

Ricoh Group's Green Procurement Standards

<Annex> Ricoh Criteria for Environmentally Sensitive Chemical Substances

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**Ricoh Company.,Ltd.
Ricoh Group**

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1. Purpose

The purpose of this criteria is to make suppliers well aware and thoroughly understood of the intention of Ricoh Group to obtain information of and control the status of chemical substances contained in a part or material constituting Ricoh Group brand products, and to ban or reduce the use of environmentally sensitive chemical substances, for the ultimate goal of reducing the impact of Ricoh products as a whole on the environment.

2. Scope of Application

2.1 Scope of application to products

- (1) The criteria apply to products with Ricoh Group brand*
Instruments and products designed, manufactured and sold by Ricoh Group.
- (2) Instruments and products whose design and manufacture are commissioned by Ricoh Group to the third party, and sold with Ricoh brand.
- (3) Instruments and products designed and manufactured by the third party and sold with Ricoh Group brand.

* Ricoh Group brand refers to the following brand.



2.2 Scope of application to parts and materials

- (1) A part or material constituting the main body, peripheral equipment, or optional parts, etc. of products
- (2) Packaging materials and packaging parts of instruments and products
- (3) Instruction books
- (4) Parts for service
- (5) Consumables for manufacturing such as grease, adhesives, double-faced adhesive tape, packaging tape, etc.
- (6) Supplies and packaging materials

3. Definition of Terms

3.1 Environmentally sensitive chemical substances

- (1) Chemical substances whose uses, purposes for use or content volumes are required by the law and regulations of Japan and overseas, or voluntary criteria such as environmental label, etc. to be regulated, or expected to be regulated in the future.
- (2) Chemical substances whose information on inclusion in products is required to be disclosed under laws and regulations or voluntary standards like eco-labeling at home and abroad
- (3) Chemical substances whose information on inclusion in products is possibly requested by customers at the time of bidding and the like
- (4) In addition to the above, chemical substances whose information on inclusion in products must be identified, because there is a likelihood that the restriction or information disclosure may be required with respect to the purpose of use or the content quantity of these substances in products in the near future.

3.2 Article

An object of specific shape, appearance, or design provided during manufacture which determines functions in final use at a level beyond that provided by its chemical composition.

In the case of equipment products, component parts and consumable supplies that are intentionally attached to the products or the packaging materials which remain with the final products fall under this category. Of those, however, the portion that is intentionally released is regarded as substances/ preparations, and therefore, not articles.

As regards supply products, paper, ink, ribbon, thermal paper and so forth fall under the category of articles. Of these, the portion that is intentionally released is regarded as substances/preparations, and therefore, not articles.

3.3 Substances/preparations

Chemical substance: a chemical element or compound that exists in nature or is obtained via a manufacturing process. A substance includes impurities introduced in manufacturing processes, and additives required for maintenance of stability. Solvents that can be separated without affecting the stability of the single chemical substance or without changing its composition are excluded from this definition.

Preparation: A mixture or solution intentionally comprising two or more individual chemical substances.

3.4 Substance whose inclusion is banned

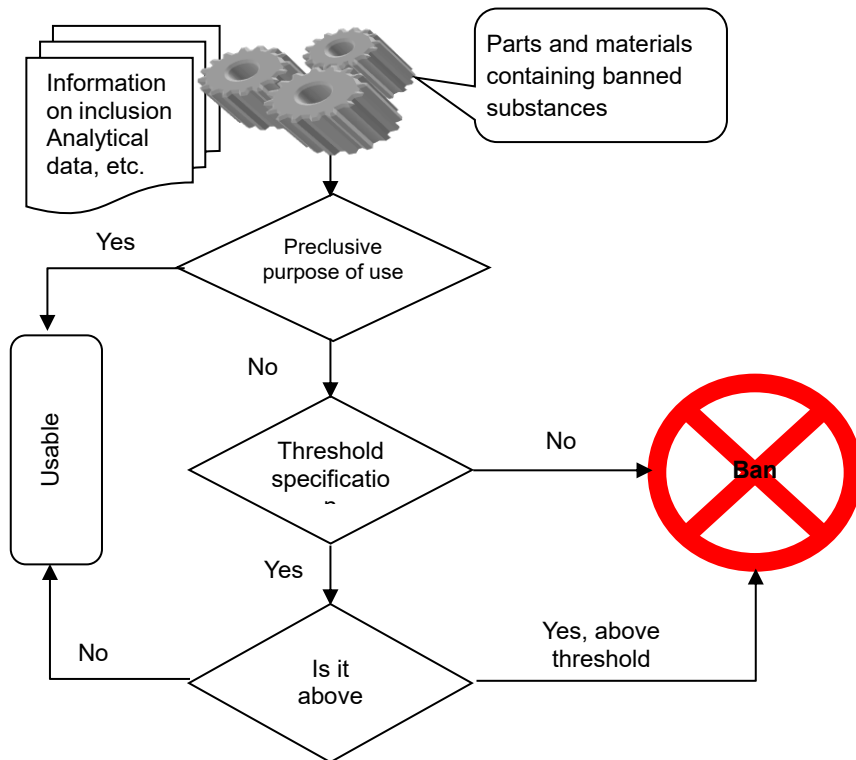
A substance whose inclusion in equipment products or articles constituting equipment products is banned. The following is the definition of "inclusion is banned".

- (1) Inclusion of substances in equipment products or articles that constitute equipment products in the amount above threshold is banned. However, as regards heavy metals in packaging materials (cadmium, hexavalent chromium, lead and mercury), intentional addition is also banned (See Table 4-1-3).

- (2) As regards substances without threshold, they are banned when information on inclusion can be obtained, for instance, when they are intentionally added, or information on inclusion can be obtained from upper stream in the supply chain, or inclusion can be identified by analysis as needed.
- (3) Use is permitted for a purpose exempt from application of this standard, and for the amount below the threshold.

[Figure 1] Flow chart on the definition of substances whose inclusion is banned (Excluding packaging materials)

"Parts and materials containing banned substances" are applicable when it is possible to identify the inclusion of banned substances by some methods, such as mentioned in the definition in the above.



3.5 Substances subject to controlled use

Substances whose information on inclusion in equipment products and articles constituting equipment products must be grasped and controlled.

3.6 Inclusion (existence)

Inclusion may be intentional by addition, or it may be unintentional. We regard that the relevant substance is included when the inclusion is identifiable by some method, for instance, by the fact that it is added intentionally during the in-house process, or by information from the upper stream in the supply chain, or analysis of part and materials when necessary.

3.7 Intentional addition

Refers to the fact that said substances are used for the purpose of improving the performance of a part or material, or changing its characteristics. In addition, when said substances are used in manufacturing process, etc. and so it is clear that they are contained in the final products, it is also regarded as intentional addition.

3.8 Unintentional inclusion

Refers to the case when said substances are contained in natural materials and cannot be removed technologically in the refining processes, also when they are mixed or bonded unintentionally in manufacturing processes. Refers to so-called impurities.

3.9 Inclusion threshold

Content of a substance included in a part and material, or the maximum latitude of content density.

In the case of complex part that has multiple substances (materials) inside, the content density is defined as density in Homogeneous Material* containing the subject substance, not as the value defining the whole part as a denominator.

3.10 Homogeneous Material

Refer to a material which cannot be mechanically separated into two or more different materials.

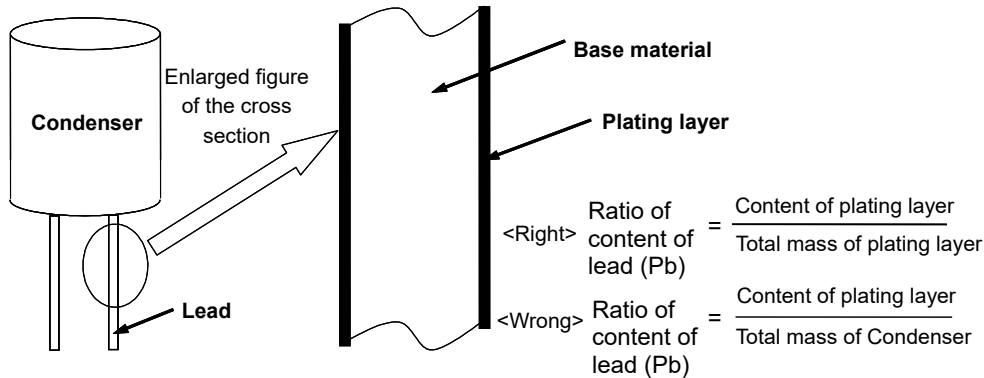
The following are some examples of homogeneous material.

- Metal alloy, polymer alloy, chemical compounds, etc.
- Paint, adhesive, ink, paste, plastic polymer, glass powder, ceramic powder, etc.

