

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

Version 7

May 09, 2016

**Fuji Electric Co., Ltd.
Electronic Devices Business Group**

Guidelines for Chemical Substances contained in products

【Semiconductors】

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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. Electronic Devices 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. Electronic Devices Business Group Production Division

Matsumoto Factory

Yamanashi Branch Factory

Fuji Electric Power Semiconductor Co., Ltd. Oomachi Factory

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Iiyama Factory

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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 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.

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 .

No.	Regulations on prohibited substances	Scope
[A01]	Ozone Layer Protection Law (Montreal Protocol)	Annex A(I, II), B(I, II, III), C(I, II, III), E(I)
[A02]	Chemical Substances Control Law	Class I Specified Chemical Substances
[A03]	Industrial Safety and Health Act	Prohibition of Manufacturing etc. Permission for Manufacturing
[A04]	Poisonous and Deleterious Substances Control Law	Specific Poison
[A05]	Act on the Regulation of Nuclear Source Material etc.	Radioactive material
[A06]	EU RoHS, ELV and Package Directive (*1)	Restricted substances
[A07]	EU REACH (Regulation EC/1907/2006)	Annex XIV (Authorisation list), Annex XVII (Restriction list) [Substance by which the condition of the restriction relates to our company]
[A08]	GADSL	P: Prohibited substances D/P: [Substance by which the condition of the prohibition relates to our company]
[A09]	<u>Customer Request substances</u>	Cyanide (Poison and Deleterious substance of Poisonous and Deleterious Substances Control Law) Polyvinyl chloride (U.S. IEEE 1680) <u>Chlorinated Flame Retardants (U.S. Vermont State. Act 85)</u>

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

(*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, Polybromobiphenyl (PBB), Polybromodiphenylether (PBDE)) are established for each supply at Table B. 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.

No.	Regulations on controlled substances	Scope
[B01]※	EU REACH (Regulation EC/1907/2006)	SVHC (Candidate List)
		Annex XVII (Restriction substance) [Substance by which the condition of the restriction does not relate to our
[B02]※	EU CLP (Regulation EC/1272/2008)	Annex VI Table3.1 and 3.2 CMR Cat1,2
[B03]※	EU ESIS PBT list	Fulfilling
[B04]※	GADSL	D:Declarable substances D/P:[Substance by which the condition of the prohibition does not relate to our company]
[B05]※	IEC62474 (JIG-101)	Criteria 1, 2, 3
[B06]	Law concerning Pollutant Release and Transfer Register (PRTR)	Class I Designated Chemical Substances
		Class II Designated Chemical Substances
[B07]	Chemical Substances Control Law (CSCL)	Class II Specified Chemical Substances
		Monitoring Chemical Substances
[B08]	Measures to Tackle Global Warming	Green House Gases (Kyoto Protocol)
[B09]	Other Controlled Substances	Norway PoHS Candidate substance
		U.S. TSCA [The object of SNUR is a substance of 'any use' (except for the prohibited substances of our company, medicine, explosive, etc.).]
		Polycyclic aromatic hydrocarbons (PAH)
		Red phosphorus and Organophosphorus compounds (except Prohibited Substances)
		Perfluoroalkyl sulfonate (PFAS)
		GADSL old version (The substance deleted by revision)
		JIG old version (The substance deleted by revision)

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

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

※ laws from [B01] to [B05] are also served as follow-up for AIS relevant substances of JAMP council.

<http://www.jamp-info.com/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”.

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”)

- Please enter “ × ” on the relevant box of “ <7> Judgment of substance ”.

When the substance is relevant to our prohibited and controlled substance	Please enter “ × ” on the box of the relevant class and law.
When the substance isn't relevant to our prohibited and controlled substance	Please enter “ × ” on “Other substances “ box.

- 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 “Additional controlled substances survey form ”

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

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

6) Submission of “Data of analysis”

For the parts and materials delivered to our company, submission of precise analysis data for relevant substances (Lead, Cadmium, Mercury, Hexavalent Chromium, PBB, PBDE) 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.

【Addition of required substance (four phthalates)】

Four phthalates were added as restricted substances of RoHS directive by amending in 2015 ((EU) 2015/863). The restriction of these phthalates shall apply from 22 July 2019.

Added substance name in RoHS	Threshold values in RoHS	Our prohibited No.
Bis (2-ethylhexyl)phthalate (DEHP)	1000ppm	56
Benzyl butyl phthalate (BBP)	1000ppm	57
Dibutyl phthalate (DBP)	1000ppm	58
Diisobutyl phthalate (DIBP)	1000ppm	59

These phthalates are our prohibited substances already as Authorisation substances of REACH.

Submission of precise analysis data for these phthalates will be requested later on.

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.

7) 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. Quality Assurance Dept.
Production Division Electronic Devices Business Group
Fuji Electric Co., Ltd.

Takashi Inanuma or Tsutomu Kasuga

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Table A. Prohibited substances

Please refer to Table B. Threshold values as to the threshold values.

Please refer to Table C Exemption from prohibited substances as to the exemption.

