiconductors of our company or our manufacturing companies

※Our manufacturing companies

Fuji Electric Co., Ltd. Semiconductors Business Group Production Division

Matsumoto Factory

Yamanashi Branch Factory

Fuji Electric Power Semiconductor Co., Ltd. Oomachi Factory

“ Iiyama Factory

“ Hokuriku Factory

Fuji Electric Tsugaru Semiconductor Co., Ltd.

Fuji Electric Philippines, Inc.

Fuji Electric Malaysia Sdn. Bhd.

Fuji Electric (Shenzhen) Co., Ltd. Semiconductor Section

Our company asks for our suppliers that deliver the parts and materials to the companies above to follow these guidelines and give priority to these guidelines over “the Guidelines for Green Procurement” separately issued by Fuji Electric Group.

2) Applicable parts and materials (parts and materials, hereinafter)

Constituent parts (including products manufactured on commission), materials, packaging materials (that are used for packaging our company’s products), and subsidiary materials used in products (that get in or touch the products at process) of our company’s semiconductors. However, supplies from our company are exempted.

3. A request for the construction of management system for chemical substances contained in the products

It is necessary to control the chemical substances contained in every product throughout supply chain to conform to restrictions on chemical substances contained in the products such as EU RoHS Directive.

Requirements for our suppliers to follow are completed in Appendix 1 “Requirements on Environmental Quality Assurance”. Suppliers are encouraged to construct the management system in accordance with that requirements or equal system to improve environmental quality.

Construction of the management system will be checked with Appendix 2 “Environmental Quality Assurance System Check-sheet”.

4. Chemical substance in delivered parts and materials

Our company establishes two categories “Prohibited substances” and “Controlled substances” on the chemical substances contained in parts and materials delivered by our suppliers, and asks to warrant not to contain any of them for the former, and to report the content for the latter.

With this revision, U.S. TSCA Section 8(a)(7) “Reporting and Recordkeeping Rule for PFAS” has been added to the applicable laws for Controlled substances. Accordingly, 5.6) “PFAS Survey Form” has been added to the surveys we request our suppliers to conduct.

1) Prohibited substances

These are the substances that their production and use are prohibited or restricted by law or treaty or the prohibited substances specified our company’s own standard. They are not allowed to use on purpose in principle except to our specified parts and materials .

Please refer to Table A “Prohibited substances” as to the details of substances.

ID	Applicable laws and standards	Classification in laws and standards/Substance name
A01	Ozone Layer Protection Law (Montreal Protocol)	Annex A(I, II), B(I, II, III), C(I, II, III), E(I) , F(I, II)
A02	Japan Chemical Substances Control Law (the Stockholm Convention, EU POPs Regulation)	Class I Specified Chemical Substances (Convention: Annex A and B, EU Regulation: Annex I) [Substances whose uses are related to our company]
A03	EU RoHS, ELV and Package Directive (*1)	Restricted substances
A04	EU REACH (Regulation EC/1907/2006)	Annex XVII (Restriction list) [Substance by which the condition of the restriction relates to our company]
A05	U.S. Toxic Substances Control Act (TSCA)	Section 6 (prohibit or restrict) [Substance by which the condition of the prohibition and restriction relates to our company]
A06	GADSL (Global Automotive Declarable Substance List)	P: Prohibited substances D/P: [Substance by which the condition of the prohibition relates to our company]
A07	Customer Request substances	Polyvinyl chloride [U.S. IEEE 1680] Chlorinated Flame Retardants [U.S. Vermont State. Act 85] Radioactive substances [the Regulation of Nuclear Source Material, Nuclear Fuel Material, etc. Ship Recycling Convention] BNST [Old Canadian regulations] Beryllium and its compounds [Carcinogenic substance] Cyanide [Poison and Deleterious substances of PDSL] Mineral oil (MOAH, MOSH) [French environment law]

(*1) Allowable concentrations and exemption of substances in EU RoHS/ELV/Package directive

Standards for allowable concentrations of substances on EU RoHS/ELV/Package directive (Lead, Cadmium, Mercury, Hexavalent Chromium, PBB, PBDE, DEHP, BBP, DBP, DIBP) are established for each supply at Table B.

The allowable concentrations for Mercury, PBB, PBDE and 4 Phthalates are stricter than RoHS threshold values. (according to the threshold of REACH and EU POPs regulation).

Please pay attention to conformity to package directive that is required for the materials used for packaging of our company's products.

Exemption is stipulated under the provision of EU RoHS directive and they are shown at Table C.

2) Controlled substances

Controlled substances that should be properly managed by grasping the content are specified as follows. The main structure of controlled substances is based on chemSHERPA.

The object substance follows the latest version of each regulations and industry standards.

ID	Applicable laws and regulations	Scope	chem SHERPA
B01	EU REACH (Regulation (EC) No 1907/2006)	SVHC (Candidate List)	※
		Annex XVII (Restriction substance) [Substance by which the condition of the restriction does not relate to our company]	※
B02	EU CLP (Regulation(EG)/1272/2008)	Annex VI Table3 CMR Cat. 1A,1B ※ EU MDR (Medical Device Regulation) Annex I 10.4.1(a)	※
B03	U.S. Toxic Substances Control Act (TSCA)	Section 6 (prohibit or restrict) [Substance by which the condition of the prohibition and restriction does not relate to our company]	※
		Section 5 (Significant New Use Rule : SNUR) [Substances that are not exempt from SNUR if they are contained in articles, and those SNUs are related to our products]	
		Section 8(a)(7) "Reporting and Recordkeeping Rule for per- and polyfluoroalkyl substances (PFAS)"	
B04	GADSL	D:Declarable substances D/P:[Substance by which the condition of the prohibition does not relate to our company]	※
B05	IEC62474	Criteria 1, 2, 3	※
B06	Other Controlled Substances (Excluding Prohibited substances and Controlled substances B01 to B05)	Norway PoHS Candidate substance	
		Polycyclic aromatic hydrocarbons (PAH) [Substances subject to German GS mark]	
		Red phosphorus and Organophosphorus compounds	
		GADSL old version (The substance deleted by revision)	
		JIG old version (The substance deleted by revision)	

Please refer to the attached list "Prohibited and controlled substances detailed list" as to the details on the illustrated substances and CAS number.

※ Declarable substances of chemSHERPA.

chemSHERPA HP: <https://chemsherpa.net/chemSHERPA/english/>

5. A request of investigation into green procurement to our suppliers

1) Submission of "Environmental quality management system check sheet"

Our company periodically confirms the construction of management system at our suppliers with Appendix 2 "Environmental Quality Assurance System Check-sheet". we may audit again depending on the result of that check.

2) Submission of "The warranty on the prohibited substances"

Submission of Appendix 3 "The warranty on the prohibited substances" is requested to ensure that parts and materials which contains prohibited substances specified at clause 4. 1) are not delivered to our company. Even though intentional containing shall not be allowed in principle except to the designated parts and materials by us, please report regardless of its relevant law, use, exemption, threshold value, etc. because we want to grasp containing ingredients.

•Investigation into the use of ozone-depleting substances in the process

Our company confirms the use of prohibited ozone-depleting substances in our suppliers' process. Please report with Appendix 3 "The warranty on the prohibited substances".

(However, HFCs listed in Annex F(I, II) of Montreal Protocol are not subject to investigation.)

3) Submission of "The list of information on the constituent"

Submission of Appendix 4 "The list of information on the constituent" is requested to grasp chemical substances constituting parts and materials delivered to our company. For chemical substances used intentionally as well as prohibited and controlled substances mentioned at clause 4. 1) and 2) contained in delivered parts and materials, please report all of their defined or measured content.

Necessary information on chemical substances to complete the list should be acquired from your suppliers and answer with taking into account its change of composition in your process.

The concrete entry to this form is specified in the examples of "The list of information on the constituent.xls". Please pay attention to the following points.

- Please report on all of material, components, and concentration in each supplied model.
- Please report the substances with their concentration of 0.1 wt% and over and make the sum of concentration 100% for each material. However, Please report on our prohibited or controlled substances even less than 0.1 wt%.

The unit of the material is "the homogeneous material" defined by RoHS Directive. (Refer to appendix 7 "Periodic analysis guideline")

- For each substance, make a "Prohibited substances" or "Controlled substances" judgment in the "FE Prohibited / Controlled Substance Detail List" and select "×" for the corresponding item. For substances that do not fall under "Prohibited substances" and "Controlled substances", select "×" for "Other substances".

Even if you do not disclose specific chemical substance names and CAS numbers for manufacturing reasons, be sure to judge them.

- The specific name and CAS No. of chemical substances do not have to be disclosed because of manufacturing method etc. on condition that its composition is less than 10 wt% in the material.

Even in this case, please be sure to enter "×" on the relevant box.

- Please fill the finally remained substances for resin, plating solution, ink, etc. that their composition change.

4) Submission of "REACH SVHC survey form "

When EU REACH SVHC(Candidate List) is updated, Appendix 5 "REACH SVHC survey form " is sent to you each time. Please report information on containment of SVHC indicated in the survey form.

*The latest list: <http://echa.europa.eu/web/guest/candidate-list-table>

5) Submission of “Controlled substances survey form ”

When controlled substances is added, Appendix 6 “Controlled substances survey form” is sent to you each time. Please report information on containment of controlled substances indicated in the survey form.

(However, the addition of SVHC is surveyed by clause 5.4).)

