

## **Pioneer Group**

# **Environmental Hazardous Substances List**

## **4th-Edition(Ver4.0)**

**Note:** This document has been translated into English from original Japanese version.

**If there are any questions or discrepancies between original Japanese version and English translated version, refer to original Japanese version.**

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27 Feb. 2003

Pioneer Corporation

## 1.Objectives

The objectives for the standard is to improve product quality from view of environment by clearly announcing to all of suppliers which have a business with Pioneer group.

In order to achieve the objectives, the standard shows as first substance groups which shall be reported, about environmental hazardous substances which are contained in all parts and materials which construct Pioneer group products and used in manufacturing process. Then those substances are classified into 3 management ranks such as Banned substances, Banned substances with conditions and Restricted substances for making sure treatments by Pioneer group Environmental planning.

## 2.Scope

The standard shall apply with all parts, materials and so on including followings which construct Pioneer group products.

(Including OEM purchasing products, Design and manufacturing consigned products)

- \* Assembled parts such as functional units/modules/assembled boards
- \* Accessories as parts procured
- \* Subsidiary used material which are controlled by specification sheet
- \* Substances used in manufacturing process of parts and materials
- \* Spare parts

### 3.Definitions

#### (1) Environmental hazardous substances

Among substances contained in parts and materials, in addition substances used in manufacturing process, the substances which have environmental negative impacts for human and environment on earth and the substances of which Pioneer will ask investigations to suppliers are defined as "Environmental hazardous substances".

#### (2)Management ranks

"Management ranks" means common naming of 3 ranks such as "Banned without any condition", Banned with conditions and "Restricted" which management levels for 28 substance groups in order to reduce environmental impacts have been classified into.

#### (3)Banned substances

"Banned substances" means, among environmental hazardous substances, substances which are banned without any conditions or with conditions (contained ratio, used in a specific part, purpose and due date etc) by law and Pioneer policy.

(Refer to "6.Management ranks for banned substances")

##### \*Banned substances without any condition:

Banned substances without any conditions of use, purpose, contained ratio, due date.  
The substances shall not be used.

##### \*Banned substances with conditions:

Banned substances with conditions of use, purpose, contained ratio, due date.  
The conditions are shown in "6.2 Banned substances with conditions"

#### (4)Restricted substances

The substances which are just grasped volume of use for a time being, but will be reduced volume of use in future. Pioneer will plan to reduce use of the substances for own target.

#### (5) Essential 7 substances for ban of use

The substance group which is essentially considered ban of use by Pioneer policy involves 7 substances such as Cadmium, Lead, Hexavalent chromium, Mercury, Chlorinated paraffins, PBBs, PBDEs.

\* PBBs and PBDEs are terminology of specific brominated flame retardant substances

### 4.Essential requirements

#### 4.1 Banned substances

Substances which are listed in "6.Management ranks for banned substances" shall not be used or contained without any condition or with conditions according to the lists.

#### 4.2 Banned substances used in manufacturing process (Substances which shall be reported)

Substances which are listed in "7.Banned substances used in manufacturing process" such as Ozone layer depleting substances shall not be used in manufacturing process of parts and materials.

#### 4.3 Obligatory reporting of contained substances

Suppliers who will provide parts or materials shall report substance groups listed in "5.", volume of contained substances, the place of the part contained substances and purpose of use according to "Pioneer group green procurement standard" and "Environmental substances survey outline" and "Environmental substances survey manual".

Actual individual substances of substance groups listed in "5.List of environmental hazardous substance groups" will be referred to "8.Breakdown substances list"

#### 4.4 Obligatory reporting of Restricted substances

According to voluntary action plan for reducing of hazardous substances by Pioneer group, actual plan for reducing of hazardous substances by suppliers shall be reported.