A part applied with paint, print or plating can be mechanically separated into material part and coating of paint, ink or plating. So, each of these is a homogeneous material. "Mechanical separation" means that a material is separated into pieces by mechanical actions such as removing screws, cutting, crushing, grinding, polishing and so forth.

[Figure 2] [Example of a condenser]

When the surface of lead is plated with solder containing lead, a material part and plated layer can be mechanically separated from each other, so each of them is a homogeneous material.



3.11 Control level

Contained chemical substances are classified into the following two levels based on laws and regulations, etc.

- (1) Banned: The use that is not allowed by laws and regulations.
- (2) Exempt: The use that is not limited by laws and regulations, and that substitute does not exist.

3.12 Schedule to discontinue delivery

- (1) Immediately: Delivery discontinuance becomes effective immediately
- (2) From __/ __/__: Delivery will be discontinued on the specified
- (3) Date under assessment: Currently, the delivery is not a subject to discontinue.

The delivery discontinuance will be scheduled accordingly when it is determined that the introduction of substitute is possible based on changes of social conditions or technological/economical situations.

4. Ricoh criteria for managing environmentally sensitive chemical substances

4.1 Substances whose inclusion is banned

Table 4-1-1 indicates substances whose inclusion is banned.

In case of intentional addition, use of any of these parts or materials is prohibited, regardless of whether the content is below the threshold limit.

Table 4-1-2 indicates the control level of substances whose inclusion is banned, examples of purpose of their use, the content thresholds and the period when delivery is prohibited.

◇Table 4-1-1 List of substances whose inclusion is banned

No.	Name of substance
1	Polychlorinated Biphenyls (PCBs)
2	Polychlorinated Terphenyls
3	Polychloronaphthalenes (Cl=>1)
4	Polybrominated Biphenyls (PBBs)
5	Polybrominated Diphenyl ethers (PBDEs)
6	Short Chain Chlorinated Paraffins
7	Asbestos
8	Ozone Depleting Substances
9	Cadmium and Cadmium Compounds
10	Hexavalent Chromium Compounds
11	Lead and Lead Compounds
12	Mercury and Mercury Compounds
13	Perfluorooctane sulfonates*1
14	Certain Azocolourants and Azodyes*2
15	Tri-substituted organostannic compounds*3
16	Dibutyltin (DBT) compounds
17	Dioctyltin (DOT) compounds
18	Dimethyl fumarate (DMF)
19	Polycyclic aromatic hydrocarbons (PAHs)*4
20	Perfluorooctanoic acid (PFOA) and any related substances*5
21	Hexabromocyclododecane (HBCDD) *6
22	Bis(2-ethylhexyl) phthalate (DEHP)
23	Benzyl butyl phthalate (BBP)
24	Dibutyl phthalate (DBP)
25	Diisobutyl phthalate (DIBP)
26	Polymers in which halogens are contained structurally and polymers to which halogenated compounds are added

*1 Those perfluorooctanesulfonic acid and its salts (PFOS) derived from the following molecular formula are controlled.
[Molecular formula] C₇F₁₇SO₂X (X = OH, Metal salt, halide, amide, and other derivatives including polymers).

*2 Certain Azocolourants and Azodyes that form certain amines. See Appendices Table 4 for the detailed list of certain amines.

*3 Includes bis tributyltin oxide (TBTO), tributyltins (TBTs) and triphenyltin (TPTs).

*4 See Table 5 for the list of applicable substances.

*5 See Table 6 for the list of applicable substances.

*6 See Table 7 for the list of applicable substances.

*7. "polymers in which halogens are contained structurally and polymers to which halogenated compounds are added" cover the scope of "halogen-containing polymers" described in both German Blue Angel and "Japanese Eco-mark".

◇ **Table 4-1-2 Ricoh criteria for substances whose inclusion is banned**

- (Note) 1. Since examples of purposes and uses do not cover all cases, please check with the publisher if you are not sure.
 2. When there is no indication of exempt in the control level, it means “there is no exempt purposes and uses.”
 3. See Appendices Table 2 for the details of each substance group. As for ozone depleting substances, see Appendices Table 3.

No.	Name of substance	Control level	Examples of purposes and uses	Content threshold	Period when delivery is prohibited
1	Polychlorinated Biphenyls (PCBs)	Banned	Insulating oil, Lubricant, Electric insulating medium, Solvent, Electrolyte	—	Immediately
		Exemption	When contained as by-product	50ppm	—
2	Polychlorinated Terphenyls	Banned	Insulating oil, Lubricant, Electric insulating medium, Solvent, Electrolyte	—	Immediately
3	Polychloronaphthalenes (Cl=>1)	Banned	Lubricant, Paint, Plastic stabilizer, Electric insulating medium, Flame retardant	—	Immediately
4	Polybrominated Biphenyls (PBBs)	Banned	Flame retardant	1000ppm	Immediately
5	Polybrominated Diphenyl ethers (PBDEs)	Banned	Flame retardant	1000ppm	Immediately
6	Short Chain Chlorinated Paraffins	Banned	PVC plasticizer, Flame retardant	1000ppm	Immediately
7	Asbestos	Banned	Brake lining pad, Insulator, Filler, Rubbing agent, Electric insulating medium, Filler, Pigment/Paint, Talc, Heat insulator	—	Immediately
8	Ozone Depleting Substances[*1]	Banned	Coolant, Foaming agent, Digestive, Detergent	—	Immediately
		Exemption	When contained as by-product	—	—
9	Cadmium and its compounds	Banned	<ul style="list-style-type: none"> • Packaging materials 	Table 4-1-3	Immediately
			<ul style="list-style-type: none"> • Portable battery, Battery 	20ppm	
			<ul style="list-style-type: none"> • Paint, ink • Additives such as pigment, dye, stabilizer in resin (including gum) materials (excluding impurities) • Material or a part treated with cadmium electroplating or cadmium coating. • Parts Electroless plated with nickel using luster, containing cadmium • Pigment and dye in glass and paint for glass • Silver brazing filler metals containing cadmium • Material and parts such as zinc, zinc alloy, and zinc compound, etc. (free-cutting brass rods, rubber belt, etc.) • Electric point of contact of DC motor, switch, relay, breaker and the like • Fuse element of temperature fuse • Fluorescent tubes (small-size fluorescent tubes, straight fluorescent tubes) • Nickel/cadmium battery • Fluorescent material contained in fluorescent indicator 	100ppm	Immediately
10	Hexavalent chromium and its compounds	Banned	<ul style="list-style-type: none"> • Products that come into contact with skin, including leather products and leather parts 	3ppm (In total dry weight of leather)	Immediately
			<ul style="list-style-type: none"> • Packaging materials 	Table 4-1-3	
			<ul style="list-style-type: none"> • Paint, ink • Materials and parts galvanized and treated with chromate (sheet metal, screw, shafts, bearings, etc. used for general machinery components, purchased electronic components, electric power devices, etc.) • Materials and parts such as aluminum, copper alloys and zinc alloys chemically synthesized with chromate (treatment before painting) 	1000ppm	

*1. Ozone depleting substances are banned from use in manufacturing process as well. (See Section 4.4)

No.	Name of substance	Control level	Examples of purposes and uses	Content threshold	Period when delivery is prohibited
11	Lead and lead compounds	Banned	<ul style="list-style-type: none"> • Packaging materials • Lead in polyvinyl chloride electric wire coating • Paint, ink • Additives such as pigment, dye, stabilizer in resin (including gum) materials • Material and parts plated with lead alloy (e.g. piano wire plated with tin) • Parts containing lead as lubricant (e.g. Dry bearing) • Optical glass, filter glass • Various alloys containing lead(However, exempt alloys are excluded.) • Solder materials (solders with Pb = 85% or less) • Soldered parts and units (Printed Circuit Board, electric power device, motor, clutch, sensor, etc) • Lead in server and storage (HDD) • FFC connector contact part 	Table 4-1-3 300ppm [*2]	Immediately
		Exempt	<ul style="list-style-type: none"> • Glass fluorescent tube with lead content of no more than 0.2wt% • 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 • Lead as an alloying element in aluminium containing up to 0,4 % lead by weight, provided it stems from lead-bearing aluminium scrap recycling • Lead as an alloying element in aluminium for machining purposes with a lead content up to 0,4 % by weight • Lead contained in copper alloy (no more than 4.0wt%) • Lead contained in high melting point solder (Lead alloy with 85wt% or more of lead content) • Electric and electronic parts containing lead in glass or ceramic exempt dielectric ceramic in condenser (example: piezo element), or electric and electronic parts containing lead in glass or ceramic base compound • Lead in dielectric ceramic in condenser with rated voltage of AC125v or DC 250 or more. • Lead in dielectric ceramic in condenser with rated voltage of AC125 or less than DC250V. However , limited to the spare parts for electrical and electronic products placed on the market prior to January 1, 2013 • Lead contained in white glass used for optical purposes • Lead contained in solder composed of more than two kinds of elements, and is used for joining pin and package of microprocessor, of which lead content is more than 80wt% and less than 85wt%. However, spare parts of products put on market before Jan. 1, 2011 only are applicable • 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. 	—	—