6) Submission of “PFAS Survey Form”

PFAS (Per- and polyfluoroalkyl substances) are proposed for restriction under the EU REACH regulation, and US TSCA Section 8(a)(7) requires reporting of “Products containing PFAS.”

For this reason, please provide content information for any substances that fall under the “Definition of PFAS” below.

【Definition of PFAS】

Substances that include any member of the class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom.

For details of the survey substances, please refer to the “Survey substance List” on the separate sheet of Appendix 7 “PFAS Survey Form”. Even if the substance is not on the survey substance list, please report it if it falls under the definition of PFAS.

7) Submission of “Analysis Report (High-precision analysis data)”

For the parts and materials delivered to our company, submission of precise analysis data for relevant substances (Lead, Cadmium, Mercury, Hexavalent Chromium, PBB, PBDE, DEHP, BBP, DBP, DIBP) is requested for each homogeneous material as evidence of conformity to the EU RoHS/ELV/Packgae directive except some exemption. This data is effective within one year from the analyzed date and required to update continuously.

Please refer to Appendix 7 “Periodic analysis guideline” about analyzing method.

If analysis data is not available, please provide samples for the analysis for every homogeneous material.

As for the parts and materials that our company requested halogen-free, the analysis on the related substances (Chloride, Bromine, Antimony) are also requested. Standards for allowable concentrations of the related substances are established at Table B.

8) Submission of “SDS (Safety Data Sheet)”

Please submit SDS (Safety Data Sheet) with the parts and materials delivered to our company. If a supply is an article, SDS of used materials should be submitted.

6. Alteration management

If processes or materials involving to the parts and materials delivered to our company are changed, that alteration shall be noticed to our purchase division in advance and approval must be obtained. In that case, please submit the document of preceding clause 5 again.

7. Inquiries on these guidelines

Any questions on these guidelines, please contact the section in charge of the investigation into green procurement or below.

Environment & Quality Management Sec. Industrial Quality Assurance Dept.
Production Division Semiconductors Business Group
Fuji Electric Co., Ltd.

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Table A. Prohibited substances

Refer to Table B as to the threshold values. Refer to Table C as to the exemption from prohibition.
Refer to the attached list "Prohibited and controlled substances detailed list" as to the details on the illustrated substances and CAS number.

No.	Substance name	CAS-No.	Prohibited conditions	Applicable laws & regulations ID
1	Ozone-Depleting Substances [Annex A(I, II), B(I, II, III), C(I, II, III), E(I) of the Montreal Protocol]	75-69-4 75-71-8	Intentional addition and use in manufacturing processes	A01/A06
2	Polychlorinated biphenyl (PCB)	1336-36-3	2ppm	A02/A05/A06
3	Polychloronaphthalene (PCN) [$Cl \geq 1$ (based on EU Regulation)]	1321-64-8	1000ppm	A02/A06
4	Hexachlorobenzene and pigment containing by-product hexachlorobenzene	118-74-1	10ppm	A02/A06
5	p-Phenylenediamines	620-91-7	Intentional addition	A02
6	2,4,6-tri-tert-butylphenol	732-26-3	1000ppm	A02/A06
7	Mirex	2385-85-5	Intentional addition	A02/A06
8	Hexachlorobuta-1,3-diene	87-68-3	Intentional addition	A02/A05/A06
9	2-(2H-1,2,3-Benzotriazol-2-yl)-4,6-di-tert-butylphenol (UV-320)	3846-71-7	1000ppm	A02/A06
10	Perfluorooctane sulfonate (PFOS) and its salt (Including PFOS-F)	1763-23-1	1000ppm	A02/A06
11	Pentachlorobenzene (PeCB)	608-93-5	Intentional addition	A02/A06
12	Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified	3194-55-6	75ppm	A02/A06
13	Pentachlorophenol and its salts and esters	87-86-5	5ppm	A02/A06
14	Short Chain Chlorinated Paraffins (SCCPs) [C10-13, $Cl \geq 1$ (based on GADSL)]	85535-84-8	1000ppm	A02/A06
15	(a) Perfluorooctanoic acid (PFOA) and its salts, (b) PFOA-related compounds	335-67-1	(a) 25ppb (b) 1ppm	A02/A06
16	(a) Perfluorohexane sulfonic acid (PFHxS) and its salts, (b) PFHxS-related compounds	355-46-4	(a) 25ppb (b) 1ppm	A02/A06
17	Dechlorane Plus	13560-89-9	Intentional addition	A02
18	UV-328 (2-(2H-benzotriazol-2-yl)-4,6-ditertpentyphenol)	25973-55-1	Intentional addition	A02
19	Medium Chain Chlorinated paraffins (MCCPs) [C14-17]	85535-85-9	1000ppm	A02 Candidate
20	C9-C21 PFCAs (Perfluorocarboxylic acids), their salts and related compounds (a) C9-C14 PFCAs and their salts, (b) C9-C14 PFCA-related substances	375-95-1 67905-19-5	Intentional addition and (a) 25ppb, (b) 260ppb	A02 Candidate A04/A06
21	Cadmium and its compounds	7440-43-9	See Table B for threshold values and Table C for exemption.	A03/A04/A06
22	Hexavalent chromium compounds	1333-82-0		A03/A06
23	Mercury and its compounds	7439-97-6		A03/A04/A06
24	Lead and its compounds	7439-92-1		A03/A06
25	Specified Brominated flame retardants [PBB and PBDE]	67774-32-7	500ppm	A03/A02 A05/A06
26	Bis(2-ethylhexyl) phthalate (DEHP)	117-81-7	Total 1000ppm	A03/A04/A06
27	Butyl benzyl phthalate (BBP)	85-68-7		
28	Dibutyl phthalate (DBP)	84-74-2		
29	Diisobutyl phthalate (DIBP)	84-69-5		
30	Polychloro terphenyl (PCT)	61788-33-8	50ppm	A04/A06
31	Asbestos fibres [asbestos, amosite, Crocidolite, etc.]	1332-21-4	Intentional addition	A04/A05/A06
32	Arsenic compounds	7440-38-2	100ppm	A04
33	Organostannic compounds [Dibutyltin/Dioctyltin/All tri-substituted organostannic compounds]	56-35-9	1000ppm (weight of tin)	A04/A02/A06
34	Monomethyl-tetrachloro-diphenyl methane (Ugilec 141)	76253-60-6	1000ppm	A04/A06
35	Monomethyl-dichloro-diphenyl methanes (Ugilec 121)	81161-70-8	1000ppm	A04/A06
36	Monomethyl-dibromo-diphenyl methane (DBBT)	99688-47-8	1000ppm	A04/A06
37	Nickel and its compounds «Human body contact parts are prohibition and alloy content are excepted»	7440-02-0	Intentional addition	A04
38	Dimethyl fumarate	624-49-7	0.1ppm	A04/A06
39	PIP(3:1) (Phenol, isopropylated phosphate (3:1))	68937-41-7	1000ppm	A05
40	PCTP (Pentachlorothiophenol)	133-49-3	1%	A05
41	4-Aminobiphenyl and its salts, all members	92-67-1	100ppm	A06

No.	Substance name	CAS-No.	Prohibited conditions	Applicable laws & regulations ID
42	Azodyes that can form carcinogenic amines, selected	12217-14-0	1000ppm	A06
43	Benzene	71-43-2	5ppm	A06/A04
44	Benzidine and its salts, all members	92-87-5	100ppm	A06
45	Bis(chloromethyl) ether (BCME)	542-88-1	Intentional addition	A06
46	Chlorinated or brominated Dibenzo-p-dioxins or Dibenzofurans, all members	1746-01-6	10ppb	A06
47	2-Methoxyethanol	109-86-4	Intentional addition	A06
48	Formaldehyde	50-00-0	Intentional addition	A06/A04
49	Hydrofluorocarbons (HFC's), all members	75-46-7	1000ppm	A06/A01
50	2-Naphthylamine and its salts, all members	91-59-8	100ppm	A06
51	4-Nitrobiphenyl and its salts, all members	92-93-3	100ppm	A06
52	N-Nitroso dimethyl amine	62-75-9	Intentional addition	A06
53	Tetrachlorobenzene, all members	95-94-3	Intentional addition	A06
54	Tris-(1-aziridiny) phosphine oxide	545-55-1	1000ppm	A06
55	Phosphoric Acid tris(2,3-dibromopropyl)ester	126-72-7	1000ppm	A06
56	Polyvinyl chloride (PVC) and PVC compounds	9002-86-2	Intentional addition	A07 IEEE1680
57	Tris(2-chloroethyl)phosphate (TCEP)	115-96-8	1000ppm	A07 U.S.
58	Tris(2-chloro-1-methylethyl)phosphate (TCPP)	13674-84-5	1000ppm	Vermont State.
59	Tris(1,3-dichloro-2-propyl)phosphate (TDCPP)	13674-87-8	1000ppm	Act 85
60	Radioactive substances	7440-61-1	Intentional addition	A07 Nuclear Source Material
61	Benzenamine, N-phenyl-, reaction products with styrene and 2,4,4-trimethylpentene (BNST)	68921-45-9	Intentional addition	A07 Old Canadian reg.
62	Beryllium and its compounds	1304-56-9	1000ppm	A07Carcinogenic
63	Cyanide	143-33-9	Intentional addition	A07 Poison & Deleterious
64	Mineral oil «If delivering product is packaging material, the prohibited target is the ink used in its printing.» (a) Mineral oil aromatic hydrocarbons (MOAH) comprising 1 to 7 aromatic rings (b) Mineral oil aromatic hydrocarbons (MOAH) comprising 3 to 7 aromatic rings (c) Mineral oil saturated hydrocarbons (MOSH) with 16 to 35 carbon atoms	Mineral oil is a complex mixture, making it difficult to investigate its content using CAS No.	Concentration in ink (a) 1000ppm (b) 1ppm (c) 1000ppm	A07 French environment law (D.543-45-1).