## 5. List of environmental hazardous substance groups

Kinds	No.	Names	CAS.No.	Main Legislation or Pioneer's Policy	Management Level		
					Ban		Reduction
					Without any cond.	With cond.	
Metal Compounds	A01	Antimony and its compounds	1314-60-9 etc.	PRTR Law(Japan), WHO-Water, Basel treaty			*
	A02	Arsenic and its compounds	7440-38-2 etc.	PRTR Law(Japan), 76/769/EEC, 89/677/EEC		*	
	A03	Beryllium and its compounds	7440-41-7 etc.	PRTR Law(Japan), Basel treaty			*
	A04	Bismuth and its compounds	7440-69-9 etc.	Labor Law(Japan)			*
	A05	Cadmium and its compounds	7440-43-9 etc.	76/769/EEC, 93/86/EEC, 91/338/EEC, 2000/53/EC(EU/ELV), EU/RoHS, Packaging Law(USA), 94/62/EEC PRTR Law(Japan)		**	
	A06	Chromium compounds *1	1308-38-9 etc.	PRTR Law(Japan), 76/464/EEC			*
	A07	Hexavalent Chromium compounds	7789-00-6 etc.	2000/53/EC(EU/ELV), EU/RoHS, Packaging Law(USA), 94/62/EEC PRTR Law(Japan)		**	
	A08	Cobalt and its compounds	7440-48-4 etc.	PRTR Law(Japan), Labor Law(Japan)			*
	A09	Lead and its compounds	1317-36-8 etc.	89/677/EEC, 93/86/EEC, 94/62/EEC, 2000/53/EC(EU/ELV), EU/RoHS, Packaging Law(USA) PRTR Law(Japan)		**	
	A10	Mercury and its compounds	7439-97-6 etc.	76/769/EEC, 93/86/EEC, 94/62/EEC 2000/53/EC(EU/ELV), EU/RoHS, Packaging Law(USA) PRTR Law(Japan)		**	
	A11	Nickel compounds *2	1313-99-1 etc.	76/769/EEC, PRTR Law(Japan)		*	
	A12	Organo tin compounds	1066-44-0 etc.	76/769/EEC, PRTR Law(Japan)		*	
	A13	Selenium and its compounds	7782-49-2 etc.	PRTR Law(Japan), Basel treaty			*
	A14	Tellurium and its compounds	13494-80-9 etc.	PRTR Law(Japan), Basel treaty			*
	A15	Thallium and its compounds	7740-28-0 etc.	PRTR Law(Japan), Basel treaty			*
Halogenated Organic Compounds	B01	Chlorinated paraffins	63449-39-8 etc.	Dioxin Law(Germany), Pioneer's Policy	**		
	B02	Polybrominated biphenyl	13654-09-6 etc.	Dioxin Law(Germany), Pioneer's Policy	**		
	B03	Polybrominated diphenyl ethers	1163-19-5 etc.	Dioxin Law(Germany), Pioneer's Policy	**		
	B04	Halogenated Resin Additives *3	79-94-7 etc.	Self-controlled by chemical industry (TBBA)			*
	B05	PCBs	1336-36-3 etc.	Chemical Law (Japan), 76/769/EEC, PRTR Law(Japan)	*		
	B06	Polychlorinated Naphthalene (with more than 3 chlorine atoms)	70776-03-3 etc.	Chemical Law (Japan)	*		
	B07	Poly vinyl chloride (PVC)	9002-86-2	Pioneer's Policy		*	
Others	C01	Asbestos	1332-21-4 etc.	Labor Law(Japan), IARC group 1, 76/769/EEC, 91/659/EEC	*		
	C02	Azo compounds *4	92-67-1 etc.	Daily Necessities Law (Germany)		*	
	C03	Cyanides	143-33-9 etc.	Labor Law(Japan), Toxic Law (Japan)			*
	C04	Ozone depleting substances *5	71-55-6 etc.	Ozone layer protection Law(Japan), Montreal Protocol, 94/60/EEC, 97/64/EEC, Labor Law(Japan), Pioneer's Policy	*		
	C05	Phthalate esters	84-74-2 etc.	PRTR Law(Japan), WHO-Water			*
	C06	Radioactive substances		Nuclear Substances Law	*		

Notes regarding the Group Names (Detail examples are shown in "8.breakdown substances list").

\*1: Chromium compounds except chromium VI and metal chromium

\*2: Nickel compounds except metal nickel

\*3: Halogen additions except chlorinated paraffins, PBBs and PBDEs

\*4: Azo compounds that may form by decomposition of one or more azo groups

(Azo groups quoted from BedarfsgegV = Act on food commodities = Bedarfsgegenstände-Verordnung (German national law))

\*5: The substances according to "Montreal Protocol"

Essential 7 substances for ban of use

The substance groups which have "\*\*\*" in the list are "Essential 7 substances for ban of use". Those substances shall be banned with priority.

## 6. Management ranks for banned substances

### 6.1 Banned substances without any condition

Following substances shall not be used or contained without any condition.  
Italicized letter with \* means "Essential 7 substances for ban of use".

No.	Substance Names	CAS. No.
B01	<i>Chlorinated paraffins</i> *	63449-39-8 etc.
B02	<i>Polybrominated biphenyl</i> *	13654-09-6 etc.
B03	<i>Polybrominated diphenyl ethers</i> *	1163-19-5 etc.
B05	PCBs	1336-36-3 etc.
B06	Polychlorinated Naphthalene (with more than 3 chlorine atoms)	70776-03-3 etc.
C01	Asbestos	1332-21-4 etc.
C04	Ozone depleting substances	71-55-6 etc.
C06	Radioactive substances	

### 6.2 Banned substances with conditions

#### 6.2.1 Banned substances required by Law and legislation

(At the present of Nov. 2002)

This article shows law and legislation which require ban of use for environmental hazardous substances.  
Products shall comply with law and legislation.

In case of that any violation of the article in the standard, the responsible section shall make adequate counter-measure with allowance of the section issued the standard.

This chart shows due date for products.

Italicized letter with \* means "Essential 7 substances for ban of use".