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

No.	Applicable laws and regulations	Substance name	CAS-No.
1	Ozone Layer Protection Law	Ozone-Depleting Substances [Montreal Protocol]	75-69-4
2	Chemical Substances	Polychlorinated biphenyl (PCB)	1336-36-3
3	Control Law	Polychloronaphthalene (PCN) [$Cl \geq 1$ (based on GADSL)]	1321-64-8
4	[Class I Specified Chemical	Hexachlorobenzene and pigment containing by-product hexachlorobenzene	118-74-1
5	Substances]	Aldrin	309-00-2
6		Dieldrin	60-57-1
7		Endrin	72-20-8
8		DDT	50-29-3
9		Chlordane	57-74-9
10		Bis(tributyltin)oxide	56-35-9
11		p-Phenylenediamine	620-91-7
12		2,4,6-tri-tert-butylphenol	732-26-3
13		Toxaphene	8001-35-2
14		Mirex	2385-85-5
15		Dicofol or Kelthane	115-32-2
16		Hexachlorobuta- 1,3-diene	87-68-3
17		2-(2H-1,2,3-Benzotriazol-2-yl)-4,6-di-tert-butylphenol	3846-71-7
18		Perfluorooctane sulfonate (PFOS) and its salt	71463-74-6
19		Perfluorooctane sulfonyl fluoride (PFOS-F)	307-35-7
20		Pentachlorobenzene (PeCB)	608-93-5
21		α -Hexachlorocyclohexane(α -HCH)	319-84-6
22		β -Hexachlorocyclohexane(β -HCH)	319-85-7
23		γ -Hexachlorocyclohexane(γ -HCH, Lindane)	58-89-9
24		Chlordecone	143-50-0
25		Hexabromobiphenyl	36355-01-8
26		Polybromodiphenyl ether [Br:4-8]	40088-47-9
27		Endosulfan	115-29-7
28		Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified	3194-55-6
29		Pentachlorophenol and its salts and esters	87-86-5
30	Industrial Safety and	Yellow phosphorus match	12185-10-3
31	Health Act	Benzidine and its salt	92-87-5
32	[Prohibition of Manufacturing etc.]	4-amino diphenyl and its salt	92-67-1
33		Asbestos [asbestos, amosite, Crocidolite, etc.]	1332-21-4
34		4-nitrodiphenyl and its salt	92-93-3
35		Bis(chloromethyl)ether	542-88-1
36		beta-naphthylamine and its salt	91-59-8
37		Benzene	71-43-2
38	[Permission for Manufacturing]	Dichlorobenzidine and its salts	84-68-4
39		alpha-Naphthylamine and its salts	134-32-7
40		o-Tolidine and its salts	119-93-7
41		Dianisidine and its salts	119-90-4
42		Beryllium and its compounds	1304-56-9
43		Benzotrichloride	98-07-7
44	Poisonous and Deleterious	Octamethylphosphoramide	152-16-9
45	Substances Control Law	Specified organophosphorus compound	56-38-2
46	[Specific Poison]	[Parathion, Methyl Demeton, Phosphamidon, Methyl Parathion, TEPP]	
47		Fluoroacetic acid, its salt, and amide	144-49-0
48		Aluminium phosphide	20859-73-8
49	Nuclear Source Material Act	Radioactive material	7440-61-1
50	EU RoHS	Cadmium and its compounds	7440-43-9
51		Hexavalent chromium compounds	1333-82-0
52		Mercury and its compounds	7439-97-6
53		Lead and its compounds	7439-92-1
		Specified Brominated flame retardants [PBB and PBDE]	67774-32-7

No.	Applicable laws and regulations	Substance name	CAS-No.
54	EU REACH [Annex XIV] (Authorisation substances)	5-tert-butyl-2,4,6-trinitro-m-xylene (musk xylene)	81-15-2
55		4,4'- Diaminodiphenylmethane (MDA)	101-77-9
56		Bis (2-ethylhexyl)phthalate (DEHP)	117-81-7
57		Benzyl butyl phthalate (BBP)	85-68-7
58		Dibutyl phthalate (DBP)	84-74-2
59		Diisobutyl phthalate (DIBP)	84-69-5
60		tris(2-chloroethyl)phosphate	115-96-8
61		2,4-Dinitrotoluene	121-14-2
62		Trichloroethylene	79-01-6
63		Formaldehyde, oligomeric reaction products with aniline	25214-70-4
64		Bis(2-methoxyethyl) ether	111-96-6
65	(Annex XVII) (Restriction substances) (Substance by which the condition of the restriction relates to our company)	1,2-dichloroethane	107-06-2
66		2,2'-dichloro-4,4'-methylenedianiline (MOCA)	101-14-4
67		Polychloro terphenyl (PCT)	61788-33-8
68		Arsenide	7440-38-2
69		Organostannic compounds [Dibutyltin/Dioctyltin/All tri-substituted organostannic compounds]	56-35-9
70		Monomethyl-tetrachloro-diphenyl methane (Ugilec 141)	76253-60-6
71		Monomethyl-dichloro-diphenyl methanes (Ugilec 121)	81161-70-8
72		Monomethyl-dibromo-diphenyl methane (DBBT)	99688-47-8
73		Cobalt dichloride	7646-79-9
74		Formaldehyde	50-00-0
75		Nickel compound 《Human body contact parts are prohibition and alloy content are excepted》	7440-02-0
76	(Candidate substance)	Chloroform	67-66-3
77		1,1,2-trichloroethane	79-00-5
78		1,1,2,2-tetrachloroethane	79-34-5
79		1,1,1,2-tetrachloroethane	630-20-6
80		Pentachloroethane	76-01-7
81		1,1-dichloroethylene	75-35-4
82		Hexachloroethane	67-72-1
83		Nonyl phenol, Nonyl phenol ethoxy rate	25154-52-3
84		Dimethyl fumarate	624-49-7
85		Perfluorooctanoic acid (PFOA), including its salts and its derivatives	335-67-1
86	GADSL [P: Prohibited substances] [D/P] (Substance by which the condition of the prohibition relates to our company)	Azodyes that can form carcinogenic amines, selected	12217-14-0
87		Benzenamine, N-phenyl-, reaction products with styrene and 2,4,4-trimethylpentene (BNST)	68921-45-9
88		Chlorinated or brominated Dibenzo-p-dioxins or Dibenzofurans, all members	1746-01-6
89		Chlorinated paraffins, short chain length (SCCP), all members	85535-84-8
90		2-Methoxyethanol	109-86-4
91		Hydrofluorocarbons (HFC's), all members	75-46-7
92		N-Nitroso dimethyl amine	62-75-9
93		Tetrachlorobenzene, all members	95-94-3
94		TriAziridinylphosphineoxide	545-55-1
95		Phosphoric Acid tris(2,3-dibromopropyl)ester	126-72-7
96		Chloroethylene (vinyl chloride monomer)	75-01-4
97	(Old P: Prohibited substances)	Amines, carcinogenic, which are formed from Azo-dyes, selected	137-17-7
98	Customer Request substances	Cyanide [Poison & Deleterious substance]	143-33-9
99		Polyvinyl chloride (PVC) and PVC compounds [U.S. IEEE 1680]	9002-86-2
100		Tris(2-chloro-1-methylethyl)phosphate (TCPP) [U.S. Vermont State. Act 85]	13674-84-5
101		Tris(1,3-dichloro-2-propyl)phosphate (TDCPP) [U.S. Vermont State. Act 85]	13674-87-8

【The main amendments of Prohibited substances】

- Addition of Chlorinated Flame Retardants of U.S. Vermont State. Act 85, as Customer Request substances.