*2. According to the Proposition65 of the State of California, USA

No.	Name of substance	Control level	Examples of purposes and uses	Content threshold	Period when delivery is prohibited	
12	Mercury and mercury compounds	Banned	• Packaging materials	Table 4-1-3	Immediately	
			• Batteries or accumulators	5ppm [*3]		
			• Dispensation into pigment, paint, ink and resin • Relay, switch and sensor with mercury as contact point	1000ppm		
		Exempt	Mercury in straight tube fluorescent lamp with double caps for generic illumination	Standard lifetime lamp using three band fluorescent light with lamp radius of less than 9mm (Example: T2)	4mg	—
				Standard lifetime lamp using three band fluorescent light with lamp radius of at least 9mm and no more than 17mm (Example: T5)	3mg	
				Standard lifetime lamp using three band fluorescent light with lamp radius of over 17mm and no more than 28mm (Example: T8)	3.5mg	
				Standard lifetime lamp using three band fluorescent light with radius of over 28mm (Example: T12)	3.5mg	
				Long lifetime (25000 hours) lamp using three band fluorescent light	5mg	
			Cold cathode fluorescent lamp for special uses and external electrode fluorescent lamp (mercury included in CCFL and EEFL)	Short lamp (500mm or less) (500mm以下)	3.5mg	
				Medium length lamp (over 500mm and no more than 1500)	5mg	
Long lamp (over 1500mm)	13mg					
• High-pressure mercury lamp used as light source of projector	—	—				

*3. Mercury content threshold in battery is calculated by the proportion of the mass of mercury in the total mass of battery cell (i. e., concentration per one battery cell), in the same way as the definition in the EU Battery Directive.

No.	Name of substance	Control level	Examples of purposes and uses	Content threshold	Period when delivery is prohibited
13	Perfluorooctanesulfonic acid and its salts (PFOS)	Banned	<ul style="list-style-type: none"> Surface treatment, plating, fabric Other than preparations, surface treatment, plating, and fabric 	1µg/m ² or 1000 ppm	Immediately
		Exempt	<ul style="list-style-type: none"> Photoresists or anti reflective coatings for photolithography processes Photographic coatings applied to films, papers, or printing plates. "Mist suppressants for non-decorative hard chromium (VI) plating and wetting agents for use in controlled electroplating systems" where the amount of PFOS released into the environment is minimized, by fully applying relevant best available techniques. 	—	
14	Certain Azocolourants and Azodyes that form certain amines	Banned	<ul style="list-style-type: none"> Fabric and leather parts/products that can come into direct contact with human skin (or mouth orifice) for extended period of time. [*4] 	30ppm	Immediately
		Exempt	<ul style="list-style-type: none"> Purpose of use other than the above 	—	
15	Trisubstituted organotin compound	Banned	<ul style="list-style-type: none"> Antiseptic, antimold, paint, colorant, antifoulant paint, cooling medium, bloating agent, extinguishing agent, cleaning agent, stabilization agent, antioxidizing agent/age inhibitor, antibacterial and antifungal agents, antifoulant 	1000ppm [*5]	Immediately
16	Dibutyltin compounds	Banned	<ul style="list-style-type: none"> Stabilizers for vinyl chloride resin, lubricants and catalyst 	1000ppm [*5]	Immediately
17	Dioctyltin compounds	Banned	<ul style="list-style-type: none"> RTV-2 moulding kits) Two uses of articles made of fabric with an intention to come into contact with skin 	1000ppm [*5]	Immediately
		Exempt	<ul style="list-style-type: none"> Use other than the above two uses 	—	
18	Dimethylfumarate (dimethyl fumarate (DMF))	Banned	<ul style="list-style-type: none"> Antiseptic of leather products Desiccant (silica gel pack) 	0.1ppm	Immediately
19	Polycyclic aromatic hydrocarbons (PAHs)	Banned	<ul style="list-style-type: none"> Rubber or plastic components that come in direct contact with human skin or in the mouth for extended period or short period repeatedly 	1ppm	Immediately
		Exempt	<ul style="list-style-type: none"> Applications other than the above 	—	
20	Perfluorooctanoic acid (PFOA) and any related substances 1: eight substances regulated by Norwegian law [*7]	Banned	<ul style="list-style-type: none"> Textile and coated materials 	1µg/m ²	Immediately
			<ul style="list-style-type: none"> Articles (other than the above) 	1000ppm	
	Perfluorooctanoic acid (PFOA) and any related substances 2: Substance regulated by EU REACH regulation [*7]	Banned	<ul style="list-style-type: none"> Article (except for the following) 	PFOA and its salts : 25ppb One or a combination of related substances : 1000ppb [*8]	Since 1st January, 2020
		Exempt [*9]	<ul style="list-style-type: none"> Molded products with photographic coating for film or paper or printing plate Semiconductors and compound semiconductors manufactured by use in photolithographic processes for semiconductors or etching processes for compound semiconductors. 	—	—
21	Hexabromocyclododecane (HBCDD)	Banned	<ul style="list-style-type: none"> Flame retardant 	—	Immediately

22	Bis(2-ethylhexyl) phthalate (DEHP)	Banned	• Plasticizers, etc.	1000ppm [*10]	Immediately
23	Benzyl butyl phthalate (BBP)	Banned	• Plasticizers, etc.	1000ppm [*10]	Immediately
24	Dibutyl phthalate (DBP)	Banned	• Plasticizers, etc.	1000ppm [*10]	Immediately
25	Diisobutyl phthalate (DIBP)	Banned	• Plasticizers, etc.	1000ppm [*10]	Immediately
26	Polymers in which halogens are contained structurally and polymers to which halogenated compounds are added[*7]	Banned	• plastic parts for packaging	—	Immediately
		Exempt	• Packaging plastic parts for individual products that are known not to be used for office equipment-related products such as copiers and printers • Plastic parts used for purposes except for packaging	—	—

*4. Only those instructed in drawings or specifications are applicable

*5. Concentration of tin mass after conversion into metal

*6. The suppliers of the relevant parts shall be contacted by Ricoh group individually.

*7. Refer to Appendix 6 for details of target substances

*8. The threshold value in the molded product is used.

*9. Eight substances regulated by Norwegian law must meet Norwegian law standards even if they are excluded.

*10 For products that are not subject to the EU RoHS directive (packaging materials, promotional items, etc.), the threshold value is the sum of DEHP, BBP, DBP, and DIBP in the plasticized material.

◇ **Table 4-1-3 Ricoh criteria for packaging materials**

Banned Substances	Control Level	Subject	Threshold	Schedule to discontinue delivery
Cadmium, hexavalent chromium, lead, mercury	Banned	• Intentional addition • Packing materials and parts for packing (corrugated cardboard, Styrofoam, plastic bag, adhesive tape, desiccating agent, wire band, staple, etc.)	— 100ppm in total [*]	Immediately
	Exempt	• Packaging materials and material handling used at the time of delivery of parts or materials to Ricoh Group	—	
Bis (2-ethylhexyl) phthalate (DEHP) Butyl benzyl phthalate (BBP) Dibutyl phthalate (DBP) Diisobutyl phthalate (DIBP)	Banned	• Plasticized packaging material or its material	Total [*2] 1000ppm	Since 1st January, 2020
Polymers in which halogens are contained structurally and polymers to which halogenated compounds are added	Banned	• plastic parts for packaging	—	Immediately
	Exempt	• Purpose of use other than the above	—	—

* Total concentration of cadmium, hexavalent chromium, lead and mercury in packaging materials must not be more than 100ppm.

◇Table 4-1-4 Ozone depleting substances banned from inclusion

The following is a classification list of ozone depleting substances banned from inclusion in products.

Please see Appendices Table 3 for the details.

No.	Name of substance	Group in Montreal Protocol
1	Chlorofluorocarbons (CFC)	Annex A Group I
2	Halons	Annex A Group II
3	Other chlorofluorocarbons (CFC)	Annex B Group I
4	Carbon tetrachloride	Annex B Group II
5	1,1,1-Trichloroethane (Methyl chloroform)	Annex B Group III
6	HBFC	Annex C Group II
7	Bromochloromethane	Annex C Group III
8	Methyl bromide	Annex E Group I
9	Hydrochlorofluorocarbons (HCFC)	Annex C Group I

◇Regarding exemption of application to supply parts

Legally some substances which the specified regulation prohibits to contain in products may be exempted from application to supply parts (service parts, maintenance parts, etc.) for products sold already on specified conditions. Accordingly there are some cases Ricoh accept to contain the above prohibited substances in parts. However, these cases are limited to the parts which Ricoh Group specify (the parts which meet the specified condition).