No.	Substance names [ CAS. No. ]	Purpose	Condition for ban(Threshold by law), Exempt conditions etc.	Due date on products by Law etc. (*5)	Name of Law and legislation related
A02	Arsenic and its compounds [ 7440-38-2 etc. ]	1 Antiseptic in woods	-	Banned	EU Dir. (76/769/EEC)
		2 Other applications(on electric and electronic equipment)	-	-	-
A05	<i>Cadmium and its compounds</i> * [ 7440-43-9 etc. ]	1 Additives in plastics(stabilizers in PVC, pigment and dye in/on plastic),paint	banned in case of more than 100ppm (*1)	Banned	EU Dir. (91/338/EEC)
		2 Paint and ink on packing materials	see as below (*4)	Banned in case of the condition(*4)	EU Dir. (94/62/EC)
		3 Ni-Cd batteries	-	1st Jan. 2008 (plan)	EU Dir. Draft
		4 ELV parts (*6)		1st July 2003	EU ELV Dir.
		4.1 Thick film pastes	postponed	1st July 2006	EU ELV Dir. (postponed item)
		4.2 Batteries for electrical vehicles	postponed	1st Jan. 2006	EU ELV Dir. (postponed item)
		4.3 In case of that not intentionally contained in homogeneous materials	exempted in case less than 100ppm	1st July 2003	EU ELV Dir. (Exempted item)
		5 RoHS parts (*7)		1st July 2006	EU RoHS Dir. Draft
		5.1 Cadmium plating except for applications banned under 91/338/EEC	exempted	-	EU RoHS Dir. Draft (Exempted item)
A07	<i>Hexavalent chromium and its compounds</i> * [ 7789-00-6 etc. ]	1 Paint and ink on packing materials	see as below (*4)	Banned in case of the condition(*4)	EU Dir. (94/62/EC)
		2 ELV parts (*6)		1st July 2003	EU ELV Dir.
		2.1 Corrosion preventive coatings	postponed	1st July 2007	EU ELV Dir. (postponed item)
		2.2 Absorption refrigerators in motorcaravans	exempted	-	EU ELV Dir. (exempted item)
		2.3 In case of that not intentionally contained in homogeneous materials	exempted in case less than 1000ppm	1st July 2003	EU ELV Dir. (exempted item)
		3 RoHS parts (*7)		1st July 2006	EU RoHS Dir. draft
		3.1 Anti-corrosion of the carbon steel cooling system in absorption refrigerators	exempted	-	EU RoHS Dir. Draft(exempted item)