No.100 Tris(2-chloro-1-methylethyl)phosphate (TCPP)

No.101 Tris(1,3-dichloro-2-propyl)phosphate (TDCPP)

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 concentration (Threshold
Lead	Resin, Ink	100
	Lead free solder	500
	Lead free solder plating	1000
	Plating (including electroless Ni plating, electroless Au plating)	1000
	Copper alloys, Brass, Phosphor bronze	40000
	Aluminium alloy	4000
	Steel	3500
	High melting temperature type solder	≥ 85%
	Lead glass	—
	The others	1000
Cadmium	Resin, Ink	5
	Lead free solder, Solder plating	20
	The others	75
Mercury	All	1000
Hexavalent chromium	Resin, Ink	1000
	Chromate coating	1000
	The others	1000
PBB (Polybromobiphenyl)	Resin (Flame retardants)	1000
PBDE (Polybromodiphenyl ether)	Resin (Flame retardants)	1000

2. Threshold values for prohibited substances of Package Directive

Packaging materials	Unit (ppm)	
Substance name	Allowable concentration (Threshold value)	
Lead	—	total 100
Cadmium	5	
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	
Antimony [as Diantimony trioxide]	835 [1000]	

Table C. Exemption from prohibited substances

No.	RoHS exemption list	Dates of applicability
1~4(f)	Mercury in lamps (An acceptable value sets up according to the kind of lamp.) (For details, please refer to the directive.)	Under review
5(a)	Lead in glass of cathode ray tubes	2016/7/21
5(b)	Lead in glass of fluorescent tubes not exceeding 0.2% by weight	Under review
6(a)	Lead as an alloying element in steel for machining purposes and in galvanised steel containing up to 0.35% lead by weight	Under review
6(b)	Lead as an alloying element in aluminium containing up to 0.4% lead by weight	Under review
6(c)	Copper alloy containing up to 4% lead by weight	Under review
7(a)	Lead in high melting temperature type solders (i.e. lead-based alloys containing 85% by weight or more lead)	Under review
7(b)	Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signalling, transmission, and network management for tele – communications	2016/7/21
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	Under review
7(c)– II	Lead in dielectric ceramic in capacitors for a rated voltage of 125V AC or 250V DC or higher	Under review
7(c)–IV	Lead in PZT based dielectric ceramic materials for capacitors being part of integrated circuits or discrete semiconductors'	Under review
8(b)	Cadmium and its compounds in electrical contacts	Under review
9	Hexavalent chromium as an anticorrosion agent of the carbon steel cooling system in absorption refrigerators up to 0.75% by weight in the cooling solution	Under review
9(b)	Lead in bearing shells and bushes for refrigerant-containing compressors for heating, ventilation, air conditioning and refrigeration (HVACR) applications	Under review
13(a)	Lead in white glasses used for optical applications	Under review
13(b)	Cadmium and lead in filter glasses and glasses used for reflectance standards	Under review
15	Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit flip chip packages	Under review
17	Lead halide as radiant agent in high intensity discharge (HID) lamps used for professional reprography applications	2016/7/21
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)	Under review
21	Lead and cadmium in printing inks for the application of enamels on glasses, such as borosilicate and soda lime glasses	Under review
24	Lead in solders for the soldering to machined through hole discoidal and planar array ceramic multilayer capacitors	Under review
25	Lead oxide in surface conduction electron emitter displays (SED) used in structural elements, notably in the seal frit and frit ring	2016/7/21
29	Lead bound in crystal glass as defined in Annex I (Categories 1, 2, 3 and 4) of Council Directive 69/493/EEC (1)	Under review
30	Cadmium alloys as electrical/mechanical solder joints to electrical conductors located directly on the voice coil in transducers used in high-powered loudspeakers with sound pressure levels of 100dB (A) and more	2016/7/21
31	Lead in soldering materials in mercury free flat fluorescent lamps (which, e.g. are used for liquid crystal displays, design or industrial lighting)	2016/7/21
32	Lead oxide in seal frit used for making window assemblies for Argon and Krypton laser tubes	Under review
33	Lead in solders for the soldering of thin copper wires of 100 μ m diameter and less in power transformers	2016/7/21
34	Lead in cermet-based trimmer potentiometer elements	Under review
37	Lead in the plating layer of high voltage diodes on the basis of a zinc borate glass body	Under review
38	Cadmium and cadmium oxide in thick film pastes used on aluminium bonded beryllium oxide	2016/7/21
41	Lead in solders and termination finishes of electrical and electronic components and finishes of printed circuit boards used in ignition modules and other electrical and electronic engine control systems, which for technical reasons must be mounted directly on or in the crankcase or cylinder of hand-held combustion engines (classes SH:1, SH:2, SH:3 of Directive 97/68/EC of the European Parliament and of the Council	2018/12/31

※This list is based on RoHS2 2011L0065 (24.06.2015)

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 (see Guidelines for Chemical Substances Contained in Products [Semiconductors]) of the Electronic Devices 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.

Date of evaluation	
Name of your company	
Name of delivered product or outsourced work	
Name of production plant	
Name of department	
Person responsible for evaluation (post/name)	

1. If the check results are different depending on the delivered product or the production plant, use different check sheets for replies.
2. Give a grade of evaluation for all check items of questions 1 to 31.
3. In the "Description of management/Comment, etc." column, enter a description of management relating to the check item concerned.

* Enter in the columns.