4.2 Substances whose inclusion is subject to management

Substances whose inclusion is subject to management are indicated in **the list of substances subject to management of chemSHERPA [*1]** (hereinafter, referred to as List of substances whose inclusion is subject to management). The information on contained chemical substances are collected and managed by chemSHRPA-AI [*2] in the case of articles, and by chemSHRPA-CI[*2]/SDS for substances/preparations.

4.2.1 Scope of application of products whose information on contained chemical substances is to be collected

- (1) Applicable products are Ricoh Brand equipment products including supplies, and packaging materials of these products which will be transferred to the customers (end users, business partners) eventually.
- (2) Also applicable to containers/packaging materials (for materials, parts and products) for transportation, loading platform (such as pallet), and equipment/jigs to be imported to the EU
Ricoh Group will indicate specific target products when it makes a request for the collection of information on inclusion of substances.

For the details concerning how to answer to the request for collection of information on contained chemical substances, see Annex: **Operation Manual of Collection System of Information on Chemical Substances Contained in Products(Pro ChemistAS) [*3]** (hereinafter referred to as Chemical Substances Information Collection System Operation Manual)

- *1. The List of Inclusion Managed Substances is a list that is published by JAMP (Joint Article Management Promotion-consortium). See the URL at the end of the article.
- *2. Data recording sheet for disclosure and transmission of information of chemical substances contained in articles and substances/preparations, provided by JAMP (Joint Article Management Promotion-consortium).
- *3. "Chemical substance information collection system operation manual It is published on "Notification Information" for the suppliers who are ProChemist/AS users.

4.3 Substances banned from use in manufacturing process

The following substances are prohibited from use in the manufacturing process. We ask for thorough elimination (nonuse) activities.

◇Table 4-3 List of Prohibited substances in manufacturing process

No.	Name of substance	CAS No.
1	Trichloroethylene	79-01-6
2	Tetrachloroethylene	127-18-4
3	Dichloromethane	75-09-2
4	Carbon tetrachloride	56-23-5
5	1,2- dichloroethane	107-06-2
6	1,1- dichloroethylene	75-35-4
7	cis-1, 2-Dichloroethylene	156-59-2
8	1,1,1- trichloroethane	71-55-6
9	1,1,2- trichloroethane	79-00-5
10	1,3-dichloropropane	542-75-6
11	Benzene※ including benzene-containing products	71-43-2
12	Ozone-depletingsubstances (see Appendix 3)	-

Revision History

Revised date	Edition	Content of the revision
December 2006	First Edition	<p><Annex> Newly established as “Environmentally sensitive substances: Imaging system equipment products Volume”</p> <p>* Content of the revision of Green Procurement Standards Fourth Edition</p> <ol style="list-style-type: none"> 1) Changed the scope of application from Ricoh Group brand products as a whole to the imaging system equipment products with Ricoh Group 2) Banned substances were reduced from 16 substance groups to 14 substance groups <ol style="list-style-type: none"> 1. Polyvinyl chloride (PVC) → Transferred to substances subject to regulated use (the new classification) 2. Transferred medium chain and long chain chlorinated paraffines (CPs) to substances subject to regulated use. (Note) Short chain chlorinated paraffines (CPs) shall remain as a banned substance. 3. Transferred HFCs, PFCs and SF₆ to substances subject to controlled use. 3) Newly established a classification of “substances subject to regulated use”. 4) Reviewed the purposes for use and threshold of cadmium <ul style="list-style-type: none"> • As for the threshold of content by unintentional addition, 75ppm shall apply as far as the substance is used for surface treatment, coloring and stabilizing agent of plastic. For other uses, the threshold of 100ppm shall apply. 5) With respect to lead in electroless nickel-plating, Intentional addition of hexavalent chromium (threshold of 100ppm) is exempted from the application. 6) Substances subject to controlled use were reduced from 50 substance groups to 27 substance groups. In addition, control level is limited to intentional addition only. They were also classified into substances listed as “A” (10 substance groups), of which content volumes must be grasped, and substances listed as “B” (17 substance groups), of which content volumes need not be grasped. 7) “Fireproof ceramic fiber subject to EU WEEE Directive” is newly added as a substance subject to controlled use. 8) Others <ol style="list-style-type: none"> 1. Review of purposes for use and examples of use of banned substances Reflection of EU RoHS Directive exempt uses, etc. 2. An item of “homogeneous material” is added in the definition of terms. 3. Detailed list of chemical substances groups is added (Example of substances, CAS NO.)
April 2008	The 2nd edition	<ol style="list-style-type: none"> 1) Added Infotec to Ricoh Group’s brand names 2) Changed descriptions of Banned Substances 3) Added PFOS to Banned Substances 4) Deleted threshold limit value for PCB and PCT content. 5) Changed threshold limit value for a cadmium content from 75 ppm to 100 ppm. 6) Changed wording of exempt use of lead (lead contained in alloys) 7) Removed “button battery” from exempt use of mercury. 8) Reclassified medium and long chain chlorinated paraffins from Controlled Use Substances to Controlled Use Substances B. 9) Reclassified some azo dyes and pigments that form certain amines from Controlled Use Substances A to Controlled Use Substances. 10) Changed descriptions of the method of analysis of Banned Substances and added the method of analysis of PFOS. 11) Changed Appendices Table 2: Detailed List of Environmentally Sensitive Chemical Substances 12) Changed telephone number of contacts.
March 2009	The 3rd edition	<ol style="list-style-type: none"> 1. Background of the revision Revision was performed to comply with EU REACH regulations, and in accordance with the revision of substances whose inclusion is banned by Ricoh Groups 2. Main details of the revision <ol style="list-style-type: none"> 2.1 Title and related items <ol style="list-style-type: none"> (1) Deleted the phrase, “For Imaging system equipment products” from the title of this volume and revised the title of this volume to Ricoh Criteria for Environmentally Sensitive Chemical Substances. In addition, deleted the word, “imaging system” from the entire text. (2) Replaced the terms, “banned substances, substances subject to regulated use, and substances subject to regulated use”, by the terms, “substances whose inclusion is banned, substances whose inclusion is regulated (restricted), and substances subject to controlled use,” respectively in the entire text. 2.2 Section 2.1 Scope of application to products <ol style="list-style-type: none"> (1) Added RICOH IBM brand logos in (3) in this section. 2.3 Section 2.2 Scope of application to parts and materials <ol style="list-style-type: none"> (1) Deleted the Note in (2) in this section, “Excluding packaging materials and material handlings used for delivery,” because they are within the scope of application with respect to substances whose inclusion is banned. (2) Regarding (6) in this section, deleted the specific items in the product group, and the Note, “as provided in separate regulations”, for the same reason as mentioned in the