No.	Substance names [ CAS. No. ]	Purpose	Condition for ban(Threshold by law), Exempt conditions etc.	Due date on products by Law etc. (*5)	Name of Law and legislation related
A09	<i>Lead and its compounds</i> * (*2) [ 1317-36-8 etc. ]	1 Lead in batteries	in case of more than 0.4%	banned	EU Dir. (91/157/EEC,93/86/EEC)
		2 Paint and ink on packing materials	see as below (*4)	Banned in case of the condition (*4)	EU Dir. (94/62/EC)
		3 ELV parts (*6)		1st July 2003	EU ELV Dir.
		3.1 Lead as alloying element			
		Steel for machining purpose and galvanized steel (Lead ≤ 0.35wt%)	exempted	-	EU ELV Dir. (exempted item and postponed item)
		Aluminum for machining purpose (1 < Lead ≤ 2wt%)	postponed	1st July 2005	
		Aluminum for machining purpose (Lead ≤ 1wt%)	postponed	1st July 2008	
		Copper alloy (Lead ≤ 4wt%)	exempted	-	
		Lead-bronze bearing shells and bushes	exempted	-	
		3.2 Lead and its compounds in parts			
		Stabilizer in protective paints	postponed	1st of July 2005	EU ELV Dir. (exempted item and postponed item)
		Solder in electronic circuit boards and other electric applications	exempted	-	
		Carbon brushes for electric motors	exempted	Vehicles type-approved before 1st July 2003 and its spare parts: 1st Jan. 2005	
		Glass in bulbs	postponed	1st Jan. 2005	
		Batteries	exempted	-	
		Electrical components in glass or ceramic matrix compound (except glass in bulbs)	exempted	-	
		3.3 In case of that not intentionally contained in homogeneous materials (in case of that in aluminum 4000ppm is threshold)	exempted in case less than 1000ppm	-	EU ELV Dir. (exempted item)
		4 RoHS parts (*7)		1st July 2006	EU RoHS Dir. Draft
		4.1 Lead in glass of CRT, electronic components and fluorescent tubes	exempted	-	EU RoHS Dir. Draft(exempted item)
		4.2 Lead as an alloying element in steel up to 0.35%	exempted	-	EU RoHS Dir. Draft(exempted item)
		4.3 Lead as an alloying element in aluminum up to 0.4%	exempted	-	EU RoHS Dir. Draft(exempted item)
		4.4 Lead as an alloying element in copper up to 4%	exempted	-	EU RoHS Dir. Draft(exempted item)
		4.5 Lead in high melting temperature type solders(tin -lead solder alloys containing more than 85% lead)	exempted	-	EU RoHS Dir. Draft(exempted item)
		4.6 Lead in solders for servers, storage and storage array systems	postponed	1st Jan. 2011	EU RoHS Dir. Draft(postponed item)
		4.7 Lead in solders for network infrastructure equipment for switching, signaling, transmission as well as network management for telecommunication	exempted	-	EU RoHS Dir. Draft(exempted item)
		4.8 Lead in electronic ceramic parts(e.g. piezoelectric devices)	exempted	-	EU RoHS Dir. Draft(exempted item)
A10	<i>Mercury and its compound</i> * (*3) [ 7439-97-6 etc. ]	1 Antiseptic in woods	-	banned	EU Dir. (76/769/EEC)
		2 Paint and ink on packing materials	see as below (*4)	Banned in case of the condition (*4)	EU Dir. (94/62/EC)
		3 Batteries	more than 0.025%	banned	EU Dir. (91/157/EEC)
		4 ELV parts (*6)		1st July 2003	EU ELV Dir.
		4.1 Discharge lamps and instrument panel displays	exempted	-	EU ELV Dir. (exempted item)
		4.2 In case of that not intentionally contained in homogeneous materials	exempted in case less than 1000ppm	-	EU ELV Dir.
		5 RoHS parts (*7)		1st July 2006	EU RoHS Dir. Draft
		5.1 Mercury in compact fluorescent (not exceeding 5mg per lamp)	exempted	-	EU RoHS Dir. Draft (exempted item)
		5.2 Mercury in straight fluorescent lamps for general purposes in case contained halophosphate(less than 10mg)	exempted	-	EU RoHS Dir. Draft (exempted item)
		5.3 Mercury in straight fluorescent lamps for general purposes in case contained triphosphate with normal lifetime(less than 5mg)	exempted	-	EU RoHS Dir. Draft (exempted item)
		5.4 Mercury in straight fluorescent lamps for general purposes in case contained triphosphate with long lifetime(less than 8mg)	exempted	-	EU RoHS Dir. Draft (exempted item)
		5.5 Mercury in straight fluorescent lamps for special purpose	exempted	-	EU RoHS Dir. Draft (exempted item)
		5.6 Mercury in other lamps not specifically mentioned in this Annex	exempted	-	EU RoHS Dir. Draft (exempted item)
A11	Nickel compounds [ 1313-99-1etc. ]	1 Banned for the purpose of the part which can touch with a skin (e.g. a part which can touch with a skin in Headphones, Microphones etc.)	-	banned	EU Dir. (76/769/EEC)
A12	Organo tin compounds [ 1066-44-0 etc. ]	1 Banned for the purpose of the part which will be used at sanitary, kitchen and so on such a water around.	-	banned	EU Dir. (76/769/EEC)
		2 The other purpose	-	-	-
B07	Poly vinyl chloride (PVC) [ 9002-86-2 ]	1 Banned for the purpose of use on packing materials	-	-	- (Pioneer policy)
		2 The other purpose	-	-	- (Pioneer policy)
C02	Azo compounds [ 92-67-1etc. ]	1 Banned for the purpose of the part which can touch with a skin (e.g. a part which can touch with a skin in Headphones, Microphones etc.)	-	banned	Daily Necessities Law (Germany)

(\*1) As standard measurement, BS EN 1122:2001[Plastics-Determination of cadmium-Wet decomposition method] (pre treatment method) and inductively coupled plasma mass spectrometry (ICP-AES) will be recommended.

(\*2) As standard measurement, Wet decomposition method (pre treatment method) and flame atomic absorption spectrometry (FLAA) or ICP-AES will be recommended.

(\*3) As standard measurement, Wet decomposition method (pre treatment method) and atomic absorption spectrometry (AAS) will be recommended.

(\*4) For the purpose of packing materials, the total volume of the heavy metals such as lead, mercury, cadmium and hexavalent chromium shall be less than 100ppm.

(\*5) **The products which will be placed on market after the date mentioned on above chart shall not contain the environmental hazardous substances.**

(\*6) ELV parts means the parts which will be adapted with EU directive 2000/53/EC(ELV Dir.)

(\*7) RoHS parts means the parts which will be adapted with EU directive draft "the restriction of the use of certain hazardous substances in electrical and electronic equipment"(RoHS Dir. draft)

## 6.2.2 Due date for banned substances on parts

Please contact us at the following address if you have any questions concerning this content

Pioneer Corporation Procurement Center Section for Environment

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## 7.Banned substances used in manufacturing process

\* These are the Ozone Depleting Substances except HCFCs according to Montreal Protocol.