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	Do you have a management policy of chemical substances in products that approved by top management?		Title of document
2(1)	Documentation of criteria	2	Do you have criteria of chemical substances in products and their management and review it as needed?		Title of criteria
2(3)	Responsibility and authority	3	Is a management representative for chemical substances in products appointed, and are the responsibility and authority of the management representative clearly defined?		Title of document stipulating management representative
3	Management at Design and Development	4	Do you verify information about chemical substances in materials and parts, and check conformity to the criteria before the start of mass production?		Contents specifically checked
		5	Do you verify composition and concentration changes (solder bath, polymerization, plating, inks and paints, adhesives, etc.) in the process, the effect of contamination by prohibited substances, and the use of recycled materials and check conformity to the criteria before the start of mass production?		Contents specifically checked
		6	Do you stipulate check points before the start of mass production to ensure conformity to the criteria for the management of chemical substances in products at delivery?		Contents specifically checked
4(1)	Collection and Verification of Information	7	Do you acquire from the component/raw material supplier, etc. information about chemical substances in products (guarantee of containing no prohibited substances, composition table, analysis record, etc.), which is required to fulfill the standard?		Acquired information
		8	Do you check information about chemical substances in each material and part purchased from several suppliers and conformity to the criteria?		Material and part purchased from several
	Verification of the Management Status at	9	Do you require each of your suppliers to establish and apply a scheme for the management of chemical substances in products?		Title of document requiring establishment and application
		10	When selecting a supplier, do you evaluate its commitment to the management of chemical substances in products?		Evaluated record
		11	Do you evaluate the management of chemical substances in products by each supplier having continued transactions with you and perform an audit, corrective action, etc. as needed?		Evaluated record
	Management at Receiving	12	At receiving, do you confirm that the purchased materials and parts fulfill the criteria? (Don't you use components that are not checked or identified?)		Details of check at the time of acceptance
		13	Do you have analysis equipment for chemical substances in the products concerned at the production site where they are manufactured, and regularly analyze materials and parts or products as needed?		Analysis equipment (XRF, ICP, etc.) Items to be analyzed, frequency of analysis
5	Management for the Manufacturing Process	14	Is there any possibility that prohibited substances exceeding the management criteria will remain or be generated due to composition and concentration changes of parts and materials in the process? (Solder bath, polymerization, plating, inks and paints, adhesives, etc.)		Name of possible process or parts and Name of prohibited substance
		(1)	Do you perform management considering prohibited substances that may remain or be generated?		Manufacturing condition, etc. considering prohibited substances
		(2)	Do you regularly analyze composition change or concentration change?		Analysis equipment (XRF, ICP, etc.)
					Items to be analyzed, frequency of analysis

5	Management for the Manufacturing Process	Prevention of Contamination by Incorrect Use or Admixture	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?		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 you use recycled materials for products delivered to Fuji Electric?		Name of recycled material
			(1)	When closed-loop recycled materials (recycling in a closed route, for example, crushing and reuse of your resin molded defective products) are used, can you guarantee by traceability control or regular analysis that RoHS prohibited substances are not contained?		Subject material
			(2)	When open-loop recycled materials (recycling in an open route with unknown properties) are used, can you prove that control capable of guaranteeing that prohibited substances are not contained is implemented?		Control method
			(2)			Subject material
						Grounds for guarantee
6	Management at Delivery		18	Do you check the results of the management of chemical substances in products at the time of warehousing or delivery of products?		Checked contents
7	Confirmation of status of management at Outsourcing		19	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
8	Traceability		20	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
9	Exchange of Information with the Customer		21	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 area
			22	Do you guarantee the requirements of "The warranty on prohibited substances" for products delivered to Fuji Electric?		
			23	Can you present the latest (within a year) data on the contents of the six (or four) RoHS restricted substances obtained from precision measurement, such as by means of ICP, in relation to products delivered		
10	Change Management		24	When performing material or process changes, do you confirm that these changes fulfill the requirements relating to chemical substances in products?		Checked contents
			25	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)
11	Response to Nonconformity		26	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
			27	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)
12	Education and Training		28	Is education in chemical substances in products and their management conducted for employees as appropriate?		Education conducted for the past year
13	Control of Document and Record		29	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
14	Evaluation and Improvement of Implementation Status		30	Do you regularly perform an internal audit of the management of chemical substances in products?		Date of audit for the past year
			31	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. 7-**

Date of answer		
Your company's 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. Electronic Devices Business Headquarters 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> The concentration of the substance including impurities is less than the threshold value of Table B.

<3> There is no use of ozone-depleting substances in the manufacturing process of our delivering product/s.

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

[1] Delivering products list

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

Fe code	Product number, Type number, Name	Contain ing	Information on prohibited substances				Exemption No. (shown in Table C)	Note
			※Please enter the used region in the case of composite material.					
			Used region	Substance name	CAS No.	Maximum percentage of a constituent		
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.	Applicable laws	Substance name	CAS-No.	Note of the warranty
1	Ozone Layer Protection Law	Ozone-Depleting Substances [Montreal Protocol]	75-69-4	There is no use in the manufacturing process.
2	Chemical	Polychlorinated biphenyl (PCB)	1336-36-3	—
3	Substances	Polychloronaphthalene (PCN) [CI≥1 (based on GADSL)]	1321-64-8	—
4	Control Law	Hexachlorobenzene and pigment containing by-product hexachlorobenzene	118-74-1	—
5	[Class I	Aldrin	309-00-2	—
6	Specified	Dieldrin	60-57-1	—
7	Chemical	Endrin	72-20-8	—
8	Substances]	DDT	50-29-3	—
9		Chlordane	57-74-9	—
10		Bis(tributyltin)oxide	56-35-9	—
11		p-Phenylenediamine	620-91-7	—
12		2,4,6-tri-tert-butylphenol	732-26-3	—
13		Toxaphene	8001-35-2	—
14		Mirex	2385-85-5	—
15		Dicofol or Kelthane	115-32-2	—
16		Hexachlorobuta-1,3-diene	87-68-3	—
17		2-(2H-1,2,3-Benzotriazol-2-yl)-4,6-di-tert-butylphenol	3846-71-7	—
18		Perfluorooctane sulfonate (PFOS) and its salt	71463-74-6	—
19		Perfluorooctane sulfonyl fluoride (PFOS-F)	307-35-7	—
20		Pentachlorobenzene (PeCB)	608-93-5	—
21		α-Hexachlorocyclohexane(α-HCH)	319-84-6	—
22		β-Hexachlorocyclohexane(β-HCH)	319-85-7	—
23		γ-Hexachlorocyclohexane(γ-HCH, Lindane)	58-89-9	—
24		Chlordecone	143-50-0	—
25		Hexabromobiphenyl	36355-01-8	—
26		Polybromodiphenyl ether [Br:4-8]	40088-47-9	—