		<p>above section.</p> <p>2.4 Section 3 Definition of terms</p> <p>(1) Added definitions of Section 3.2 and 3.3 and revised the definitions from Section 3.4 to 3.7.</p> <p>(2) Added [Figure 1] in Section 3.4 and clarified the interpretation of the definition of substances whose inclusion is banned.</p> <p>(3) Replaced the term “parts/materials” from Section 3.4 to 3.6 by the term “articles”.</p> <p>2.5 Section 4.1 Substances whose inclusion is banned</p> <p>(1) Transferred the substance listed as No.16 in the “List of substances whose inclusion is restricted (Table 4-2-1) to Table 4-1-1: List of substances whose inclusion is banned, and Table 4-1-2: Ricoh criteria for substances whose inclusion is banned, respectively (revised from restricted substance to banned substance)</p> <p>2.6 Section 4.3 Substances whose inclusion is subject to management</p> <p>(1) In accordance with the expansion of substances whose inclusion is subject to management, added the description on new establishment/disclosure of the list of chemical substances whose inclusion is subject to management, and the collection of information on contained chemical substances.</p> <p>(2) Added the scope of application of products whose information is to be collected in Section 4.3.1 and left the statement in Section 4.3.2. that the current survey on environmental impact information would be conducted.</p> <p>(3) Added a statement on the new establishment/issuance of Operation Manual of chemical substances information collection system, and AIS Preparation Guidance.</p> <p>(4) Revised the structure of Appendices Tables 1 to 4, to make them conform to the management levels of above-mentioned substances whose inclusion is banned, subject to restriction, and subject to management, respectively.</p>
March 2010	Version 4.0	<p>1. Background of revision</p> <p>In accordance with added substances in REACH Annex XVII Restriction and SVHC, the revision was implemented to add Ricoh Group’s banned substances and substances subject to management.</p> <p>2. Main content of revision</p> <p>2.1 Section 2. Scope of Application</p> <p>(1) The brand logo of “IKON” was added to the Ricoh Group brand.</p> <p>2.2 Section 3. Definition of Terms</p> <p>(1) In the definition of Article in Section 3.2, the wording “that are intentionally attached to the products or the packaging materials” was added with respect to consumable supplies which remains with the final products.</p> <p>(2) In Section 3.4, a qualifying statement was added to ban intentional addition of heavy metals to packaging materials as well. The Model Toxics in Packaging Legislation (GONEG) prohibits intentional addition of these heavy metals and requires that their total mass not exceed the defined value. In compliance with this requirement, this standard banned intentional addition up to the Version 2.0. However, in the revised Version 3.0 in which “intentional addition was abolished,” this measure was omitted. Thus, in this version, the ban on intentional addition was revived as regards packaging materials. Similarly, a note was added in the management standards of packaging materials, stating “the total concentration in each packaging material must not be more than the threshold.”</p> <p>2.3 Section 4. Ricoh criteria for managing environmentally sensitive chemical substances</p> <p>(1) In accordance with revised REACH Annex XVII Restriction, 3 additional substances (No. 15-17) were included in Table 4-1-1. Because TBTO, TBTs and TPTs (former Version 7 and 8) are types of Tri-substituted organostannic compounds in No. 15, they were included as such.</p> <p>(2) The coverage of JIG list in the same table was deleted because we decided to eliminate this list as a consideration item. Similarly, it was deleted from Tables 4-2-1, 4-3-1 and 4-3-2.</p> <p>(3) No.8 (Ozone depleting substances) in Table 4-1-2 may be contained as traces of byproduct in polycarbonate resin and polycarbonate compound resin manufactured by interfacial polycondensation. Because complete elimination of the byproduct is impossible by current industrial technology, and also because the level of content does not have any personal or environmental impact, it was added as exempt.</p> <p>(4) The banned purposes and uses of No. 11 (Lead and lead compounds) and No. 13 (PFOS) were updated based on the Ricoh Standards.</p> <p>(5) The wording, “EU RoHS directive exempt uses and purposes”, was deleted completely, because they are not necessarily in conformity with exempt uses and purposes of Ricoh.</p> <p>(6) The exempt uses and purposes specified by Ricoh in No. 11 (Lead and lead compounds) were deleted.</p> <p>(7) The same table, control level and exempt uses and purposes for substances from No. 15 to 17, which were newly added in this revision, were clearly stated.</p> <p>(8) Table 4-1-4 was newly added, which is Ozone depleting substances banned from inclusion in products, transferred from the text of Green Procurement Standards.</p>

		<p>(9) By adding Section 4.4, the ozone depleting substances and the list of chloric organic solvent banned from use in manufacturing process were transferred (added) here from the text of Green Procurement Standards.</p> <p>2.4 Appendices Table</p> <p>(1) 3 additional substances were entered in the Appendices Table 1, and the laws and regulations were updated to the latest version.</p> <p>(2) In the same table, "(2) Industrial standard" was changed from JIG to JAMP, and the column "(3) Environmental label, etc." was deleted, because it is not established as a consideration item.</p> <p>(3) Exemplary substances of additional 3 substances (No. 15-17) were included in Appendices Table 2.</p>
March 2011	5th Edition	<p>1. Background of revision In response to the revision of EU RoHS Directive, we newly added substances banned from inclusion and reviewed exempt uses.</p> <p>2. Main content of revision</p> <p>(1) Updated Ricoh Group Brand in the applicable range of products in section 2.1 to the latest one.</p> <p>(2) Added DMF (No.18) to substances banned from inclusion in Table 4-1-1. Also added DMF to the following Table 4-1-2 and the separate Tables 1 and 2, and clarified threshold and banned period of delivery, etc.</p> <p>(3) Deleted No. 9 exempt purposes of use of Cadmium in Table 4-1-2 (There is no exempt use).</p> <p>(4) Reflected the revision details of EU RoHS in the exempt use of No. 11: lead and No.12: mercury (Please see the said section for the details).</p> <p>(5) Added high-pressure mercury lamp as the light source of projector as an independent exempt use of Ricoh Group.</p> <p>(6) Added "④ In case of use to meet the requirement of safety standard of Ricoh Group" to exempt use in Table 4-2-2 regarding substance of which inclusion is included in Section 4.2.</p> <p>(7) Clearly mentioned that "Rico Group List of substances subject to management that are contained in Articles" in Section 4.3 was the list of substances subject to management of JAMP, and indicated its URL at the end of this article.</p> <p>(8) Updated the name of contact department for inquiries, and the name of organization responsible for the publishing, which is written in the back.</p>
September 2011	5.1th Edition	<p>1. Background of revision Based on Ricoh Groups' Policy, revise start date of substances banned (exempt period) to 3months ahead of RoHS Directive date</p> <p>2. Main revision</p> <p>(1) No.11 lead exempt period (Lead in dielectric ceramic in condenser with rated voltage of AC 125v or DC 250 less) in table 4-1-2, revise end date to 2012/09/30</p> <p>(2) Revise effective period of No.12 lead exempt rules in the same table to 3months ahead of each schedule</p>
December 2012	6th Edition	<p>1. Background of revision Formally finish Environmental Impact Information Survey (43substances survey) which had been conducted so far, unifying AIS provided by JAMP (Japan article management Promotion-consortium) with MSDS plus survey, conducting revision of green procurement standards.</p> <p>2. Main revision</p> <p>(1) Deleted description of 4.3.2. Environmental Impact Information Survey, contained chemical substances list of 4-3-1~4-3-4, example of purpose and use.</p> <p>(2) Deleted Annex 1 of [Substances A] and [Substances B]</p> <p>(3) Correcting description misses of 5.1version Use case of Mercury and Mercury Compounds [Standard lifetime lamp using three band fluorescent light with radius of over 28mm (Example: T12)], its effective period was revised to one year after.</p>
May 2012	7th Edition	<p>1. Background of revision Until now, PVC contained in products is restricted to use since we concerned environmental impact after product disposal and hazardous property of additives. At this time, we have reviewed a scope of PVC restricted use by confirming public movement and concern surrounding PVC. Also, we have changed the management criteria as METI issued "About manufacturing and importation of organic pigments containing residual PCB (Poly Chlorinated Biphenyls)".</p> <p>2. Main Revision</p> <p>(1) The definition of inclusion restricted substances is deleted.</p> <p>(2) Exempted uses for PCB are set.</p> <p>(3) Threshold value (2000ppm) for button battery is added.</p> <p>(4) Expired threshold value for "mercury and its compounds" is deleted.</p> <p>(5) Description of 4.2 inclusion restricted substances and management criteria of inclusion restricted substances from Table4-2-1 to Table4-2-2 are deleted.</p>

April 2015	8th Edition	<p>1. Background of revision The establishment and revision of laws and regulations related to chemical substances contained in products have been reflected.</p> <p>2. Main Revision (1) Added polycyclic aromatic hydrocarbons (PAHs) to the banned substances. (2) Added the criteria of "leather products" to the prohibited use of hexavalent chromium and its compounds. (3) Added the period for the ban on delivery of "button battery" as exemption of mercury and its compounds. (4) Deleted the exempt application of dibutyltin compounds, whose period had elapsed.</p>
April 2016	9th Edition	<p>1. Background of revision The establishment and revision of laws and regulations related to chemical substances contained in products have been reflected. Also, we reviewed the need of reference information related to analytical methods.</p> <p>2. Main Revision (1) Added the following substances to the list of substances of which inclusion is banned. · Perfluorooctanoic acid (PFOA) and individual salts and esters of PFOA · Hexabromocyclododecane (HBCDD) · Benzenamine, N-phenyl-, reaction products with styrene and 2,4,4-trimethylpentene (BNST) · Bis(2-ethylhexyl) phthalate (DEHP) · Benzyl butyl phthalate (BBP) · Dibutyl phthalate (DBP) · Diisobutyl phthalate (DIBP) (2) Deleted "[Reference] Regarding methods for analyzing substances whose inclusion is banned". (Reason: More professional and detailed information is disclosed on web sites, etc.)</p>
January 2017	10th Edition	<p>1. Background of revision The establishment and revision of laws and regulations related to chemical substances contained in products have been reflected.</p> <p>2. Main Revision (1) Changed the value of Polychloronaphthalenes from (Cl=>3) to (Cl=>1). (2) Updated the name of contact department for inquiries. (3) Replaced the term "policy" by "standards" in order to avoid misunderstanding and maintain the consistency (Front page)</p>
September, 2018	11th Edition	<p>1. Background Relevant parts were revised in accordance with switching of controlled chemical substance information transmission tool (AIS → chemSHERPA). Furthermore, it reflects the revised information of laws and regulations.</p> <p>2. Main points of revision (1) Changed the name from AIS to chemSHERPA (2) Deleted N-Phenyl-benzenamine reaction products with styrene and 2,4,4-trimethylpentene (BNST)</p>
April 2019	12 th edition	<p>1. Background of revision The establishment and revision of laws and regulations related to chemical substances contained in products have been reflected.</p> <p>2. Main points of revision (1) Changed a part of exempted use for No. 11 (Lead and lead compounds) (2) Added the following substances to the list of substances of which inclusion is banned. "Polymers in which halogens are contained structurally and polymers to which halogenated compounds are added"</p>
October 2019	13th Edition	<p>1. Revision history Reflected the revision of laws and regulations related to chemical substances in products.</p> <p>2. Main revisions (1) Excluded application of lead and its compounds Applicable conditions for "lead contained in solder necessary for reliable electrical connection between internal semiconductor die and carrier of integrated circuit package (flip chip)" were added. (2) The name of "perfluorooctanoic acid (PFOA) and its salts and esters" has been changed to "perfluorooctanoic acid (PFOA) -related substances", and management standards and substances such as usage and application examples, content thresholds, etc. The detail list was changed. (3) Added management standards for products that are not subject to EU RoHS directives for "bis (2-ethylhexyl) phthalate (DEHP), butyl benzyl phthalate (BBP), dibutyl phthalate (DBP), diisobutyl phthalate (DIBP)" The management standard of wood was changed.</p>