\* Isomers included

No.	Substance	Chemical Formula
D01001	CFC-11	CFCl <sub>3</sub>
D01002	CFC-12	CF <sub>2</sub> Cl <sub>2</sub>
D01003	CFC-113	C <sub>2</sub> F <sub>3</sub> Cl <sub>3</sub>
D01004	CFC-114	C <sub>2</sub> F <sub>4</sub> Cl <sub>2</sub>
D01005	CFC-115	C <sub>2</sub> F <sub>5</sub> Cl
D01006	Halon 1211	CF <sub>2</sub> BrCl
D01007	Halon 1301	CF <sub>3</sub> Br
D01008	Halon 2402	C <sub>2</sub> F <sub>4</sub> Br <sub>2</sub>
D01009	CFC-13	CF <sub>3</sub> Cl
D01010	CFC-111	C <sub>2</sub> FCl <sub>5</sub>
D01011	CFC-112	C <sub>2</sub> F <sub>2</sub> Cl <sub>4</sub>
D01012	CFC-211	C <sub>3</sub> FCl <sub>7</sub>
D01013	CFC-212	C <sub>3</sub> F <sub>2</sub> Cl <sub>6</sub>
D01014	CFC-213	C <sub>3</sub> F <sub>3</sub> Cl <sub>5</sub>
D01015	CFC-214	C <sub>3</sub> F <sub>4</sub> Cl <sub>4</sub>
D01016	CFC-215	C <sub>3</sub> F <sub>5</sub> Cl <sub>3</sub>
D01017	CFC-216	C <sub>3</sub> F <sub>6</sub> Cl <sub>2</sub>
D01018	CFC-217	C <sub>3</sub> F <sub>7</sub> Cl
D01019	Carbon tetrachloride	CCl <sub>4</sub>
D01020	1,1,1-Trichloroethane	C <sub>2</sub> H <sub>3</sub> Cl <sub>3</sub>
D01021	Methyl bromide	CH <sub>3</sub> Br
D01022	Dibromofluoromethane	CH <sub>2</sub> Br <sub>2</sub>
D01023	Bromodifluoromethane	CHF <sub>2</sub> Br
D01024	Bromofluoromethane	CH <sub>2</sub> FBr
D01025	Tetrabromofluoroethane	C <sub>2</sub> HBr <sub>4</sub>
D01026	Tribromodifluoroethane	C <sub>2</sub> H <sub>2</sub> Br <sub>3</sub>
D01027	Dibromotrifluoroethane	C <sub>2</sub> HBr <sub>3</sub> Br <sub>2</sub>
D01028	Bromotetrafluoroethane	C <sub>2</sub> HBr <sub>4</sub> Br
D01029	Tribromofluoroethane	C <sub>2</sub> H <sub>2</sub> FBr <sub>3</sub>
D01030	Dibromodifluoroethane	C <sub>2</sub> H <sub>2</sub> F <sub>2</sub> Br <sub>2</sub>
D01031	Bromotrifluoroethane	C <sub>2</sub> H <sub>2</sub> F <sub>3</sub> Br
D01032	Dibromofluoroethane	C <sub>2</sub> H <sub>3</sub> FBr <sub>2</sub>
D01033	Bromodifluoroethane	C <sub>2</sub> H <sub>3</sub> F <sub>2</sub> Br
D01034	Bromofluoroethane	C <sub>2</sub> H <sub>4</sub> FBr
D01035	Hexabromofluoropropane	C <sub>3</sub> HBr <sub>6</sub>
D01036	Pentabromodifluoropropane	C <sub>3</sub> HBr <sub>5</sub> Br <sub>2</sub>
D01037	Tetrabromotrifluoropropane	C <sub>3</sub> HBr <sub>4</sub> Br <sub>3</sub>
D01038	Tribromotetrafluoropropane	C <sub>3</sub> HBr <sub>4</sub> Br <sub>3</sub>
D01039	Dibromopentafluoropropane	C <sub>3</sub> HBr <sub>5</sub> Br <sub>2</sub>
D01040	Bromohexafluoropropane	C <sub>3</sub> HBr <sub>6</sub> Br
D01041	Pentabromofluoropropane	C <sub>3</sub> H <sub>2</sub> FBr <sub>5</sub>
D01042	Tetrabromodifluoropropane	C <sub>3</sub> H <sub>2</sub> F <sub>2</sub> Br <sub>4</sub>
D01043	Tribromotrifluoropropane	C <sub>3</sub> H <sub>2</sub> F <sub>3</sub> Br <sub>3</sub>
D01044	Dibromotetrafluoropropane	C <sub>3</sub> H <sub>2</sub> F <sub>4</sub> Br <sub>2</sub>
D01045	Bromopentafluoropropane	C <sub>3</sub> H <sub>2</sub> F <sub>5</sub> Br
D01046	Tetrabromofluoropropane	C <sub>3</sub> H <sub>3</sub> FBr <sub>4</sub>
D01047	Tribromodifluoropropane	C <sub>3</sub> H <sub>3</sub> F <sub>2</sub> Br <sub>3</sub>
D01048	Dibromotrifluoropropane	C <sub>3</sub> H <sub>3</sub> F <sub>3</sub> Br <sub>2</sub>
D01049	Bromotetrafluoropropane	C <sub>3</sub> H <sub>3</sub> F <sub>4</sub> Br
D01050	Tribromofluoropropane	C <sub>3</sub> H <sub>4</sub> FBr <sub>3</sub>
D01051	Dibromodifluoropropane	C <sub>3</sub> H <sub>4</sub> F <sub>2</sub> Br <sub>2</sub>
D01052	Bromotrifluoropropane	C <sub>3</sub> H <sub>4</sub> F <sub>3</sub> Br
D01053	Dibromofluoropropane	C <sub>3</sub> H <sub>5</sub> FBr <sub>2</sub>
D01054	Bromodifluoropropane	C <sub>3</sub> H <sub>5</sub> F <sub>2</sub> Br
D01055	Bromofluoropropane	C <sub>3</sub> H <sub>6</sub> FBr
D01056	Chlorobromomethane	CH <sub>2</sub> BrCl

## 8. Breakdown substances list

\* CAS. No., chemical formula and metals' conversion factors of these substances should be correct, but not guaranteed.