27		Endosulfan	115-29-7	—
28		Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified	3194-55-6	—
29		Pentachlorophenol and its salts and esters	87-86-5	—
30	Industrial Safety	Yellow phosphorus match	12185-10-3	—
31	and Health Act	Benzidine and its salt	92-87-5	—
32	[Prohibition of	4-amino diphenyl and its salt	92-67-1	—
33	Manufacturing	Asbestos [asbestos, amosite, Crocidolite, etc.]	1332-21-4	—
34	etc.]	4-nitrodiphenyl and its salt	92-93-3	—
35		Bis(chloromethyl)ether	542-88-1	—
36		beta-naphthylamine and its salt	91-59-8	—
37		Benzene	71-43-2	—
38	[Permission for	Dichlorobenzidine and its salts	84-68-4	—
39	Manufacturing]	alpha-Naphthylamine and its salts	134-32-7	—
40		o-Tolidine and its salts	119-93-7	—
41		Dianisidine and its salts	119-90-4	—
42		Beryllium and its compounds	1304-56-9	—
43		Benzotrithloride	98-07-7	—
44	Poisonous and	Octamethylphosphoramide	152-16-9	—
45	Deleterious	Specified organophosphorus compound	56-38-2	—
46	Substances	[Parathion, Methyl Demeton, Phosphamidon, Methyl Parathion, TEPP]		—
47	Control Law	Fluoroacetic acid, its salt, and amide	144-49-0	—
48	[Specific Poison	Aluminium phosphide	20859-73-8	—
49	Nuclear Act	Radioactive material	7440-61-1	—
50	EU RoHS	Cadmium and its compounds	7440-43-9	The concentrations are less than the threshold value of Table B.
51		Hexavalent chromium compounds	1333-82-0	
52		Mercury and its compounds	7439-97-6	
53		Lead and its compounds	7439-92-1	
54		Specified Brominated flame retardants [PBB and PBDE]	67774-32-7	
55	EU REACH	5-tert-butyl-2,4,6-trinitro-m-xylene (musk xylene)	81-15-2	—
56	[Annex XIV]	4,4'- Diaminodiphenylmethane (MDA)	101-77-9	—
57	(Authorisation	Bis (2-ethylhexyl)phthalate (DEHP)	117-81-7	—
58	substances)	Benzyl butyl phthalate (BBP)	85-68-7	—
59		Dibutyl phthalate (DBP)	84-74-2	—
60		Diisobutyl phthalate (DIBP)	84-69-5	—
61		tris(2-chloroethyl)phosphate	115-96-8	—
62		2,4-Dinitrotoluene	121-14-2	—
63		Trichloroethylene	79-01-6	—
64		Formaldehyde, oligomeric reaction products with aniline	25214-70-4	—
65		Bis(2-methoxyethyl) ether	111-96-6	—
66		1,2-dichloroethane	107-06-2	—
67	[Annex XVII]	2,2'-dichloro-4,4'-methylenedianiline (MOCA)	101-14-4	—
68	(Restriction	Polychloro terphenyl (PCT)	61788-33-8	—
69	substances)	Arsenide	7440-38-2	—
70		Organostannic compounds	56-35-9	—
71	(Substance by	[Dibutyltin/Dioctyltin/All tri-substituted organostannic compounds]		—
72	which the	Monomethyl-tetrachloro-diphenyl methane (Ugilec 141)	76253-60-6	—
73	condition of the	Monomethyl-dichloro-diphenyl methanes (Ugilec 121)	81161-70-8	—
74	restriction	Monomethyl-dibromo-diphenyl methane (DBBT)	99688-47-8	—
75	relates to our	Cobalt dichloride	7646-79-9	—
76	company)	Formaldehyde	50-00-0	—
77		Nickel compound	7440-02-0	Human body contact parts are prohibition and alloy content are excepted
78		Chloroform	67-66-3	—
79		1,1,2-trichloroethane	79-00-5	—
80		1,1,2,2-tetrachloroethane	79-34-5	—
81		1,1,1,2-tetrachloroethane	630-20-6	—
82		Pentachloroethane	76-01-7	—
83		1,1-dichloroethylene	75-35-4	—
84		Hexachloroethane	67-72-1	—
85	(Candidate)	Nonyl phenol, Nonyl phenol ethoxy rate	25154-52-3	—
86		Dimethyl fumarate	624-49-7	—
87	GADSL	Perfluorooctanoic acid (PFOA), including its salts and its derivatives	335-67-1	—
88	[P : Prohibited	Azodyes that can form carcinogenic amines, selected	12217-14-0	—
89	substances]	Benzenamine, N-phenyl-, reaction products with styrene and 2,4,4-trimethylpentene (BNST)	68921-45-9	—
90	[D/P]	Chlorinated or brominated Dibenzo-p-dioxins or Dibenzofurans, all members	1746-01-6	—
91	(Substance by	Chlorinated paraffins, short chain length (SCCP), all members	85535-84-8	—
92	which the	2-Methoxyethanol	109-86-4	—
93	condition of	Hydrofluorocarbons (HFC's), all members	75-46-7	—
94	the prohibition	N-Nitroso dimethyl amine	62-75-9	—
95	relates to our	Tetrachlorobenzene, all members	95-94-3	—
96	company)	TriAziridinylphosphineoxide	545-55-1	—
97	(Old P : Prohibited)	Phosphoric Acid tris(2,3-dibromopropyl)ester	126-72-7	—
98	Customer	Chloroethylene (vinyl chloride monomer)	75-01-4	—
99	Request	Amines, carcinogenic, which are formed from Azo-dyes, selected	137-17-7	—
100	substances	Cyanide [Poison & Deleterious substance]	143-33-9	—
101		Polyvinyl chloride (PVC) and PVC compounds [U.S. IEEE 1680]	9002-86-2	—
		Tris(2-chloro-1-methylethyl)phosphate (TCPP) [U.S. Vermont State. Act 85]	13674-84-5	—
		Tris(1,3-dichloro-2-propyl)phosphate (TDCPP) [U.S. Vermont State. Act 85]	13674-87-8	—

After confirming the content of Fuji Electric Co., Ltd. Electronic Devices Business Headquarters' "Guidelines for chemical substances contained in products (Version 7) ", please separate your supplies to <4> Component, <5> Material, and <6> Substance, and report weight, etc. Please judge in < 7> of Table whether the substance contained in supplies is relevant to our prohibited and controlled substance.