Applicable laws and regulations

- A01 Ozone Layer Protection Law (Montreal Protocol)
- A02 JP Chemical Substances Control Law (Class I Specified Chemical Substances), the Stockholm Convention (Annex A and B), EU POPs Reg. (Annex I)
- A03 EU RoHS, ELV and Package Directive
- A04 EU REACH Annex XVII (Restriction list)
- A05 U.S. Toxic Substances Control Act (TSCA) Section 6 (prohibit or restrict)
- A06 GADSL (P: Prohibited substances, D/P: Conditionally prohibited substances)
- A07 Customer requirement substances

Table B.Threshold values

1. Threshold values for prohibited substances of RoHS and ELV Directive

Parts or Materials		Unit (ppm)	
Substance name	parts and materials	Allowable	
Lead	Resin, Ink	100	
	Lead free solder	500	
	The others	1000	
	exemption	Copper alloys (Brass, Phosphor bronze)	40000
		Steel	3500
		High melting temperature type solder	≥ 85%
Lead glass		—	
Cadmium	Resin, Ink	5	
	Solder, Tin plating, Tin alloy plating	20	
	The others	75	
Mercury	All	100 *1	
Hexavalent chromium	All	1000	
PBB (Polybromobiphenyl)	Resin (Flame retardants)	500 *2	
PBDE (Polybromodiphenyl ether)	Resin (Flame retardants)	500 *2	
DEHP (Bis (2-ethylhexyl)phthalate)	Resin	Total 1000 *3	
BBP (Benzyl butyl phthalate)			
DBP (Dibutyl phthalate)			
DIBP (Diisobutyl phthalate)			

*1 According to the threshold in REACH Annex XVII No. 62.

*2 According to the threshold in EU POPs Regulation ((EU) 2019/1021).

(Sum of the concentrations of tetra-, penta-, hexa-, hepta- and decaBDE : 500 ppm)

*3 According to the threshold in REACH Annex XVII No. 51.

2. Threshold values for prohibited substances of Package Directive

Packaging materials		Unit (ppm)
Substance name	Allowable concentration (Threshold value)	
Lead	total 100	
Cadmium		
Mercury		
Hexavalent chromium		

3. Threshold values for halogen-free related substances

Parts and materials requested halogen-free		Unit (ppm)
Substance name	Allowable concentration (Threshold value)	
Chlorine	900	total 1500
Bromine	900	
Diantimony trioxide [as Antimony]	1000 [835]	

Table C. Exemption from prohibited substances

No.	RoHS exemption list	Dates of applicability
5(b)	Lead in glass of fluorescent tubes not exceeding 0.2% by weight	21/07/2021 *1
6(a)-I	Lead as an alloying element in steel for machining purposes containing up to 0,35 % lead by weight and in batch hot dip galvanised steel components containing up to 0,2 % lead by weight	
6(b)-I	Lead as an alloying element in aluminium containing up to 0,4 % lead by weight, provided it stems from lead-bearing aluminium scrap recycling [Our company abolish the exemption]	21/07/2021 *1
6(b)-II	Lead as an alloying element in aluminium for machining purposes with a lead content up to 0,4 % by weight [Our company abolish the exemption]	18/05/2021 *1
6(c)	Copper alloy containing up to 4% lead by weight	21/07/2021 *1
7(a)	Lead in high melting temperature type solders (i.e. lead-based alloys containing 85% by weight or more lead)	
7(c)- I	Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound	
7(c)- II	Lead in dielectric ceramic in capacitors for a rated voltage of 125V AC or 250V DC or higher	21/07/2021 *1
8(b)-I	Cadmium and its compounds in electrical contacts used in: <ul style="list-style-type: none"> – circuit breakers, – thermal sensing controls, – thermal motor protectors (excluding hermetic thermal motor protectors), – AC switches rated at: <ul style="list-style-type: none"> – 6 A and more at 250 V AC and more, or – 12 A and more at 125 V AC and more, – DC switches rated at 20 A and more at 18 V DC and more, and – switches for use at voltage supply frequency \geq 200 Hz. 	
13(a)	Lead in white glasses used for optical applications	
13(b)-I	Lead in ion coloured optical filter glass types	
13(b)-II	Cadmium in striking optical filter glass types; excluding applications falling under point 39 of this Annex	
13(b)-III	Cadmium and lead in glazes used for reflectance standards	
15(a)	Lead in solders to complete a viable electrical connection between the semiconductor die and carrier within integrated circuit flip chip packages where at least one of the following criteria applies: <ul style="list-style-type: none"> – a semiconductor technology node of 90 nm or larger; – a single die of 300 mm² or larger in any semiconductor technology node; – stacked die packages with die of 300 mm² or larger, or silicon interposers of 300 mm² or larger. 	21/07/2021 *1
18(b)	Lead as activator in the fluorescent powder (1% lead by weight or less) of discharge lamps when used as sun tanning lamps containing phosphors such as BSP (BaSi2O5:Pb)	
24	Lead in solders for the soldering to machined through hole discoidal and planar array ceramic multilayer capacitors	
29	Lead bound in crystal glass as defined in Annex I (Categories 1, 2, 3 and 4) of Council Directive 69/493/EEC (1)	
32	Lead oxide in seal frit used for making window assemblies for Argon and Krypton laser tubes	21/07/2021 *1
34	Lead in cermet-based trimmer potentiometer elements	
39(a)	Cadmium selenide in downshifting cadmium-based semiconductor nanocrystal quantum dots for use in display lighting applications ($< 0,2 \mu\text{g Cd per mm}^2$ of display screen area)	21/11/2025
39(b)	Cadmium in downshifting semiconductor nanocrystal quantum dots directly deposited on LED semiconductor chips for use in display and projection applications ($< 5 \mu\text{g Cd per mm}^2$ of LED chip surface) with a maximum amount per device of 1 mg	31/12/2027

This list is based on [\(EU\) 2024/1416\(2024-03-13\)](#)

*1 Draft deadline under discussion. If the repeal the exemption is decided, it will expire after 18 months from 12 months after the decision.

Requirements on Environmental Quality Assurance

Please develop, maintain and improve the management system of chemical substances in products in order to ensure environment quality of products.

1. The Management Policy

Top management shall define the management policy of chemical substances in products and shall state that the organization works on that policy.

2. Planning

- (1) The organization shall define and document the management criteria of chemical substances in products.
The management criteria shall be determined in accordance with laws, regulations and customers' requirement, etc.
And the management criteria shall be reviewed where necessary.
- (2) The organization shall set the target in order to develop, maintain and improve the management of chemical substances in products.
The organization shall establish and implement the program to achieve the target.
- (3) The organization shall define responsibilities and authorities to implement management of chemical substances in products effectively.
And the organization shall clarify departments and their roles and shall document.
- (4) The organization should identify necessary information on management of chemical substances in products, and establish a procedure for the internal communication in order to communicate appropriately.

3. Management at Design and Development

- (1) For the purpose of producing products which can fulfil the management criteria of chemical substances in products, the organization shall define clearly and document the management criteria at the stage of purchasing, manufacturing and delivery respectively.
 - Management at the stage of Purchasing
 - Verification of information on chemical substances in purchased materials and parts.
 - Verification of information on some chemical product applied on manufactured articles. Examples of these chemical products are refrigerant, grease, lubricant or rustproof.
 - Management at the stage of Manufacturing Process
 - Understanding a change (concentration or kind) of prohibited substances in the manufacturing process.
 - The management method to prevent contamination by incorrect use or admixture, in case there is a parallel production.
 - The management method of recycled material
 - Management at the stage of Delivery
 - The method to verify that products to be shipped satisfy the requirement of chemical substances in products.
- (2) The organization shall clearly define and implement the necessary check items at the respective stage of development. (testing, trial and mass production, etc).
For example, the verification of the components before trial products are input into the mass manufacturing line, etc.
- (3) At the respective stage of purchasing, manufacturing and delivery, the organization shall clearly define the instruction for the management. (For example, specifications, drawings, work request, etc.)

4. Management at Purchasing

- (1) Collection and Verification of Information of Chemical Substances in Products
 - The organization shall present the requirement (the management criteria) of chemical substances in products to suppliers.
 - The organization shall collect necessary information of chemical substances in products from suppliers.
(In case of purchasing from multiple suppliers, necessary information shall be collected from all suppliers.)
 - The organization shall verify if the collected information satisfies the requirement (the management criteria) of chemical substances in products before the start of production and record the result accordingly.
 - The organization shall define the action to the case that necessary information could not be collected, or it does not satisfy the requirement (the management criteria).

- (2) Verification of the Management Status of Chemical Substances in Products at Supplier
- The organization shall request the suppliers to establish and operate the management system of chemical substances in products.
 - When the organization selects the supplier, the organization shall verify the management status of chemical substances in products at the supplier.
 - In case that the organization continues business with the supplier, for the purpose of fulfilling the management criteria of chemical substances in products, the organization shall verify the supplier's management status of chemical substances in products again whenever necessary.
 - The organization shall define the response or the action to take, when verification for the management status of chemical substances in products is incomplete or when verification result has some problems.
- (3) Management of Chemical Substances in Products at Receiving
- The organization shall verify purchased materials and parts upon receiving if they fulfil the requirement (the management criteria) and record accordingly.
 - Corresponding to risks (of the targets), the organization shall have the analysis equipment for chemical substance and analyzes materials and parts or products.