Classification	No.	Substance Group	No.	Substance	Chemical Formula	Metal conversion factor	CAS. No.
Metal compounds	A01	Antimony and its compounds	A01001	Antimony	Sb	1.000	7440-36-0
			A01002	Antimony trichloride	SbCl <sub>3</sub>	0.534	10025-91-9
			A01003	Antimony trioxide	Sb <sub>2</sub> O <sub>3</sub>	0.835	1309-64-4
			A01004	Antimony pentoxide	Sb <sub>2</sub> O <sub>5</sub>	0.753	1314-60-9
			A01005	Sodium antimonate	NaSbO <sub>2</sub>	0.632	15432-85-6
			A01997-9	Other antimony compounds	-	-	-
	A02	Arsenic and its compounds	A02001	Arsenic	As	1.000	7440-38-2
			A02002	Gallium arsenide	GaAs	0.518	1303-00-0
			A02003	Arsenic pentoxide	As <sub>2</sub> O <sub>5</sub>	0.652	1303-28-2
			A02004	Arsenic trioxide	As <sub>2</sub> O <sub>3</sub>	0.757	1327-53-3
			A02997-9	Other arsenic compounds	-	-	-
	A03	Beryllium and its compounds	A03001	Beryllium	Be	1.000	7440-41-7
			A03002	Beryllium oxide	BeO	0.360	1304-56-9
			A03997-9	Other beryllium compounds	-	-	-
	A04	Bismuth and its compounds	A04001	Bismuth	Bi	1.000	7440-69-9
			A04997-9	Other bismuth compounds	-	-	-
	A05	Cadmium and its compounds	A05001	Cadmium	Cd	1.000	7440-43-9
			A05002	Cadmium oxide	CdO	0.875	1306-19-0
			A05003	Cadmium sulfide	CdS	0.778	1306-23-6
			A05004	Cadmium chloride	CdCl <sub>2</sub>	0.613	10108-64-2
			A05005	Cadmium sulfate	CdSO <sub>4</sub>	0.539	10124-36-4
			A05997-9	Other cadmium compounds	-	-	-
	A06	Chromium compounds*1	A06001	Chromium(III) oxide	Cr <sub>2</sub> O <sub>3</sub>	0.684	1308-38-9
			A06002	Neochromium	Cr(OH)SO <sub>4</sub>	0.315	64093-79-4
			A06997-9	Other chromium compounds	-	-	-
	A07	Chromium VI and its compounds	A07001	Sodium dichromate	Na <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	0.397	10588-01-9
			A07002	Chromium(VI) oxide	CrO <sub>3</sub>	0.520	1333-82-0
			A07003	Calcium chromate	CaCrO <sub>4</sub>	0.333	13765-19-0
			A07004	Lead(II) chromate	PbCrO <sub>4</sub>	0.161	7758-97-6
			A07005	Potassium dichromate	K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	0.353	7778-50-9
			A07006	Potassium chromate	K <sub>2</sub> CrO <sub>4</sub>	0.268	7789-00-6
			A07997-9	Other hexavalent chromium compounds	-	-	-
	A08	Cobalt and its compounds	A08001	Cobalt	Co	1.000	7440-48-4
			A08002	Cobalt(II) oxide	CoO	0.786	1307-96-6
			A08003	Cobalt oxide (II,III)	Co <sub>3</sub> O <sub>4</sub>	0.734	1308-06-1
			A08997-9	Other cobalt compounds	-	-	-
	A09	Lead and its compounds	A09001	Lead	Pb	1.000	7439-92-1
			A09002	Lead(II) carbonate	PbCO <sub>3</sub>	0.775	598-63-0
			A09003	Lead(IV) oxide	PbO <sub>2</sub>	0.866	1309-60-0
			A09004	Lead(II,IV) oxide	Pb <sub>3</sub> O <sub>4</sub>	0.907	1314-41-6
			A09005	Lead(II) sulfide	PbS	0.866	1314-87-0
			A09006	Lead(II) oxide	PbO	0.928	1317-36-8
			A09007	Lead(II) carbonate basic	2PbCO <sub>3</sub> ·Pb(OH) <sub>2</sub>	0.801	1319-46-6
			A09008	Lead hydroxidecarbonate	2PbCO <sub>3</sub> ·Pb(OH) <sub>2</sub>	0.801	1344-36-1
			A09009	Lead(II) sulfate	PbSO <sub>4</sub>	0.683	7446-14-2
			A09010	Lead(II) phosphate	Pb <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	0.766	7446-27-7
			A09011	Lead(II) chromate	PbCrO <sub>4</sub>	0.641	7758-97-6
			A09012	Lead(II) titanate	PbTiO <sub>3</sub>	0.686	12060-00-3
			A09013	Lead sulfate,sulphuric acid, lead salt	PbXSO <sub>4</sub>	1.000	15739-80-7
			A09997-9	Other lead compounds	-	-	-
	A10	Mercury and its compounds	A10001	Mercury	Hg	1.000	7439-97-6
			A10002	Mercury(II) chloride	HgCl <sub>2</sub>	0.739	7487-94-7
			A10003	Mercury(II) oxide	HgO	0.926	21908-53-2
			A10997-9	Other mercury compounds	-	-	-
	A11	Nickel compounds*2	A11001	Nickel(II) oxide	NiO	0.786	1313-99-1
			A11002	Nickel(II) carbonate	NiO <sub>3</sub>	0.494	3333-67-3
			A11003	Nickel(II) Sulfate	NiSO <sub>4</sub>	0.379	7786-81-4
			A11997-9	Other nickel compounds	-	-	-
	A12	Organo tin compounds	A12001	Bis(tri-n-butyltin) oxide	C <sub>24</sub> H <sub>54</sub> O <sub>4</sub> Sn <sub>2</sub>	0.398	56-35-9
			A12002	Dibutyltin maleate	C <sub>12</sub> H <sub>20</sub> O <sub>4</sub> Sn	0.342	78-04-6
			A12003	di(n-octyl)tin maleate	C <sub>20</sub> H <sub>36</sub> O <sub>4</sub> Sn	0.258	16091-18-2
			A12997-9	Other organic tin compounds	-	-	-
	A13	Selenium and its compounds	A13001	Selenium	Se	1.000	7782-49-2
			A13002	Selenous acid	H <sub>2</sub> SeO <sub>3</sub>	0.612	7783-00-8
			A13997-9	Other selenium compounds	-	-	-
	A14	Tellurium and its compounds	A14001	Tellurium	Te	1.000	13494-80-9
			A14997-9	Other tellurium compounds	-	-	-
	A15	Thallium and its compounds	A15001	Thallium	Tl	1.000	7440-28-0
			A15002	Thallium(I) oxide	Tl <sub>2</sub> O	0.962	1314-12-1
			A15003	Thallium(I) sulfate	Tl <sub>2</sub> SO <sub>4</sub>	0.810	7446-18-6
			A15004	thallium nitrate	TlNO <sub>3</sub>	0.767	10102-45-1
			A15997-9	Other thallium compounds	-	-	-