*This standard is subject to review annually based on legal trend, our company direction, etc.
When a revision is made as a result of reviews, it will be posted in the bulletin board of Green Procurement DB of RaVenderNET website, and the latest edition will be published in Green Procurement DB and Ricoh official website (Ricoch Environmental Management website).

《URL Address》

*RaVenderNET : <https://hcs.ricoh.co.jp/fw/dfw/nit01/rvn/ravendernet.nsf>

*RICOH homepage

Japanese HP : <https://jp.ricoh.com/environment/guideline/01.html>

English HP : <https://www.ricoh.com/sustainability/environment/guideline/03.html>

*JAMP URL : <http://www.jamp-info.com/list>

Appendices Table 1: Major laws and regulations / voluntary criteria concerning environmentally sensitive chemical substances

◇Substances whose inclusion is banned

No.	Substances	Legal regulation	Industry standard
1	Polychlorinated Biphenyls (PCBs)	EU REACH (Annex 17 Restriction)	JAMP(*)
2	Polychlorinated Terphenyls (PCTs)	EU REACH (Annex 17 Restriction)	JAMP
3	Polychloronaphthalenes (Cl=>1)	EU POPs regulation Annex I Chemical Substances Control Law	JAMP
4	Polybrominated Biphenyls (PBBs)	EU RoHS directive EU REACH (Annex 17 Restriction)	JAMP
5	Polybrominated Diphenyl ethers (PBDEs)	EU RoHS directive EU REACH (Annex 17 Restriction)	JAMP
6	Short chain Chlorinated Paraffins	EU POPs regulation Annex I	JAMP
7	Asbestos	EU REACH (Annex 17 Restriction)	JAMP
8	Ozone Depleting Substances	EU REACH (Annex 17 Restriction) US: ODS labeling restriction (Section 611 on the Clean Air Act Amendments of 1990) Montreal Protocol	JAMP
9	Cadmium and Cadmium Compounds	Japan: Law on Promoting Green Purchasing EU RoHS directive EU REACH (Annex 17 Restriction) EU2006/66/EC (Battery directive) EU 94/62/EEC (Packaging directive) US: The Model Toxics in Packaging Legislation	JAMP
10	Hexavalent Chromium Compounds	EU RoHS directive EU 94/62/EEC (Packaging directive) US: The Model Toxics in Packaging Legislation	JAMP
11	Lead and Lead Compounds	Japan: Law on Promoting Green Purchasing EU RoHS directive EU REACH (Annex 17 Restriction) EU 2006/66/EC (Battery directive) EU 94/62/EEC (Packaging directive) US: The Model Toxics in Packaging Legislation	JAMP
12	Mercury and Mercury Compounds	Japan: Law on Promoting Green Purchasing EU RoHS directive EU REACH (Annex 17 Restriction) EU 2006/66/EC (Battery directive) EU 94/62/EEC (Packaging directive) US: The Model Toxics in Packaging Legislation	JAMP
13	Perfluorooctane sulfonates and its salts (PFOS)	EU POPs regulation Annex I	JAMP
14	Certain azocolourants and azodyes that form certain amines by decomposition	EU REACH (Annex 17 Restriction)	JAMP
15	Trisubstituted organotin compound	EU REACH (Annex 17 Restriction)	JAMP
16	Dibutyltin compounds	EU REACH (Annex 17 Restriction)	JAMP
17	Diocetyl tin compounds	EU REACH (Annex 17 Restriction)	JAMP
18	Dimethylfumarate (dimethyl fumarate (DMF))	EU REACH (Annex 17 restrictions)	JAMP
19	Polycyclic aromatic hydrocarbons (PAHs)	EU REACH (Annex 17 Restriction)	JAMP
20	Perfluorooctanoic acid (PFOA) and any related substances	Norwegian Act EU REACH (Annex 17 Restriction)	JAMP
21	Hexabromocyclododecane (HBCDD)	EU POPs regulation Annex I Chemical Substances Control Law	JAMP
22	Bis(2-ethylhexyl) phthalate (DEHP)	EU RoHS directive EU REACH (Annex 17 Restriction)	JAMP
23	Benzyl butyl phthalate (BBP)	EU RoHS directive EU REACH (Annex 17 Restriction)	JAMP
24	Dibutyl phthalate (DBP)	EU RoHS directive EU REACH (Annex 17 Restriction)	JAMP

No.	Substances	Legal regulation	Industry standard
25	Diisobutyl phthalate (DIBP)	EU RoHS directive EU REACH (Annex 17 Restriction)	JAMP
26	Polymers in which halogens are contained structurally and polymers to which halogenated compounds are added	Eco label ("German Blue Angel", "Japanese Eco-mark")	-

* JAMP (Joint Article management Promotion-consortium)

Appendices Table 2: Detailed List of Environmentally Sensitive Chemical Substances

(Note) Substances listed in this table are some of the specific examples. This list does not include all of the environmentally sensitive chemical substances.

◇ Banned Substances

No.	Substances	Legal regulation	Industry standard
1	Polychlorinated biphenyls (PCBs) [*1]	Polychlorinated biphenyls	1336-36-3
		Aroclor 1254	11097-69-1
		Monomethyl-tetrachloro-diphenyl methane Note (Ugilec 141)	76253-60-6
		Monomethyl-dichloro-diphenyl methane Note (Ugilec 121, 21)	-
		Monomethyl-dibromo-diphenyl methane Note (DBBT)	99688-47-8
2	Polychlorinated terphenyls (PCTs)	Polychlorinated terphenyl	61788-33-8
		Aroclor 5442	12642-23-8
3	Polychloronaphthalenes (Cl=>1)	Polychloronaphthalenes	70776-03-3
		Pentachloronaphthalene	1321-64-8
4	Polybrominated biphenyls (PBBs)	Tetrabromobiphenyl	40088-45-7
		Hexabromobiphenyl	59080-40-9
		Octabromobiphenyl	61288-13-9
		Decabromobiphenyl	13654-09-6
5	Polybrominated diphenyl ethers (PBDEs)	Hexabromodiphenyl ether	36483-60-0
		Heptabromodiphenyl ether	36483-60-0
		Octabromodiphenyl ether	68928-80-3
		Nonabromodiphenyl ether	32536-52-0
		Decabromobiphenyl ether	63936-56-1
6	Short chain chlorinated paraffins	Chlorinated paraffins (with 10-13 carbon atoms)	85535-84-8
7	Asbestos	Asbestos	7440-43-9
		Actinolite	1306-19-0
		Amosite (Grunerite)	1306-23-6
		Anthophyllite	10108-64-2
		Chrysotile	10124-36-4
		Crocidolite	7440-43-9
		Tremolite	1306-19-0
8	Ozone depleting substances	For Ozone depleting substances, see Appendices 3	—
9	Cadmium and its compounds	Cadmium metal	7440-43-9
		Cadmium oxide	1306-19-0
		Cadmium sulfide	1306-23-6
		Cadmium chloride	10108-64-2
		Cadmium sulfate	10124-36-4
10	Hexavalent chromium compounds	Barium chromate	10294-40-3
		Calcium chromate	13765-19-0
		Chromium trioxide	1333-82-0
		Lead(II)chromate	7758-97-6
		Sodium chromate	7775-11-3
		Sodium bichromate	10588-01-9
		Strontium chromate	7789-06-2
		Potassium dichromate	7778-50-9
		Potassium chromate	7789-00-6
		Zinc chromate	13530-65-9

*1. To be precise, these substances are alternate PCBs, however, they were described as exemplified substances of PCBs