5. Management for the Manufacturing Process

- (1) The management of "change of composition and change of concentration" of chemical substances in products
- The organization shall manage declarable chemical substances subject to the management criteria of chemical substances in products not to be generated or remained exceeding the level specified in the management criteria at the manufacturing process by composition change or concentration change.
 - The organization shall identify "the priority management process" and shall implement the appropriate management. "The priority management process" is the process that has any possibility to generate any restricted substances or residue of restricted substances exceeding the standard. For example,
 - Ink, Solder paste, Adhesive (Concentration change by volatilization)
 - Polymerization, UV ink (Composition change by hardening)
 - Plating (Composition change or concentration change by separation)
 - Solder bath (Concentration change by charge of solder/ soldering), etc.
 - In case that the organization is unable to identify a change of chemical composition, the organization shall take a necessary action such as contacting the supplier of chemical product.
 - The management criteria of chemical substances in products for manufacturing processes shall be reflected in QC process chart, management process chart, management flow chart and operation.
- (2) Prevention of Contamination by Incorrect Use or Admixture
- The organization shall implement the preventive measures properly to avoid any admixture or contamination of chemical substances to the products at the manufacturing process.
(The management criteria shall be reflected in management process chart, etc.)
 - The management of "the priority management process" shall be implemented separate from other general processes. In specific, "the priority management process" should separate from other general process.
"The priority management process" includes parallel production (in case that the prohibited substances are used in the same factory building) and the process which recycled materials are used.
 - In "the priority management process", the organization shall conduct proper management to prevent contamination by incorrect use, admixture or mix-up.
In specific, the organization shall implement the appropriate management by identification of the equipment, mold/die, tools and jigs to be used and materials, parts, work in progress and end products (including warehouse storage)
 - In case "the priority management process" can be not isolated from other processes, the organization shall ensure thorough implementation of the appropriate procedures (cleaning, verification by analyzing, etc.) at switch changeover.
 - In case that recycled materials are used, upon full understanding of risks in the management of chemical substances in products, the organization shall define the management method and use them accordingly.

6. Management at Delivery

- (1) At shipment of products, the organization shall verify again that the check items of chemical substances in products at receiving or at the manufacturing process satisfy the management criteria.
And their result shall be recorded accordingly.
- (2) The organization shall also manage to prevent contamination by any incorrect shipment or mixed-up in the product warehouse.

7. Management at Outsourcing

In case that the organization outsources some processes such as product design and development or manufacturing to another organization, the organization shall verify the management status of chemical substances in products at the outsourced organization to ensure that the management criteria of chemical substances in products are complied with and shall record the result accordingly.

The management items and the management contents should be instructed to the outsourced organization with document, etc.

8. Traceability

The organization shall manage in order to trace a receiving lot of components/parts/raw materials, manufacturing time, manufacturing process, outsourced organizations from the delivered products.

And the organization shall manage in order to grasp, utilize, disclose and communicate of chemical substances in products promptly.

9. Exchange of Information with the Customer

The organization shall clearly define and implement the method of communication with the customer for

- a) Laws, regulations and the industry criteria that are required by the customer to comply
- b) Information on chemical substances in products
- c) Information on the management of chemical substances in products

10. Change Management

(1) When any change which may have the possibility to affect chemical substances subject to the management criteria of chemical substances in products are made, the organization shall confirm that the management criteria of chemical substances in products are fulfilled before the change. (The examples: Change or addition of a supplier, Change of a purchased product, Alteration of the manufacturing process, etc.)

(2) When any change arises in the internal or suppliers or the outsourced organization, information on the change shall be reported to the customers prior to the change.

(3) The organization shall document the procedures of change management and record the result of the change.

11. Response to Nonconformity

(1) The organization shall develop and document procedure for dealing with nonconformity concerning chemical substances in products including the method of in-house contacts, the temporary corrective actions and the method of contacting customers.

(2) The organization requests that the suppliers and the outsourced organizations report their of nonconformance immediately.

(3) The organization shall investigate and identify the cause, determine and implement the necessary countermeasures to prevent recurrence of nonconformity. Recurrence-preventive measures should be implemented at relevant department. And preventive measures should be implemented to avoid nonconformance.

(4) The responses taken at nonconformity shall be recorded.

12. Education and Training

The organization shall develop the education and training program for management of chemical substances in products which reflects duty and work of train. The personnel who need education and training shall be identified.

The organization shall conduct the training and education, and record accordingly.

13. Control of Document and Record

The standards and manuals those are necessary to the operation of the management of chemical substances in products shall be documented and managed. And the operation record shall be managed accordingly with retention period appropriate.

14. Evaluation and Improvement of Implementation Status

(1) The organization shall conduct internal audit and evaluate the management status of chemical substances in products periodically.

(2) The organization shall take corrective actions as necessary.

(3) The result of evaluation and the corrective actions shall be recorded and reported to the top management.

The top management shall review them.

That's it.

Environmental Quality Assurance System Check-sheet

This check sheet is intended to check the progress of the establishment of your management system relating to matters for the management of chemical substances in products (Refer to "Guidelines for Chemical Substances Contained in Products [Semiconductors]") of Semiconductors Business Group, Fuji Electric Co., Ltd. (hereinafter referred to as Fuji Electric).

Please evaluate your system based on the judgment criteria shown in the table below.

* Please refer to our website for the latest version of the Guidelines for Chemical Substances in Products [Semiconductor Products]. (<https://www.fujielectric.com/products/semiconductor/green/index.h>)

Date of evaluation	
Name of delivered product or outsourced work	
Factory name	
Company name	
Department	
Person responsible for evaluation (post/name)	
E-mail	

- If the check results are different depending on the delivered product or the production plant, use different check sheets for replies.
- Give a grade of evaluation for all check items of questions 1 to 32.
- In the "Description of management/Comment, etc." column, enter the name of the document and the contents of the management

 *Please fill in the yellow coloring column.

Evaluation	Judgment criterion
Conforming	A scheme relating to requirements/checks is established and thoroughly applied.
Partial conforming	The scheme relating to requirements/checks or its application is incomplete.
Not conforming	No scheme for implementing requirements/checks is established and applied.
Not applicable	The question is not applicable.

Requirement	Question No.	Check item	Self-evaluation	Score	Description of management/Comment, etc.
1	Policy	1			Title of document
2	Documentation of criteria	2			Title of criteria / Date of the latest revision
3	Responsibility and authority	3			Title of document stipulating management representative
4	Management at Design and Development	4			Contents specifically checked
		5			Contents specifically checked
		6			Contents specifically checked
5	Collection and Verification of Information	7			Acquired information
		8			Material and part purchased from several suppliers
	Verification of the Management Status at Supplier	9			Title of document requiring establishment and application
		10			Evaluated record
		11			Evaluated record / Frequency
	Management at Receiving	12			Details of check at the time of acceptance
		13			Analysis equipment (XRF, ICP, etc.) Items to be analyzed, frequency of analysis
6	Management for the Manufacturing Process	14			Name of possible process or parts and materials
					Name of prohibited substance
		(1)			Manufacturing condition, etc. considering prohibited substances
		(2)			Analysis equipment (XRF, ICP, etc.) Items to be analyzed, frequency of analysis