Classification	No.	Substance Group	No.	Substance	Chemical Formula	Metal conversion factor	CAS. No.
Halogenated organic compounds	B01	Chlorinated paraffins	B01001	Paraffin waxes and Hydrocarbon waxes, chloro	Unspecified	-	63449-39-8
			B01002	Chlorinated Paraffins (C12, 60% Chlorine)	Unspecified	-	108171-26-2
			B01003	Chlorinated Paraffins (C23, 43% Chlorine)	Unspecified	-	108171-27-3
			B01004	Alkalinize, chloro	Unspecified	-	61788-76-9
			B01997-9	Other chlorinatedparaffins	-	-	-
	B02	PBBs	B02001	polybrominated biphenyls	C12HXBr(10-X)	-	-
	B03	PBDEs	B03001	polybrominated diphenyl ethers	C12HXBr(10-	-	-
	B04	Halogenated Resin Additives*3	B04001	1,1,2,2-Tetrabromoethane	C2H2Br4	-	79-27-6
			B04002	Tetrabromobisphenol A	C15H12Br4O2	-	79-94-7
			B04003	Hexabromobenzene	C6Br6	-	87-82-1
			B04004	Tris(2-chloroethyl) phosphate	C6H12Cl3PO4	-	115-96-8
			B04005	1,2,5,6,9,10-hexabromocyclodecane	C12H18Br6	-	3194-55-6
			B04006	Polytetrafluoroethylene	(C2F4)n	-	9002-84-0
			B04007	1,1'-(isopropylidene)bis[3,5-dibromo-4-(2,3-dibromopropoxy)benzene]	C21H20O2Br8	-	21850-44-2
			B04997-9	Other halogenated resin additives	-	-	-
	B05	PCB/PCT	B05001	Polychlorinated biphenyls	Unspecified	-	1336-36-3
			B05002	Polychlorinated terphenyls	Unspecified	-	61788-33-8
			B0599-9	Other PCBs/PCTs	-	-	-
	B06	Polychlorinated Naphthalenes (with more than 3 chlorine atoms)	B06001	Polychlorinated Naphthalenes (with more than 3 chlorine atoms)	Unspecified	-	70776-03-3
			B06007-9	Other polychlorinated Naphthalenes (with more than 3 chlorine atoms)	-	-	-
	B07	Poly vinyl chloride (PVC)	B07001	Poly vinyl chloride	(CH2CHCl)n	-	9002-86-2
Others	C01	Asbestos	C01001	Actinolite	Unspecified	-	77536-66-4
			C01002	Amosite	Unspecified	-	12172-73-5
			C01003	Anthophyllite	Unspecified	-	77536-67-5
			C01004	Chrysotile	Unspecified	-	12001-29-5
			C01005	Crocidolite	Unspecified	-	12001-28-4
			C01006	Tremolite	Unspecified	-	77536-68-6
			C01997-9	Other asbestos	-	-	-
	C02	Azo colorant*4	C02001	<i>o</i> -anisidine	C7H9NO	-	90-04-0
			C02002	2-naphthylamine	C10H9N	-	91-59-8
			C02003	3,3'-dichlorobenzidine	C12H10Cl2N2	-	91-94-1
			C02004	biphenyl-4-ylamine	C12H11N	-	92-67-1
			C02005	Benzidine	C12H12N2	-	92-87-5
			C02006	<i>o</i> -toluidine	C7H9N	-	95-53-4
			C02007	4-chloro- <i>o</i> -toluidine	C7H8ClN	-	95-69-2
			C02008	2,4-toluenediamine	C7H10N2	-	95-80-7
			C02009	<i>o</i> -aminoazotoluene	C14H15N3	-	97-56-3
			C02010	5-nitro- <i>o</i> -toluidine	C7H8N2O2	-	99-55-8
			C02011	3,3'-dichloro-4,4'-diaminodiphenylmethane	C13H12Cl2N2	-	101-14-4
			C02012	4,4'-methylenedianiline	C13H14N2	-	101-77-9
			C02013	4,4'-diaminodiphenylether	C12H12N2O	-	101-80-4
			C02014	<i>p</i> -chloroaniline	C6H6ClN	-	106-47-8
			C02015	<i>o</i> -dianisidine	C14H16N2O2	-	119-90-4
			C02016	3,3'-dimethylbenzidine	C14H16N2	-	119-93-7
			C02017	2-methoxy-5-methylaniline	C8H11NO	-	120-71-8
			C02018	2,4,5-trimethylaniline	C9H13N	-	137-17-7
			C02019	4,4'-thiodianiline	C12H12N2S	-	139-65-1
			C02020	4-methoxy- <i>m</i> -phenylenediamine	C7H10N2O	-	615-05-4
			C02021	4,4'-methylenedi- <i>o</i> -toluidine	C15H18N2	-	838-88-0
	C03	Cyanides	C03001	Acrylonitrile	C3H3N	-	107-13-1
			C03002	Sodium cyanide	NaCN	-	143-33-9
			C03997-9	Other cyanides	-	-	-