Supplementation:

- ① Please report the substance contained more than 0.1 wt% in the material (the total of the concentration is 100wt% per material). And please report also the substance contained less than 0.1wt% in the case of our prohibited and controlled substances.
- ② Please judge in < 7 > of Table whether the substance is relevant to our prohibited and controlled substance and enter " × ". Even if the specific name and CAS No. of substances are not disclosed because of manufacturing method etc. , please judge in < 7 >.
- ③ Please fill the finally remained composition of supplies like resin, plating solution, ink, etc. that their composition change.

Date of answer	
<1> Company name	
Department/Title	
The contact person	
TEL	
E-mail	
<2> Manufactured country	
Manufacturing factory	

◁3▷	Name of supplies (Product No.)	Procurement specification No.*Figure No.	Weight of supplies	mg	0
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[illegible]

Note1: If you have two or more supplies, please copy this sheet.

Note2: On the applicable supplies (product No.), Please see [1] Delivering products list on the warranty on the prohibited substances .

※1: Please refer to the attached list on the relevant REACH SVHC substances.

※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.

Date	
Company	
Section	
The responsible person (Position)	

Date	
Company	
Section	
The responsible person (Position)	

On REACH SVHC substances	<u>All of the below products do not contain.</u>	✓	<p>An inquiry ends</p> <p>Please answer the details on the products containing SVHC.</p>
	<u>Products do not contain except some products.</u>		

[illegible]

Additional controlled substances survey form

※1: Please refer to the attached tables from 1 to 2 on the surveyed substances.

※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..

On surveyed substances	All of the below products do not contain or do not intentionally contain them	
	Products do not contain or do not intentionally contain them except some products.	✓

Please answer the details on the products containing the surveyed substances

**①Supplier**

Date	
Company	
Section	
The responsible person (Position)	

②Manufacturer

Date	
Company	
Section	
The responsible person (Position)	

Delivered products list		Information on the surveyed substances					Note
Fe code	Product's name・Type No.	cont ainm ent	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 (%)	
		N					
		N					
		N					
		N					
		N					
		N					
		N					
		N					
		N					
		N					
		N					
		N					
		N					
		N					
		N					
		N					
		N					
		N					
		N					
		N					
		N					

Periodic analysis guideline

Analysis method for “Substances required the periodic report of analysis data” 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

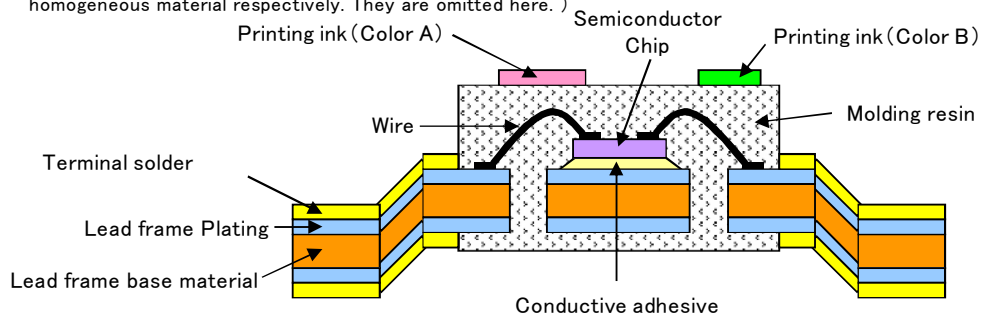
The threshold value in RoHS (ELV) directive is the concentration in homogeneous material. Homogeneous material is defined as “the minimum unit that can be separated into parts and materials by mechanical method for every constituent”.

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 H_2SO_4 , HNO_3 and H_2O_2 (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 below list, the combination is applicable.

MDL	Resin, ink	packaging material	Metal	Plating
Cadmium	5ppm	5ppm	10ppm	15ppm
Lead	30ppm	30ppm	30ppm	30ppm
Total Chromium	<u>30ppm</u>	5ppm	30ppm	30ppm

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 below list, the combination is applicable.

MDL	Resin, ink	packaging material	Metal	Plating
Mercury	<u>30ppm</u>	5ppm	30ppm	30ppm

3) Hexavalent Chromium

① Sample preparation

Elution methods (like IEC 62321:2008 Annex C, IEC 62321-7-1:2015, EPA 3060A)

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

② Measurement methods

- Ultraviolet-Visible(UV-Vis) absorptiometry (i.e. IEC 62321:2008 Annex C, IEC 62321-7-1:2015, 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 below list, the combination is applicable.

MDL	Resin, ink	packaging material	Metal, Plating	<u>Trivalent chromate coating</u>
Hexavalent Chromium	10ppm	10ppm	10ppm or <u>0.1 $\mu\text{g}/\text{cm}^2$</u>	<u>0.1 $\mu\text{g}/\text{cm}^2$</u>

4) Specific Brominated flame retardants (PBB, PBDE)

① Sample preparation

- Soxhlet Extraction Method (i.e. IEC 62321-6:2015)

② Measurement methods

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

Note: If a combination of a sample preparation and a measurement method can ensure that the method detection limit (MDL) is less than 10ppm, the combination is applicable.

5) 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.

6) 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 your analysis report.