6	Prevention of Contamination by Incorrect Use or Admixture	Management for the Manufacturing Process	15	Is the procedure for process control (lot number management, first-in first-out, identification control, prevention of inclusion of RoHS prohibited substances, etc.) described in a process control chart or control flow chart, regardless of whether there are "prohibited substances"?		Title of document			
			16	Are prohibited substances brought into or are there unchecked processes or parts and materials in the same factory building? (e.g., products, materials, etc. that contain lead, phthalates, etc., regulated by RoHS)		Subject parts and materials			
						Substance of concern			
			(1)	Do you introduce identification control (exclusive use, marking, etc.) of prohibited substances to storage areas for parts, materials, and in-process products, processes (including equipment and peripheral systems), and product warehouses?		Title of document specifying exclusive use, marking, etc.			
			(2)	Do you conduct education in prohibited substances for operators?		Name of education on record			
			(3)	Are equipment, jigs, tools, containers, etc. also used for products (parts, materials) containing prohibited substances?		Subject equipment, jig, tool, container			
						-1	Do you establish, apply, and record a standard for cleaning after the use of prohibited substances?		Title of standard for cleaning
						-2	Do you analyze and check prohibited substances whenever cleaning is performed?		Title of checked record
			-3	Can you present evidence that indicates that incorrect use, admixture of foreign substances, and contamination can be constantly prevented?		Name of evidence			
			17	Do some of the packaging and protective materials used for equipment and tools within the production process and for products delivered to us contain phthalates regulated under the RoHS Directive? (Parts that are in direct contact with delivery products/parts)		Target equipment, jigs and tools, and containers			
						(1)	Is it confirmed that there is no contamination of the RoHS phthalate from the facilities, jigs, tools, packaging, and protective materials that contain the phthalate ester to the delivery products/parts?		Confirmation method and content
			18	Do you use recycled materials for products delivered to Fuji Electric?		Name of recycled material			
						(1)	Have you ascertained the content of recycled materials and assured that they do not contain substances prohibited by RoHS?		Subject material
									Basis for warranty
			7	Management at Delivery		19	Do you check the results of the management of chemical substances in products at the time of warehousing or delivery of products?		Checked contents
8	Confirmation of status of management at Outsourcing		20	Do you outsource to another organization any of the processes relating to products delivered to Fuji Electric?		Outsourced process			
						(1)	Do you direct such a outsourced organization to manage chemical substances in products, and monitor the status of management?		Name of checked record
9	Traceability		21	Can the date of manufacture, manufacturing process, and delivery history (customer) of each delivered product lot be traced from raw materials?		Name of record (name of system) from which traceability can be verified			
10	Exchange of Information with the Customer		22	Do you keep the latest edition of Fuji Electric's requirements relating to the management of chemical substances in products (Guidelines for Chemical Substances Contained in Products [Semiconductors])?		Storage method, location, etc.			
						23	Do you guarantee the requirements of "The warranty on prohibited substances" for products delivered to Fuji Electric?		
						24	Can you present the latest (within a year) data on the contents of the RoHS restricted substances obtained from precision measurement, such as by means of ICP, in relation to products delivered to Fuji Electric?		
11	Change Management		25	Do you confirm in advance that the requirements for chemical substances in products are satisfied when changing materials or processes?		Checked contents			
						26	Do you make an application to Fuji Electric before performing a material or process change for products? (If such a change is yet to take place, do you make it a rule to apply for it?)		Name of record of application to customer (or title of rules)
12	Response to Nonconformity		27	Do you have a documented procedure for taking actions against nonconformities about chemical substances in products and keep a record of the results of actions?		Title of document in which the results of actions are recorded			
						28	If there is a possibility of delivery of non-conforming products to customers (or if non-conforming products were delivered to customers), do you have a provision of reporting it to the affected customers?		Name of record of application to customer (or title of rules)
13	Education and Training		29	Is education in chemical substances in products and their management conducted for employees as appropriate?		Education conducted for the past year			
14	Control of Document and Record		30	Do you have in place and apply standards relating to chemical substances in products and their management?		Title of document showing the organization of standards			
15	Evaluation and Improvement of Implementation Status		31	Do you regularly perform an internal audit of the management of chemical substances in products?		Date of audit for the past year			
						32	Do you take corrective actions against non-conformities found in internal audits and check and report these corrective actions and their effects to the top management?		Date of report for the past year

Total score	Evaluation result
0	0 / 100

To: Fuji Electric Co.,Ltd.

The warranty on the prohibited substances -Ver. 14.2-

Date of answer	
Company name	
Department	
An official title	
The person in charge	
Signature	
E-mail	

※The person in charge should be general manager or higher rank.

We warrant that the prohibited substances (shown in [2] Prohibited substances list) contained in our products (shown in [1] Delivering products list) delivered to Fuji Electric Co., Ltd. Semiconductors Business Group and its manufacturing companies meet item <1>-<3>.

- <1> There is no intentional inclusion except for the substance entered in Information on prohibited substances.
 <2> For substances with threshold requirements, the concentration of the substance including impurities is less than the threshold value.
 <3> There is no use of ozone-depleting substances (excluding HFC) in the manufacturing process of our delivering product/s.

※ Supplies from Fuji Electric Co., Ltd. are exempted.

※If yes is selected at the box of containing, please enter substance name, CAS No, and maximum percentage of a constituent.

[1] Delivering products list

FE code	Product number, Type number, Name	Containing	Information on prohibited substances				Exemption No. (shown in Table C)	Note
			The containing part	Substance name	CAS No.	Maximum content concentration		
ex.) ML5Q01X	Lead Solder	Yes		Lead	7439-92-1	950000ppm	7(a)	high melting temperature type solders

↑ If lines are not sufficient, please add lines.

[2] Prohibited substances list

* Please refer to the attached list "Prohibited and controlled substances detailed list" as to the details on the illustrated substances.

No.	Substance name	CAS-No.	Prohibited conditions	Applicable laws and regulations ID
1	Ozone-Depleting Substances [Annex A(I, II), B(I, II, III), C(I, II, III), E(I) of the Montreal Protocol]	75-69-4 75-71-8	Intentional addition and use in manufacturing	A01/A06
2	Polychlorinated biphenyl (PCB)	1336-36-3	2ppm	A02/A05/A06
3	Polychloronaphthalene (PCN) [Cl \geq 1 (based on EU Regulation)]	1321-64-8	1000ppm	A02/A06
4	Hexachlorobenzene and pigment containing by-product hexachlorobenz	118-74-1	10ppm	A02/A06
5	p-Phenylenediamines	620-91-7	Intentional addition	A02
6	2,4,6-tri-tert-butylphenol	732-26-3	1000ppm	A02/A06
7	Mirex	2385-85-5	Intentional addition	A02/A06
8	Hexachlorobuta-1,3-diene	87-68-3	Intentional addition	A02/A05/A06
9	2-(2H-1,2,3-Benzotriazol-2-yl)-4,6-di-tert-butylphenol (UV-320)	3846-71-7	1000ppm	A02/A06
10	Perfluorooctane sulfonate (PFOS) and its salt (Including PFOS-F)	1763-23-1	1000ppm	A02/A06
11	Pentachlorobenzene (PeCB)	608-93-5	Intentional addition	A02/A06
12	Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified	3194-55-6	75ppm	A02/A06
13	Pentachlorophenol and its salts and esters	87-86-5	5ppm	A02/A06
14	Short Chain Chlorinated Paraffins (SCCPs) [C10-13, Cl \geq 1 (based on GADSL)]	85535-84-8	1000ppm	A02/A06
15	(a) Perfluorooctanoic acid (PFOA) and its salts, (b) PFOA-related compounds	335-67-1	(a) 25ppb, (b) 1ppm	A02/A06
16	(a) Perfluorohexane sulfonic acid (PFHxS) and its salts, (b) PFHxS-related compounds	355-46-4	(a) 25ppb, (b) 1ppm	A02/A06
17	Dechlorane Plus	13560-89-9	1000ppm	A02
18	UV-328 (2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol)	25973-55-1	1000ppm	A02

19	Medium Chain Chlorinated paraffins (MCCPs) [C14-17]	85535-85-9	1000ppm	A02 (Candidate)
20	C9-C21 PFCAs (Perfluorocarboxylic acids), their salts and related compounds (a) C9-C14 PFCAs and their salts, (b) C9-C14 PFCA-related substances	375-95-1 67905-19-5	Intentional addition and (a) 25ppb, (b) 260ppb	A02 (Candidate) A04/A06
21	Cadmium and its compounds	7440-43-9	See Table B for threshold values and Table C for exemption.	A03/A04/A06
22	Hexavalent chromium compounds	1333-82-0		A03/A06
23	Mercury and its compounds	7439-97-6		A03/A04/A06
24	Lead and its compounds	7439-92-1		A03/A06
25	Specified Brominated flame retardants [PBB and PBDE]	67774-32-7	500ppm	A03/A02/A05/A06
26	Bis(2-ethylhexyl) phthalate (DEHP)	117-81-7	Total 1000ppm	A03/A04/A06
27	Butyl benzyl phthalate (BBP)	85-68-7		
28	Dibutyl phthalate (DBP)	84-74-2		
29	Diisobutyl phthalate (DIBP)	84-69-5		
30	Polychloro terphenyl (PCT)	61788-33-8	50ppm	A04/A06
31	Asbestos fibres [asbestos, amosite, Crocidolite, etc.]	1332-21-4	Intentional addition	A04/A05/A06
32	Arsenic compounds	7440-38-2	100ppm	A04
33	Organostannic compounds [Dibutyltin/Dioctyltin/All tri-substituted organostannic compounds]	56-35-9	1000ppm (weight of tin)	A04/A02/A06
34	Monomethyl-tetrachloro-diphenyl methane (Ugilec 141)	76253-60-6	1000ppm	A04/A06
35	Monomethyl-dichloro-diphenyl methanes (Ugilec 121)	81161-70-8	1000ppm	A04/A06
36	Monomethyl-dibromo-diphenyl methane (DBBT)	99688-47-8	1000ppm	A04/A06
37	Nickel and its compounds «Human body contact parts are prohibition and alloy content are excepted»	7440-02-0	Intentional addition	A04
38	Dimethyl fumarate	624-49-7	0.1ppm	A04/A06
39	PIP(3:1) (Phenol, isopropylated phosphate (3:1))	68937-41-7	1000ppm	A05
40	PCTP (Pentachlorothiophenol)	133-49-3	0.01	A05
41	4-Aminobiphenyl and its salts, all members	92-67-1	100ppm	A06
42	Azodyes that can form carcinogenic amines, selected	12217-14-0	1000ppm	A06
43	Benzene	71-43-2	5ppm	A06/A04
44	Benzidine and its salts, all members	92-87-5	100ppm	A06
45	Bis(chloromethyl) ether (BCME)	542-88-1	Intentional addition	A06
46	Chlorinated or brominated Dibenzo-p-dioxins or Dibenzofurans, all members	1746-01-6	10ppb	A06
47	2-Methoxyethanol	109-86-4	Intentional addition	A06
48	Formaldehyde	50-00-0	Intentional addition	A06/A04
49	Hydrofluorocarbons (HFC's), all members	75-46-7	1000ppm	A06/A01
50	2-Naphthylamine and its salts, all members	91-59-8	100ppm	A06
51	4-Nitrobiphenyl and its salts, all members	92-93-3	100ppm	A06
52	N-Nitroso dimethyl amine	62-75-9	Intentional addition	A06
53	Tetrachlorobenzene, all members	95-94-3	Intentional addition	A06
54	Tris-(1-aziridiny) phosphine oxide	545-55-1	1000ppm	A06
55	Phosphoric Acid tris(2,3-dibromopropyl)ester	126-72-7	1000ppm	A06
56	Polyvinyl chloride (PVC) and PVC compounds	9002-86-2	Intentional addition	A07 U.S. IEEE1680
57	Tris(2-chloroethyl)phosphate (TCEP)	115-96-8	1000ppm	A07 U.S. Vermont State. Act 85
58	Tris(2-chloro-1-methylethyl)phosphate (TCPP)	13674-84-5	1000ppm	
59	Tris(1,3-dichloro-2-propyl)phosphate (TDCPP)	13674-87-8	1000ppm	
60	Radioactive substances	7440-61-1	Intentional addition	A07 Nuclear Source Material Act
61	Benzenamine, N-phenyl-, reaction products with styrene and 2,4,4-trimethylpentene (BNST)	68921-45-9	Intentional addition	A07 Old Canadian regulations
62	Beryllium and its compounds	1304-56-9	1000ppm	A07 Carcinogenic
63	Cyanide	143-33-9	Intentional addition	A07 Poison & Deleterious
64	Mineral oil «If delivering product is packaging material, the prohibited target is the ink used in its printing.» (a) Mineral oil aromatic hydrocarbons (MOAH) comprising 1 to 7 aromatic rings (b) Mineral oil aromatic hydrocarbons (MOAH) comprising 3 to 7 aromatic rings (c) Mineral oil saturated hydrocarbons (MOSH) with 16 to 35 carbon atoms ※ 【Survey procedure】 For information on the use of mineral oil, please trace back to the ink manufacturer. 1) Check to see if the packaging on the delivered products list uses printing inks containing mineral oil. If there is no use, "Containing" column is "No". 2) If mineral oil is contained in the printing ink, please check whether it is a prohibited mineral oil (a) to (c). 3) If the printing ink contains prohibited mineral oils (a) to (c), please enter that information in the "Information on prohibited substances" column.	Mineral oil is a complex mixture, making it difficult to investigate its content using CAS No.(※)	Concentration in ink (a) 1000ppm (b) 1ppm (c) 1000ppm	A07 French environment law (D.543-45-1).