No.	Substances	Legal regulation	Industry standard
11	Lead and its compounds	Lead	7439-92-1
		Lead (II) sulfate	7446-14-2
		Lead(II)carbonate	598-63-0
		Lead hydrocarbonate	1319-46-6
		Lead acetate	301-04-2
		Lead (II) acetate, trihydrate	6080-56-4
		Lead phosphate	7446-27-7
		Lead selenide	12069-00-0
		Lead(IV)oxide	1309-60-0
		Lead (II, IV) oxide	1314-41-6
		Lead(II)sulfide	1314-87-0
		Lead (II) oxide	1317-36-8
		Lead (II) carbonate basic	1319-46-6
		Lead hydroxidcarbonate	1344-36-1
		Lead (II) chromate	7758-97-6
		Lead (II) titanate	12060-00-3
		Lead sulfate	15739-80-7
		Lead sulphate	12202-17-4
Lead stearate	1072-35-1		
12	Mercury and its compounds	Mercury	7439-97-6
		Mercuric chloride	33631-63-9
		Mercury (II) chloride	7487-94-7
		Mercuric sulfate	7783-35-9
		Mercuric nitrate	10045-94-0
		Mercuric(II)oxide	21908-53-2
		Mercuric sulfide	1344-48-5
13	Perfluorooctanesulfonic acid and its salts (PFOS)	Perfluorooctanesulfonic acid	1763-23-1
		Perfluorooctanesulfonic acid (ammonium salt)	29081-56-9
		Perfluorooctanesulfonic acid (diethanol amine salt)	70225-14-8
		Perfluorooctanesulfonic acid (potassium salt)	2795-39-3
		Perfluorooctanesulfonic acid (lithium salt)	29457-72-5
14	Certain Azocolourants and Azodyes that form certain amines	Information on specific examples of substances is not available	—
15	Trisubstituted organotin compound (Continued to the next page)	Bis tributyltin oxide	56-35-9
		Triphenyltin N,N-dimethyldithiocarbamate	1803-12-9
		Triphenyltin fluoride	379-52-2
		Triphenyltin acetate	900-95-8
		Triphenyltin chloride	639-58-7
		Triphenyltin hydroxide	76-87-9
		Triphenyltin fatty acid salts (C=9-11)	18380-71-7 18380-72-8 47672-31-1 94850-90-5
		Triphenyltin chloroacetate	7094-94-2
		Tributyltin methacrylate	2155-70-6
		Bis (tributyltin) fumarate	6454-35-9
		Tributyltin fluoride	1983-10-4
		Bis(tributyltin)=2,3-dibromosuccinate	31732-71-5
		Tributyltin acetate	56-36-0
		Tributyltin laurate	3090-36-6
		Bis (tributyltin) phthalate	4782-29-0
		Copolymer of alkyl acrylate, methyl methacrylate and tributyltin methacrylate (alkyl; C=8)	67772-01-4
Tributyltin sulfamate	6517-25-5		
Bis(tributyltin)maleate	14275-57-1		

No.	Substances	Legal regulation	Industry standard
15	Trisubstituted organotin compound (Continued from the previous page)	Mixture of tributyltin cyclopentanecarboxylate and its analogs (Tributyltin naphthenate)	5409-17-2
		Tributyltin-1,2,3,4,4A,4B,5,6,10,10A-decahydro-7-isopropyl-1,4A-dimethyl phenanthrenecarboxylatemix	26239-64-5
		Trimethyltin chloride	1066-45-1
		Trimethyltinsulphate	63869-87-4
		Trimethyltin (IV) hydroxide	56-24-6
		Triethyltin(IV) chloride	994-31-0
		Triethyltin hydroxide	994-32-1
		Tripopyltin chloride	2279-76-7
		Tripopyltin iodoacetate	73927-92-1
16	Dibutyltin compounds	Dibutyltin	1002-53-5
		Dibutyltin maleate	10192-92-4
		Bis[[[(Z)-4-methoxy-1,4-dioxo-2-butenyl]oxy]dibutylstannane	15546-11-9
		Bis(2-ethylhexanoic acid)dibutyltin	2781-10-4
		Dibutyltin dichloride; (DBTC)	683-18-1
		Dibutyltin oxide	818-08-6
17	Diocetyl tin compounds	Dialkyl(C=1~8)tin bis {alkyl (or alkenyl, C=6~18) thioglycollate}	15571-58-1
		Diocetyl tin maleate	16091-18-2
		Diocetyl tin	26401-97-8
		Diocetyl tinbis (Maleic acid monoalkyl(C=6~224) ester) salt	33568-99-9
		Dibutyltin dichloride	3542-36-7
18	Dimethylfumarate (dimethyl fumarate (DMF))	Dimethylfumarate (dimethyl fumarate (DMF))	624-49-7
19	Polycyclic aromatic hydrocarbons (PAHs)	See Table 5	-
20	Perfluorooctanoic acid (PFOA) and any related substances	See Table 6	-
21	Hexabromocyclododecane (HBCDD)	See Table 7	-
22	Bis(2-ethylhexyl) phthalate (DEHP)	Same as left	117-81-7
23	Benzyl butyl phthalate (BBP)	Same as left	85-68-7
24	Dibutyl phthalate (DBP)	Same as left	84-74-2
25	Diisobutyl phthalate (DIBP)	Same as left	84-69-5
26	Polymers in which halogens are contained structurally and polymers to which halogenated compounds are added	PVC etc.	-

Appendices Table 3: Detailed list of ozone depleting substances

No.	Substance name	Montreal Protocol Annex Group	Substance name	Chemical formula
1	Chlorofluorocarbons (CFC)	Annex A Group I	CFC-11	CFCl ₃
			CFC-12	CF ₂ Cl ₂
			CFC-113	C ₂ F ₃ Cl ₃
			CFC-114	C ₂ F ₄ Cl ₂
			CFC-115	C ₂ F ₅ Cl
2	Halons	Annex A Group II	Halons -1211	CF ₂ BrCl
			Halons -1301	CF ₃ Br
			Halons -2402	C ₂ F ₄ Br ₂
3	Other chlorofluorocarbons (CFC)	Annex B Group I	CFC-13	CF ₃ Cl
			CFC-111	C ₂ FCl ₅
			CFC-112	C ₂ F ₂ Cl ₄
			CFC-211	C ₃ FCl ₇
			CFC-212	C ₃ F ₂ Cl ₆
			CFC-213	C ₃ F ₃ Cl ₅
			CFC-214	C ₃ F ₄ Cl ₄
			CFC-215	C ₃ F ₅ Cl ₃
			CFC-216	C ₃ F ₆ Cl ₂
CFC-217	C ₃ F ₇ Cl			
4	Carbon tetrachloride	Annex B Group II	Carbon tetrachloride	CCl ₄
5	1,1,1-Trichloroethane (Methyl chloroform)	Annex B Group III	1,1,1-Trichloroethane (Methyl chloroform)	C ₂ H ₃ Cl ₃
6	HBFC	Annex C Group II	Dibromofluoromethane	CHFBr ₂
			Bromodifluoromethane	CHF ₂ Br
			Bromofluoromethane	CH ₂ FBr
			Tetrabromofluoroethane	C ₂ HFBr ₄
			Tribromodifluoroethane	C ₂ HF ₂ Br ₃
			Dibromotrifluoroethane	C ₂ HF ₃ Br ₂
			Bromotetrafluoroethane	C ₂ HF ₄ Br
			Tribromofluoroethane	C ₂ H ₂ FBr ₃
			Dibromodifluoroethane	C ₂ H ₂ F ₂ Br ₂
			Bromotrifluoroethane	C ₂ H ₂ F ₃ Br
			Dibromofluoroethane	C ₂ H ₃ FBr ₂
			Bromodifluoroethane	C ₂ H ₃ F ₂ Br
			Bromofluoroethane	C ₂ H ₄ FBr
			Hexabromofluoropropane	C ₃ HFBr ₆
			Pentabromodifluoropropane	C ₃ HF ₂ Br ₅
			Tetrabromotrifluoropropane	C ₃ HF ₃ Br ₄
			Tribromotetrafluoropropane	C ₃ HF ₄ Br ₃
			Dibromopentafluoropropane	C ₃ HF ₅ Br ₂
			Bromohexafluoropropane	C ₃ HF ₆ Br
			Pentabromofluoropropane	C ₃ H ₂ FBr ₅
			Tetrabromodifluoropropane	C ₃ H ₂ F ₂ Br ₄
			Tribromotrifluoropropane	C ₃ H ₂ F ₃ Br ₃
			Dibromotetrafluoropropane	C ₃ H ₂ F ₄ Br ₂
			Bromotetrafluoropropane	C ₃ H ₂ F ₅ Br
			Tetrabromofluoropropane	C ₃ H ₃ FBr ₄
			Tribromodifluoropropane	C ₃ H ₃ F ₂ Br ₃
			Dibromotrifluoropropane	C ₃ H ₃ F ₃ Br ₂
			Bromotetrafluoropropane	C ₃ H ₃ F ₄ Br
			Tribromofluoropropane	C ₃ H ₄ FBr ₃
			Dibromodifluoropropane	C ₃ H ₄ F ₂ Br ₂
Bromotrifluoropropane	C ₃ H ₄ F ₃ Br			
Dibromofluoropropane	C ₃ H ₅ FBr ₂			
Bromodifluoropropane	C ₃ H ₅ F ₂ Br			
Bromofluoropropane	C ₃ H ₆ FBr			