- ① Sample preparation method: Please specify the official method or other methods you adopt

- 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)

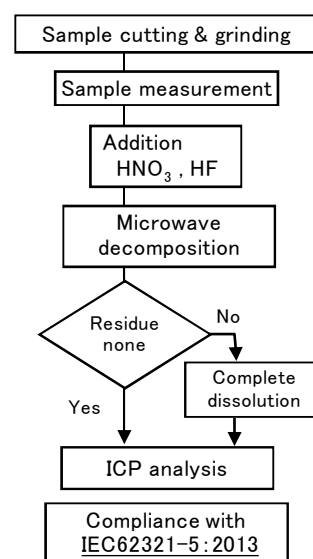
- ⑤ Test result (MDL: Method detection limit)

- ⑥ Measurement flow chart (essential for Cadmium and Lead)
(Please refer to the example of flow chart at right)

- ⑦ Sample name (Material name, model name etc.)

- (⑧ Sample photo)

Measurement Flow Chart



Revision history

Version	Date	Revision detail
1st	2008/10/1	Enacted with effectuation of REACH regulation
2nd	2010/1/22	<p>Addition of prohibited substances with reinforcement of restriction against chemical substances both domestically and internationally like chemical substance examination law and EU REACH regulation</p> <p>(Chlordecone, PFOSF, Dibutyltin compounds, Dioctyltin compounds, Dimethyl fumarate, DBP, DEHP, BBP, Musk xylene, HBCDD)</p> <p>Addition of controlled substances</p> <p>(SVHC (added as substance groups with second release), ESIS PBT (Fulfilling), JIG-101 Ed 2.0, GADSL (updated to 2009.03 revised edition))</p>
3rd	2010/7/1	<p>Addition of prohibited substances with reinforcement against chemical substances like EU REACH regulation</p> <p>(Beryllium oxide, Cobalt chloride)</p> <p>Addition of controlled substances</p> <p>(SVHC (added third released substances), JIG-101 (updated to Ed 3.0), GADSL (updated to 2010.02 revised edition), Chromium and its compounds (except hexavalent), tellurium and its compounds (except hydrogen tellurium), Titanium and its compounds, other inorganic compounds)</p> <p>Addition of Appendix 3 Periodic analysis guideline</p>
4th	2012/1/6	<p>Text is revised.</p> <p>Addition of the investigation into the use of ozone-depleting substances in the process</p> <p>Addition of prohibited substances (former 136 substance groups ⇒ this version 140 substance groups)</p> <ul style="list-style-type: none"> • Compensated the shortage of “Permission for Manufacturing” in Industrial Safety and Health Act (alpha-Naphthylamine and its salt, Beryllium and its compounds) • Addition with the revision of Export Trade Control Order (Alachlor, Aldicarb, Endosulfan). • Compensated the shortage of U.S. TSCA [The object of SNUR is 'any use'] (Benzenamine, 4,4' -[[1,1' -biphenyl]-2,5-diylbis(oxy)]bis-) <p>Alteration from prohibited substances to controlled substances (one substance)</p> <ul style="list-style-type: none"> • Methoxalen is change to controlled substances because it is removed from Law concerning Pollutant Release and Transfer Register (Class I) <p>Addition of controlled substances</p> <ul style="list-style-type: none"> • Addition of 6th released substances of EU REACH SVHC • Addition with the revision of EU REACH Annex XVII (added substances are overlapped with existing controlled substances) • Addition of revision of EU CLP regulation (2009/2/EC) • Addition with the issue of GADSL 2011 Ver 1.1 • Addition with JIG-101 Ed 4.0 • Added substances on Law concerning Pollutant Release and Transfer Register (Class I and II) to reinforce the communication on chemical substances information • Added substances on Chemical Substances Control Law (Class II Specified Chemical Substances) to reinforce the communication on chemical substances • Addition of Monitoring Chemical Substances on the Chemical Substances Control Law with its revision • request • Added perchlorate compounds (10 of them) to comply with customers' request • Added PFAS (260 of them listed on OECD's list) to comply with customers' request <p>Deletion of controlled substances</p> <ul style="list-style-type: none"> • Deletion of Annex VI CMR Cat.3 in EU CLP regulation. <p>Revised Appendix 3, 4, and 5 (Method detection limit)</p>

Version	Date	Revision detail
5th	2013/2/20	<p>2.1) Scope Addition of our manufacturing companies</p> <ul style="list-style-type: none"> • Fuji Electric Tsugaru Semiconductor Co., Ltd. • Fuji Electric (Shenzhen) Co., Ltd. Semiconductor Section <p>4. 1) Revision of prohibited substances (former 140 substance groups ⇒148 substance groups in this version)</p> <ul style="list-style-type: none"> • Addition with the revision of EU REACH Annex XIV (No.89-96) • Expansion of scope of organostannic compounds. (All of tri-substituted organostannic compounds are designated) • Change of Applicable laws and regulations of Dimethyl fumarate (No.120). (EU 2009/251/EC was deleted and integrated into EU REACH Annex XVII) <p>4. 2) Addition of controlled substances</p> <ul style="list-style-type: none"> • Addition of 7th and 8th released substances of EU REACH SVHC • Addition with revision of EU CLP regulation (286/2011/EC) • Addition with the issue of GADSL 2012 Ver 1.0 (2012/02/01) • Addition with JIG-101 Ed 4.1 • Addition of Monitoring Chemical Substances on the Chemical Substances Control Law with its revision (2012/03/22) • Addition of “Organophosphorus compounds” (into Other Controlled Substances) to comply with customers’ request <p>Addition of 5.4) Submission of “REACH SVHC survey form ”</p> <p>Addition of 5.5) Submission of “Additional controlled substances survey form ”</p> <p>Deletion of the Table of “Controlled substances”.</p> <p>Revised Appendix 7: 2. Analysis unit</p> <p>3.3) Detection limit of Hexavalent Chromium (0.1→0.05 μg/cm²)</p> <p>3.5), 3.6) Addition of Analysis method (Halogen and Antimony)</p>
6th	2015/4/16	<p>4. 1) Revision of prohibited substances (former 148 substance groups ⇒99 substance groups in this version)</p> <ul style="list-style-type: none"> • Addition with the revision of “Approved Substances” in EU REACH Annex XIV No.62 Trichloroethylene No.63 Formaldehyde, oligomeric reaction products with aniline No.64 Bis(2-methoxyethyl) ether • Addition of candidate substance of EU REACH Annex XVII in advance. No.85 Perfluorooctanoic acid (PFOA), including its salts • Addition of prohibited substances of GADSL No.86 Azodyes that can form carcinogenic amines, selected No.87 BNST No.90 2-Methoxyethanol No.91 Hydrofluorocarbons (HFC's), all members No.92 N-Nitroso dimethyl amine • The substances judged that there is not possibility to be included in our purchased products from the former survey result are deleted from the survey of Prohibited substances.(Chemical weapon, Pesticide and Medicine, etc.) <p>And the three regulations relevant to above are deleted from the target of Prohibited substance.</p> <p>Old No. [6] Act on Prohibition of Chemical Weapons and control of Specific</p> <p>Old No. [8] Export Trade Control Order</p> <p>Old No. [11] U.S. TSCA</p> <ul style="list-style-type: none"> • “Law Concerning Special Measures against Dioxins”(Old No.[7]) is deleted from the target of Prohibited substance. Because the law overlaps with [01]CSCL and [08]GADSL.