Applicable laws and regulations

A01 Ozone Layer Protection Law (Montreal Protocol)

A02 JP Chemical Substances Control Law (Class I Specified Chemical Substances), the Stockholm Convention (Annex A and B), EU POPs Reg. (Annex I)

A03 EU RoHS, ELV and Package Directive

A04 EU REACH Annex XVII (Restriction list)

A05 U.S. Toxic Substances Control Act (TSCA) Section 6 (prohibit or restrict)

A06 GADSL (P: Prohibited substances, D/P: Conditionally prohibited substances)

A07 Customer requirement substances

Notes on entering "The list of information on the constituent"

- ① Please create configuration information for each delivered product (each sheet).
- ② Please report substances of 0.1wt% or more so that the total content of each material (homogeneous material) is 100wt%.
If the substance falls under our “prohibited / controlled substances”, please report even less than 0.1 wt%.
- ③ For each substance, make a “Prohibited substances” or “Controlled substances” judgment in the “Prohibited and controlled substances detailed list” and select “×” for the corresponding item. For substances that do not fall under “Prohibited substances” and “Controlled substances”, select “×” for “Other substances”. Even if you do not disclose specific chemical substance names and CAS numbers for manufacturing reasons, be sure to judge them.
- ④ If the composition changes after curing / drying, such as resin (one-part / two-part), plating solution, ink, etc., enter the remaining components.
- ⑤ Please answer with an Excel file.

【Company information】

[MRn0260 Form 5]

Date of answer	
Company name	
Department	
The contact person	
TEL	
E-mail	

【Delivering products list】

Fe code	Product number, Type number, Name	Manufactured country	Manufacturing factory	Substance list information		Remarks
				Version of Prohibited and controlled substances detailed list	Date of confirmation of substance list	
				14.2		
				14.2		
				14.2		
				14.2		

Controlled substances survey form

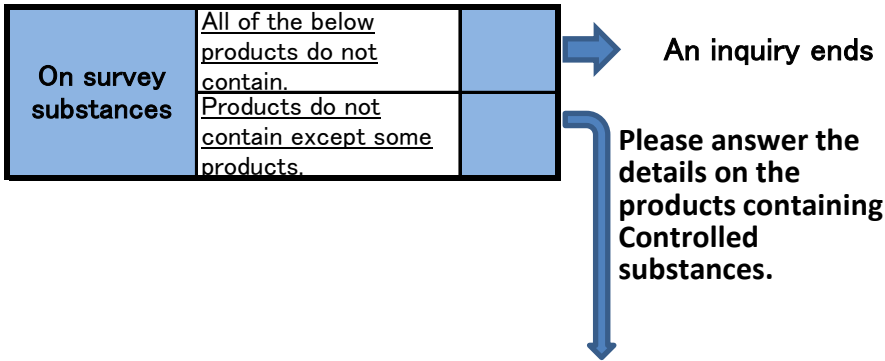
- ※1: Please refer to the "Controlled Substance List" on the separate sheet for the substances to be surveyed.
- ※2: If more than one substance are contained at the part, or a relevant substance is contained at more than one part, please add a line and fill in.
- ※3: Excluding the parts provided by Fuji Electric Co., Ltd.

①Supplier

Date	
Company	
Section	
The responsible person (Position)	

②Manufacturer

Date	
Company	
Section	
The responsible person (Position)	



Delivered products list		【Controlled substances containing information】					Note
Fe code	Product's name・Type No.	containment	The contained substance name※1	The containing part※2 (The constituent parts / Homogeneous material name)	Content rate to the part (ppm)	Content rate to the product (ppm)	

High-precision analysis guideline

Analysis method for “Substances required high-precision analysis” and necessary items on the analysis report are prescribed below.

1. Scope

All of parts, materials, packaging materials that constitute semiconductor products.

(Example) resin, ink, lead-frame, solder, plating, electronic parts, adhesive, aluminum wire, packaging material, etc.

2. Analysis unit

Analysis is carried out for every component unit shown in 1) and 2).

1) Definition of homogeneous material in RoHS(ELV) directive

The threshold value in RoHS (ELV) directive is the concentration in homogeneous material.

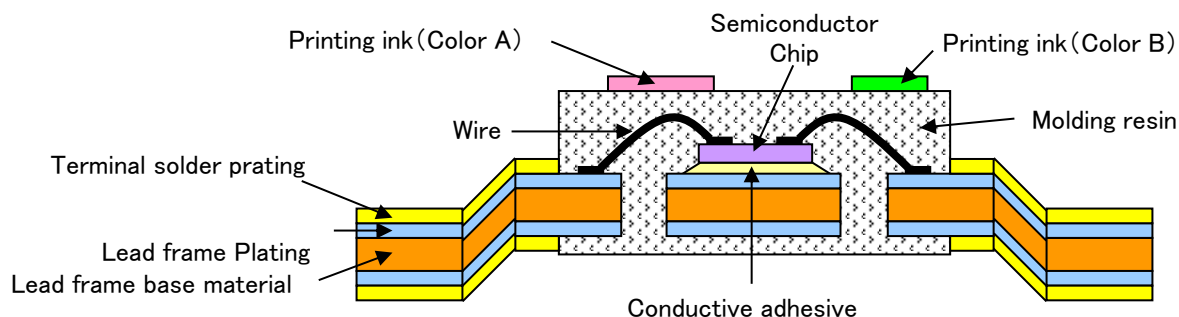
Homogeneous material is defined as “the minimum unit that can be separated into parts and materials by mechanical method for every constituent”.

Especially on plating, a base material and plating are defined as a independent homogeneous material, respectively.

【Example: Separation of homogeneous materials】

In the following figure, nine kinds of homogeneous materials, Semiconductor Chip, Conductive adhesive, Wire, Molding resin, Lead frame base material, Lead frame plating, Terminal solder plating, Printing ink (Color A) and Printing ink (Color B) constitute the electronic component (example).

(Strictly speaking, the each electrode metal layer of a semiconductor chip is considered to be the homogeneous material respectively. They are omitted here.)



2) Analysis unit of EU Packaging directive

On the other hand, the threshold value of the EU packaging directive is the concentration in each part unit which constitutes a package.

However, since US State Toxics in Packaging Clearinghouse regards ink as a separate “packaging component”, the concentration of ink in itself is analyzed for ink.

3. Analysis method

The following methods are recommended for the precise analysis of each homogeneous material.

1) Cadmium, Lead, Total Chromium

① Sample preparation

Use below methods for pretreatment.

Precipitates must be completely dissolved by some technical methods (e.g. hydrofluoric acid dissolution, Alkaline dissolution)

- Closed system for acid decomposition
(microwave decomposition method: IEC 62321-5:2013, EN13346 , EPA3052:1996)
- Acid digestion method
- Ashing method under H_2SO_4 (not applicable for lead.)

- Wet decomposition method under H₂SO₄, HNO₃ and H₂O₂ (EN1122) (not applicable for lead.)