No.	Substance name	Montreal Protocol Annex Group	Substance name	Chemical formula
7	Bromochloromethane	Annex C Group III	Bromochloromethane	CH ₂ BrCl
8	Methyl bromide	Annex E Group I	Methyl bromide	CH ₃ Br
9	Hydrochlorofluorocarbons (HCFC)	Annex C Group I	HCFC-21	CHFCI ₂
			HCFC-22	CHF ₂ Cl
			HCFC-31	CH ₂ FCI
			HCFC-121	C ₂ HFCl ₄
			HCFC-122	C ₂ HF ₂ Cl ₃
			HCFC-123	C ₂ HF ₃ Cl ₂
			HCFC-123*	CHCl ₂ CF ₃
			HCFC-124	C ₂ HF ₄ Cl
			HCFC-124*	CHFClCF ₃
			HCFC-131	C ₂ H ₂ FCI ₃
			HCFC-132	C ₂ H ₂ F ₂ Cl ₂
			HCFC-133	C ₂ H ₂ F ₃ Cl
			HCFC-141	C ₂ H ₃ FCI ₂
			HCFC-141b*	CH ₃ CFCI ₂
			HCFC-142	C ₂ H ₃ F ₂ Cl
			HCFC-142b*	CH ₃ CF ₂ Cl
			HCFC-151	C ₂ H ₄ FCI
			HCFC-221	C ₃ HFCl ₆
			HCFC-222	C ₃ HF ₂ Cl ₅
			HCFC-223	C ₃ HF ₃ Cl ₄
			HCFC-224	C ₃ HF ₄ Cl ₃
			HCFC-225	C ₃ HF ₅ Cl ₂
			HCFC-225ca*	CF ₃ CF ₂ CHCl ₂
			HCFC-225cb*	CF ₂ CICF ₂ CHClF
			HCFC-226	C ₃ HF ₆ Cl
			HCFC-231	C ₃ H ₂ FCI ₅
			HCFC-232	C ₃ H ₂ F ₂ Cl ₄
HCFC-233	C ₃ H ₂ F ₃ Cl ₃			
HCFC-234	C ₃ H ₂ F ₄ Cl ₂			
HCFC-235	C ₃ H ₂ F ₅ Cl			
HCFC-241	C ₃ H ₃ FCI ₄			
HCFC-242	C ₃ H ₃ F ₂ Cl ₃			
HCFC-243	C ₃ H ₃ F ₃ Cl ₂			
HCFC-244	C ₃ H ₃ F ₄ Cl			
HCFC-251	C ₃ H ₄ FCI ₃			
HCFC-252	C ₃ H ₄ F ₂ Cl ₂			
HCFC-253	C ₃ H ₄ F ₃ Cl			
HCFC-261	C ₃ H ₅ FCI ₂			
HCFC-262	C ₃ H ₅ F ₂ Cl			
HCFC-271	C ₃ H ₆ FCI			

*Indicates substances that are most likely to be used commercially, including their isomers.

Appendices Table 4: Detailed list of certain amines

No.	Name of substance	Chemical formula	CAS №
1	4- aminoazobenzene	C ₁₂ H ₁₁ N ₃	60-09-3
2	o- anisidine	C ₇ H ₉ NO	90-04-0
3	2- naphthylamine	C ₁₀ H ₉ N	91-59-8
4	3,3'- dichlorobenzidine	C ₁₂ H ₁₀ Cl ₂ N ₂	91-94-1
5	4- Biphenyl-4-ylamine	C ₁₂ H ₁₁ N	92-67-1
6	benzidine	C ₁₂ H ₁₂ N ₂	92-87-5
7	o- toluidine	C ₇ H ₉ N	95-53-4
8	4- chloro-2-methylamine	C ₇ H ₈ ClN	95-69-2
9	2,4- toluenediamine	C ₇ H ₁₀ N ₂	95-80-7
10	o- aminoazotoluene	C ₁₄ H ₁₅ N ₃	97-56-3
11	5- nitro-o-toluidine	C ₇ H ₈ N ₂ O ₂	99-55-8
12	3,3'- Dichloro-4,4'-diaminodiphenylmethane	C ₁₃ H ₁₂ Cl ₂ N ₂	101-14-4
13	4,4'- methylenedianiline	C ₁₃ H ₁₄ N ₂	101-77-9
14	4,4'- diaminodiphenylether	C ₁₂ H ₁₂ N ₂ O	101-80-4
15	p- chloraniline	C ₆ H ₆ ClN	106-47-8
16	3,3'- dimethoxybenzidine	C ₁₄ H ₁₆ N ₂ O ₂	119-90-4
17	3,3'- dimethylbenzidine	C ₁₄ H ₁₆ N ₂	119-93-7
18	2- methoxy-5-methylamine	C ₈ H ₁₁ NO	120-71-8
19	2,4,5- trimethylaniline	C ₉ H ₁₃ N	137-17-7
20	4,4'- thiodianiline	C ₁₂ H ₁₂ N ₂ S	139-65-1
21	2,4- methoxy-m-phenylenediamine	C ₇ H ₁₀ N ₂ O	615-05-4
22	4,4'-dimethyl-3,3'-diaminodiphenylmethane	C ₁₅ H ₁₈ N ₂	838-88-0

Appendices Table 5: List of applicable polycyclic aromatic hydrocarbons (PAHs)

No.	Name of substance	Chemical formula	CAS №
1	Benzo[a]pyrene	C ₂₀ H ₁₂	50-32-8
2	Benzo[e]pyrene	C ₂₀ H ₁₂	192-97-2
3	Benz(a)anthracene	C ₁₈ H ₁₂	56-55-3
4	Chrysene	C ₁₈ H ₁₂	218-01-9
5	Benzo(b)fluoranthene	C ₂₀ H ₁₂	205-99-2
6	Benzo(j)fluoranthene	C ₂₀ H ₁₂	205-82-3
7	Benzo(k)fluoranthene	C ₂₀ H ₁₂	207-08-9
8	Dibenzo(a,h)anthracene	C ₂₂ H ₁₄	53-70-3

Appendices Table 6: List of applicable Perfluorooctanoic acid (PFOA) and any related substances

No.	Name of substance	CAS №
1	Perfluorooctanoic acid (PFOA)	335-67-1
2	Ammonium perfluorooctanoate (APFO)	3825-26-1
3	Sodium salt of perfluorooctanoic acid	335-95-5
4	Potassium salt of perfluorooctanoic acid	2395-00-8
5	Silver salt of perfluorooctanoic acid	335-93-3
6	Perfluorooctanoic acid fluoride	335-66-0
7	Perfluorooctanoic acid methyl	376-27-2
8	Perfluorooctanoic acid ethyl	3108-24-5

Substances regulated by EU REACH "restrictions "

- PFOA (CAS No. 335-67-1) and its salts and related substances listed below;
- As one of the structural elements, any related substances having a straight chain or branched chain perfluoroheptyl group which has the chemical formula C₇F₁₅ directly bonded to another carbon atom (including its salts and polymers)
- As one of the structural elements, any related substances having a straight chain or branched chain perfluorooctyl group which has the chemical formula C₈F₁₇(including its salts and polymers)
- The following related substances are excluded.
- C₈F₁₇-X (when X is F (fluorine), Cl (chlorine), Br (bromine))
- C₈F₁₇-C (= O) OH, C₈F₁₇-C (= O) O-X', C₈F₁₇-CF₂-X' [X 'is all groups including salt]

Appendices Table 7: List of applicable Hexabromocyclododecane (HBCDD)

No.	Name of substance	CAS №
1	Hexabromocyclododecane (HBCDD)	25637-99-4
		4736-49-6
		65701-47-5
		138257-17-7
		138257-18-8
		138257-19-9
		169102-57-2
		678970-15-5
		678970-16-6
		678970-17-7
2	1,2,5,6,9,10-Hexabromocyclododecane (HBCDD)	3194-55-6
3	α -Hexabromocyclododecane (HBCDD)	134237-50-6
4	β -Hexabromocyclododecane (HBCDD)	134237-51-7
5	γ -Hexabromocyclododecane (HBCDD)	134237-52-8

【Contact information】

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