Version	Date	Revision detail
6th	2015/4/16	<p>4. 2) Revision of controlled substances</p> <ul style="list-style-type: none"> • Addition of 9th to 12th released substances of EU REACH SVHC. • Addition with revision of REACH Annex XVII (Restriction substance). (Reg. (EU) No 836/2012, Reg. (EU) No 848/2012, and Reg. (EU) No 474/2014) • Amendment with revision of GADSL. (2013 Ver 1.0, 2014 Ver 1.0 to Ver 1.4 and 2015 Ver 1.0) • Amendment with revision of GADSL. (2013 Ver 1.0, 2014 Ver 1.0 to Ver 1.4 and 2015 Ver 1.0) • Our controlled substance target is also shifted to IEC62474 because JIG-101 was taken over to IEC 62474. And amendment with revision of IEC62474 (Ver. D4.00 to D7.00) • Amendment with revision of Monitoring Chemical Substances of CSCL. (2014/5/1) • TSCA is shifted to controlled substances target from prohibited substances target. <p>Table B. Threshold values</p> <ul style="list-style-type: none"> • The threshold of antimony (900ppm→835ppm). <p>Table C. Exemption from prohibited substances</p> <ul style="list-style-type: none"> • The expired exemption uses are deleted. (7(c)-Ⅲ、11(b)、16、39、40) <p>Appendix 1 : Overall revision referring to “ Guidelines for the management of chemical substances in products ” Version 3.0. of JAMP council.</p> <p>Appendix 3-6 : Revision of survey form</p> <p>Revised Appendix 7: 3. Analysis method</p> <ul style="list-style-type: none"> • The part of MDL is reconsidered.
7th	2016/5/9	<p>4. 1) Revision of prohibited substances</p> <p>Addition of two Chlorinated Flame Retardants (former 99 substance groups ⇒101 substance groups in this version)</p> <ul style="list-style-type: none"> • Revision of Regulations No. (former [01], [02], ... ⇒ [A01], [A02], ... in this version) • Addition of “D/P: [Substance by which the condition of the prohibition relates to our company]” to Scope of [A08] GADSL. (The expression was just made clear, and there is no change in the object scope.) • Addition of [A09] Customer Request substances to Regulations on prohibited substances. Cyanide and Polyvinyl chloride were transferred to [A09]. And addition of Chlorinated Flame Retardants (U.S. Vermont State. Act 85) to [A09]. <p>Table A. Prohibited substances</p> <ul style="list-style-type: none"> • Addition of $[Cl \geq 1]$ (based on GADSL) to “Polychloronaphthalene (PCN) (No.3)”. (PCN (Cl=1) are contained in our prohibited substances already, for adapt to GADSL.) • Addition of “esters” to “Pentachlorophenol and its salts (No.29)” and change of applicable laws for adapt to revision of CSCL. • Addition of “its derivatives” to “PFOA including its salts (No.85)” for adapt to REACH candidate. • Addition of Chlorinated Flame Retardants of U.S. Vermont State. Act 85, as Customer Request substances. No.100 Tris(2-chloro-1-methylethyl)phosphate (TCPP) No.101 Tris(1,3-dichloro-2-propyl)phosphate (TDCPP) <p>Table C. Exemption from prohibited substances</p> <ul style="list-style-type: none"> • Added the Dates of applicability. • Added the exemption No.41.

Version	Date	Revision detail
7th	2016/5/9	<p>4. 2) Revision of controlled substances</p> <ul style="list-style-type: none"> • Revision of Regulations No. (former [11], [12], ...⇒ [B01], [B02], ...in this version) • Addition of 13th and 14th released substances of EU REACH SVHC. • Addition with revision of EU CLP regulation (Reg. (EU) 2015/1221). • Addition of "D/P: [Substance by which the condition of the prohibition does not relate to our company] to Scope of [B04] GADSL. (The expression was just made clear, and there is no change in the object scope.) • Addition and deletion with revision of GADSL (2015 Ver 1.1–1.3, 2016 Ver 1.0– 1.1). • Addition with revision of IEC62474 (Ver. D8.00–D11.00). • Addition with revision of Law for the Promotion of Measures to Tackle Global Warming in April 2015. <p>Revised Appendix 7: 3. Analysis method</p> <ul style="list-style-type: none"> • Changed "MDL of resin, ink" of total Chromium and Mercury for adapt to Lead. • Added IEC 62321–7–1 : 2015 to Analysis method of Hexavalent Chromium. • Addition of sample type to Sample preparation of Hexavalent Chromium. • Changed MDL (Metal, Plating and Trivalent chromate coating) of Hexavalent Chromium to 0.1 μg/cm² for adapt to IEC 62321–7–1 : 2015. • Changed Analysis method of Specific Brominated flame retardants to IEC 62321–6 : 2015. • Changed Sample preparation of Antimony to IEC62321–5 : 2013.