Note: Any extraction methods (including EN 71-3:1994, ASTM F963-96a, ASTM aF963-03, ASTM D 5517, and ISO 8124-3:1997) shall not be applied.

② Measurement methods

The following methods shall be used. (i.e. IEC 62321-5:2013)

- Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES, ICP-AES)
- Atomic absorption spectrometry (AAS) or flameless atomic absorption spectrometry (FL-AAS)
- Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

Note: If a combination of a sample preparation and a measurement method can ensure that the method detection limit (MDL) is less than Values in Table 1, the combination is applicable.

Table 1 Method detection limit (MDL) of Four heavy metals

MDL	Resin, ink	Metal	Plating	Trivalent chromate coating	Packaging material
Cadmium	<u>10ppm</u>	10ppm	15ppm	15ppm	<u>50ppm</u>
Lead	30ppm	30ppm	30ppm	30ppm	
Mercury	30ppm	30ppm	30ppm	30ppm	
Total Chromium	30ppm	30ppm	30ppm	—	<u>Total of Four heavy metals</u>
Hexavalent Chromium	10ppm	10ppm or 0.1 μg/cm ²		0.1 μg/cm ²	

2) Mercury

① Sample preparation

Use below methods for pretreatment, it will help to prevent volatilization.

Precipitates must be completely dissolved by some technical methods (e.g. hydrofluoric acid dissolution, Alkaline dissolution)

- Pressurized acid decomposition method in sealed container. (microwave decomposition method: IEC 62321-4:2013, EN13346, EPA3052:1996)
- Heating Vaporized Atomic Absorption Spectroscopy
- Wet decomposition method by H₂SO₄ and HNO₃ (Kjeldahl method)

② Measurement methods

The following methods shall be used. (i.e. IEC 62321-4:2013)

- Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES, ICP-AES)
- Cold Vapour Atomic Absorption Spectrometry (CV-AAS)
- Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

Note: If a combination of a sample preparation and a measurement method can ensure that the method detection limit (MDL) is less than Values in Table 1, the combination is applicable.

3) Hexavalent Chromium

① Sample preparation

Elution methods (like IEC 62321-7-1:2015, IEC 62321-7-2:2017, EPA 3060A, ISO 3613:2000)

- Boiling water extraction (Metal coating, Trivalent chromate coating)
- Alkaline digestion (Resin, ink)

② Measurement methods

- Ultraviolet-Visible (UV-Vis) absorptiometry (i.e. IEC 62321-7-1:2015, IEC 62321-7-2:2017, EPA 7196A)

Note: If a combination of a sample preparation and a measurement method can ensure that the method detection limit (MDL) is less than Values in Table 1, the combination is applicable.

4) Specific Brominated flame retardants (PBB, PBDE)

① Sample preparation

- Soxhlet Extraction Method (i.e. IEC 62321-6:2015)
- Ultrasonic-assisted extraction (i.e. IEC 62321-12:2023)

② Measurement methods

- Gas Chromatography – Mass Spectrometry (GC-MS) (i.e. IEC 62321-6:2015, IEC 62321-12:2023)

Note: If a combination of a sample preparation and a measurement method can ensure that the method detection limit (MDL) is less than 25ppm, the combination is applicable.

5) Phthalates (DEHP, BBP, DBP, DIBP)

① Sample preparation

- Soxhlet Extraction Method (i.e. IEC 62321-8:2017)
- Ultrasonic-assisted extraction (i.e. IEC 62321-12:2023)

② Measurement methods

- Gas Chromatography – Mass Spectrometry (GC-MS) (i.e. IEC 62321-8:2017, IEC 62321-12:2023)

Note: The method detection limit (MDL) shall be less than 100ppm.

6) Halogen (Cl, Br)

① Sample preparation

- Quartz-tube combustion method (BS EN14582:2007)
- ✘ Oxygen bomb method shall not be applied.
(Resin containing silica or metal cause incomplete combustion.)

② Measurement methods

- Ion chromatography (IC)

Note: The method detection limit (MDL) shall be less than 100ppm.

7) Antimony

① Sample preparation

- Pressurized acid decomposition method in sealed container.
(Microwave decomposition method: IEC62321-5:2013, EN13346, EPA3052:1996)
- ✘ Since Antimony is evaporated easily, acid decomposition in open system shall not be applied.

② Measurement methods

- Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES, ICP-AES)
- Atomic absorption spectrometry (AAS) or flameless atomic absorption spectrometry (FL-AAS)
- Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

Note: The method detection limit (MDL) shall be less than 10ppm.

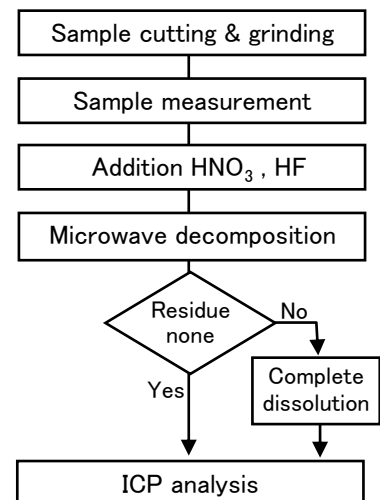
4. Items for analysis report

Below items are specified in analysis report.

- ① Sample preparation method: (Official method or other adopted methods)
- ② Measurement method: Name of the method
- ③ Name of the measurer, Name of the responsible person, analyzing organization
- ④ Testing date (Year/Month/Day)
- ⑤ Test result (MDL: Method detection limit)
- ⑥ Measurement flow chart (essential for Cadmium and Lead)
(See the example of flow chart at right)
- ⑦ Sample name (Material name, model name etc.)

(⑧ Sample photo)

Measurement Flow Chart



Compliance with IEC62321-5:

Revision history

Version	Date	Revision detail								
1st	2008-10-01	Enacted with effectuation of REACH regulation								
11th	2021-01-22	<p>4. 1) Revision of prohibited substances</p> <ul style="list-style-type: none"> Added U.S. TSCA (Section 6) to applicable laws of prohibited substances. ⇒[A08] (The targets are substances by which the condition of the prohibition and restriction relates to our company. Section 6 of TSCA is subject to the declaration of chemSEHRPA, and all the conventional target substances overlap with existing our prohibited substances. However, the January 2021 amendment (§ 751.405 – 751.413) added non-overlapping prohibited substances (PIP(3: 1) and PCTP). <p>4. 2) Revision of controlled substances</p> <ul style="list-style-type: none"> Deleted “EU ESIS PBT List Fulfilling” from [B09] Other controlled substances. (The list has been discontinued, and all the target substances overlap with other prohibited / controlled substances.) <p>5. 5) Submission of “Controlled substances survey form ”</p> <ul style="list-style-type: none"> Changed the name of Annex 6 from “Additional controlled substances survey form” to “Controlled substances survey form”. <p>Table A. Prohibited substances</p> <ul style="list-style-type: none"> Addition of prohibited substances (No. 95, 96) for adapt to the revision of Section 6 of U.S. TSCA (§ 751.405 – 751.413). No.95 PIP(3: 1) (Phenol, isopropylated phosphate (3:1)) No.96 PCTP (Pentachlorothiophenol) <p>Table B.Threshold values</p> <ul style="list-style-type: none"> Changed threshold value for Mercury : 1000ppm ⇒ 100ppm (according to the threshold of REACH Annex XVII No. 62 ; Mercury concentration of specific organic mercury compounds < 100ppm). Changed threshold values for PBB and PBDE : 1000ppm ⇒ 500ppm (Adopt the threshold in EU POPs Regulation ((EU) 2019/102 ; Sum of the concentrations of tetra-, penta-, hexa-, hepta- and decaBDE ≤ 500 ppm) 								
11.1th	2021-07-14	<p>4. 2) Revision of controlled substances</p> <ul style="list-style-type: none"> [B03] Added “Section 5 (SNUR: Significant New Use Rules) ”. (For detailed substance names, their CAS numbers, see Appendix “Prohibited and controlled substances detailed list”.) [B09] Deleted “U.S. TSCA [Substances for which SNUR is “any use”.]” from Other Controlled Substances. <p>Table C. Exemption from prohibited substances</p> <ul style="list-style-type: none"> Deleted the exemptions that expire in July 2021; 7(c)-IV, 21(a)-(c), 37, 41. 								
12th	2022-01-19	<p>4. 1) Revision of prohibited substances</p> <ul style="list-style-type: none"> The following have been deleted from Applicable laws and regulations on prohibited substances. <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Old No.</th> <th>Applicable laws and regulations</th> </tr> </thead> <tbody> <tr> <td>[A03]</td> <td>Industrial Safety and Health Act</td> </tr> <tr> <td>[A04]</td> <td>Poisonous and Deleterious Substances Control Law</td> </tr> <tr> <td>[A05]</td> <td>Act on the Regulation of Nuclear Source Material etc.</td> </tr> </tbody> </table> <ul style="list-style-type: none"> [A02] Added “the Stockholm Convention ” and “EU POPs Regulation”. (There is no change in the target prohibited substances) [A07] Added “Radioactive substances” and “Beryllium and its compounds”. (They are prohibited substances from old version, although there are changes in applicable laws and regulations.) <p>Table A. Prohibited substances</p> <ul style="list-style-type: none"> Addition of new prohibited substances (No. 76) for adapt to the revision of Annex XVII of EU REACH ((EU) 2021/1297). No.76 C9-C14 PFCAs, their salts and C9-C14 PFCA-related substances 	Old No.	Applicable laws and regulations	[A03]	Industrial Safety and Health Act	[A04]	Poisonous and Deleterious Substances Control Law	[A05]	Act on the Regulation of Nuclear Source Material etc.
Old No.	Applicable laws and regulations									
[A03]	Industrial Safety and Health Act									
[A04]	Poisonous and Deleterious Substances Control Law									
[A05]	Act on the Regulation of Nuclear Source Material etc.									

Version	Date	Revision detail																																														
12th	2022-01-19	<ul style="list-style-type: none"> Deleted 7 substances from prohibited substances. <table border="1"> <tr> <td>Yellow phosphorus match</td> <td>Specified organophosphorus compound</td> </tr> <tr> <td>alpha-Naphthylamine and its salts</td> <td>[Parathion, Methyl Demeton, Phosphamidon, Methyl Parathion, TEPP]</td> </tr> <tr> <td>Benzotrithloride</td> <td>Fluoroacetic acid, its salt, and amide</td> </tr> <tr> <td>Octamethylphosphoramidate</td> <td>Aluminium phosphide</td> </tr> </table> <p>(Due to the deletion of "Industrial Safety and Health Act" and "Poisonous and Deleterious Substances Control Law" from Applicable laws and regulations on prohibited substances.)</p> <p>Table B.Threshold values</p> <ul style="list-style-type: none"> Deleted "Cd 5ppm" from threshold value of Packaging materials. 	Yellow phosphorus match	Specified organophosphorus compound	alpha-Naphthylamine and its salts	[Parathion, Methyl Demeton, Phosphamidon, Methyl Parathion, TEPP]	Benzotrithloride	Fluoroacetic acid, its salt, and amide	Octamethylphosphoramidate	Aluminium phosphide																																						
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13th	2023-01-19	<p>4. 1) Revision of prohibited substances</p> <ul style="list-style-type: none"> [A02] The scope is limited to "Substances whose uses are related to our company". [A04] Deleted "Annex XIV (Authorisation list)" from Scope of EU REACH. [A07] Added BNST to Customer Request substances (shifted from [B06]GADSL). [A07] Deleted PFC and SF6 from Scope of Customer Request substances. <p>4. 2) Revision of controlled substances</p> <ul style="list-style-type: none"> Deleted the following from Applicable laws and regulations of controlled substances, and moved up their No. (The No. of Other Controlled Substances ; [B09] → [B06]) <ul style="list-style-type: none"> [B06] Japan Law concerning PollutantRelease and Transfer Register(PRTR) [B07] Japan Chemical Substances ControlLaw(CSCL) [B08] Measures to Tackle Global Warming [B06] Deleted "Perfluoroalkyl sulfonate (PFAS) and its salts, related substance" from Scope of Other Controlled Substances (integrated into [B04]). <p>Table A. Prohibited substances</p> <ul style="list-style-type: none"> Added No.17 "Dechlorane Plus". (Due to recommend addition to Annex A under the POPs Convention) Deleted 44 Substances from prohibited substances <table border="1"> <tr> <td>Aldrin</td> <td>1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters</td> </tr> <tr> <td>Dieldrin</td> <td></td> </tr> <tr> <td>Endrin</td> <td>Bis(2-methoxyethyl) phthalate</td> </tr> <tr> <td>DDT</td> <td>Anthracene oil</td> </tr> <tr> <td>Chlordane</td> <td>Pitch, coal tar, high temp.</td> </tr> <tr> <td>Toxaphene</td> <td>4-(1,1,3,3-Tetramethylbutyl)phenol, ethoxylated</td> </tr> <tr> <td>Dicofol or Kelthane</td> <td>Dihexyl phthalates</td> </tr> <tr> <td>Hexachlorocyclohexane</td> <td>1,2-Benzenedicarboxylic acid, di-C6-10-alkyl esters</td> </tr> <tr> <td>Chlordecone</td> <td>Trixylyl phosphate</td> </tr> <tr> <td>Endosulfan</td> <td>Sodium perborate (hydrate and anhydride)</td> </tr> <tr> <td>Musk xylene</td> <td>KARANAL</td> </tr> <tr> <td>4,4'-Diaminodiphenylmethane</td> <td>Benzotriazols (UV-327, UV-350)</td> </tr> <tr> <td>2,4-Dinitrotoluene</td> <td>Chloroethylene (vinyl chloride monomer)</td> </tr> <tr> <td>Trichloroethylene</td> <td>Cobalt dichloride</td> </tr> <tr> <td>Formaldehyde, oligomeric reaction products with aniline</td> <td>Chloroform</td> </tr> <tr> <td>Bis(2-methoxyethyl) ether</td> <td>1,1,2,2-tetrachloroethane</td> </tr> <tr> <td>1,2-dichloroethane</td> <td>1,1,1,2-tetrachloroethane</td> </tr> <tr> <td>2,2'-dichloro-4,4'-methylenedianiline</td> <td>Pentachloroethane</td> </tr> <tr> <td>1-Bromopropane</td> <td>1,1-dichloroethylene</td> </tr> <tr> <td>1,2-Benzenedicarboxylic acid,</td> <td>Nonylphenol, Nonylphenol ethoxylates</td> </tr> <tr> <td>1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7 rich</td> <td>Amines, carcinogenic, which are formed from Azo-dyes</td> </tr> <tr> <td></td> <td>Perfluorocarbons (PFCs)</td> </tr> <tr> <td></td> <td>Sulphur hexafluoride (SF6)</td> </tr> </table> <p>Table C. Exemption from prohibited substances</p> <ul style="list-style-type: none"> Deleted Mercury in lamps (No. 1-4(g)). 	Aldrin	1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters	Dieldrin		Endrin	Bis(2-methoxyethyl) phthalate	DDT	Anthracene oil	Chlordane	Pitch, coal tar, high temp.	Toxaphene	4-(1,1,3,3-Tetramethylbutyl)phenol, ethoxylated	Dicofol or Kelthane	Dihexyl phthalates	Hexachlorocyclohexane	1,2-Benzenedicarboxylic acid, di-C6-10-alkyl esters	Chlordecone	Trixylyl phosphate	Endosulfan	Sodium perborate (hydrate and anhydride)	Musk xylene	KARANAL	4,4'-Diaminodiphenylmethane	Benzotriazols (UV-327, UV-350)	2,4-Dinitrotoluene	Chloroethylene (vinyl chloride monomer)	Trichloroethylene	Cobalt dichloride	Formaldehyde, oligomeric reaction products with aniline	Chloroform	Bis(2-methoxyethyl) ether	1,1,2,2-tetrachloroethane	1,2-dichloroethane	1,1,1,2-tetrachloroethane	2,2'-dichloro-4,4'-methylenedianiline	Pentachloroethane	1-Bromopropane	1,1-dichloroethylene	1,2-Benzenedicarboxylic acid,	Nonylphenol, Nonylphenol ethoxylates	1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7 rich	Amines, carcinogenic, which are formed from Azo-dyes		Perfluorocarbons (PFCs)		Sulphur hexafluoride (SF6)
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14th	2024-01-18	<p>4. 1) Revision of prohibited substances</p> <ul style="list-style-type: none"> [A07] Added Mineral oil (MOAH, MOSH) to Customer Request substances (Due to French environment law (D.543-45-1)). <p>Table A. Prohibited substances</p> <ul style="list-style-type: none"> Added No.19 "Medium Chain Chlorinated paraffins" and No.20 "C9-C21 PFCAs (Perfluorocarboxylic acids), their salts and related compounds". (Due to recommend addition to Annex A under the POPs Convention) 																																														

Version	Date	Revision detail
14th	2024-01-26	<ul style="list-style-type: none"> • Added No.64 "Mineral oil (MOAH, MOSH)". (Due to French environment law (D.543-45-1)). • Deleted "Ozone depleting halogenated Hydrocarbons and Carbons, all members" from prohibited substances. (Due to the 2023 Ver. 1.0 revision of GADSL, the target substances were reviewed and became the same as No.1 "Ozone-Depleting Substances".) <p>Table B. Threshold values</p> <ul style="list-style-type: none"> • Deleted the threshold value (4000ppm) for lead contained in aluminum alloy. <p>Table C. Exemption from prohibited substances</p> <ul style="list-style-type: none"> • Deleted Lead as an alloying element in aluminium (6(b)-I and 6(b)-II). (Due to the EU ELV Directive, the exemption deadline was set on January 1, 2028)
14.2th	2025-02-03	<p>4. 2) Revision of Controlled substances</p> <ul style="list-style-type: none"> • Added U.S. TSCA Sec. 8(a)(7) "Reporting and Recordkeeping Rule for PFAS" to B03. <p>5.6) Added Submission of "PFAS Survey Form"</p> <p>Table A. Prohibited substances</p> <ul style="list-style-type: none"> • No.12 : Changed the threshold value for "Hexabromocyclododecane (HBCDD)" to 75 ppm. • No.30 : Changed the threshold value for "Polychloro terphenyl (PCT)" to 50 ppm. • No.39 : The threshold value for "PIP(3:1)" was set at 1,000 ppm. <p>Table B.Threshold values</p> <ul style="list-style-type: none"> • Deleted the threshold value (5 ppm) for cadmium contained in Resin, Ink. <p>Table C. Exemption from prohibited substances</p> <ul style="list-style-type: none"> • Deleted exemption that are only enabled for a specific category. (5(b), 18(b), 29, 32, 39(a)) • Added new exemption 39(b).