Classification	No.	Substance Group	No.	Substance	Chemical Formula	Metal conversion factor	CAS. No.
	C04	Ozone depleting substances*5 (Isomers included)	C04001	CFC-11	CFCl3	-	75-69-4
			C04002	CFC-12	CF2Cl2	-	75-71-8
			C04003	CFC-113	C2F3Cl3	-	76-13-1
			C04004	CFC-114	C2F4Cl2	-	76-14-2
			C04005	CFC-115	C2F5Cl	-	76-15-3
			C04006	Halon 1211	CF2BrCl	-	353-59-3
			C04007	Halon 1301	CF3Br	-	75-63-8
			C04008	Halon 2402	C2F4Br2	-	124-73-2
			C04009	CFC-13	CF3Cl	-	75-72-9
			C04010	CFC-111	C2FCI5	-	354-56-3
			C04011	CFC-112	C2F2Cl4	-	76-12-0
			C04012	CFC-211	C3FCI7	-	422-78-6
			C04013	CFC-212	C3F2Cl6	-	3182-26-1
			C04014	CFC-213	C3F3Cl5	-	134237-31-3
			C04015	CFC-214	C3F4Cl4	-	29255-31-0
			C04016	CFC-215	C3F5Cl3	-	1599-41-3
			C04017	CFC-216	C3F6Cl2	-	661-97-2
			C04018	CFC-217	C3F7Cl	-	422-86-6
			C04019	Carbon tetrachloride	CCl4	-	56-23-5
			C04020	1,1,1-Trichloroethane	C2H3Cl3	-	71-55-6
			C04021	HCFC-21	CHFCl2	-	75-43-4
			C04022	HCFC-22	CHF2Cl	-	75-45-6
			C04023	HCFC-31	CH2FCI	-	593-70-4
			C04024	HCFC-121	C2HFCl4	-	354-11-0
			C04025	HCFC-122	C2HF2Cl3	-	354-21-2
			C04026	HCFC-123	C2HF3Cl2	-	812-04-4
			C04027	HCFC-123*6	CHCl2CF3	-	306-83-2
			C04028	HCFC-124	C2HF4Cl	-	354-25-6
			C04029	HCFC-124*6	CHFClCF3	-	2837-89-0
			C04030	HCFC-131	C2H2FCI3	-	27154-33-2
			C04031	HCFC-132	C2H2F2Cl2	-	1649-08-7
			C04032	HCFC-133	C2H2F3Cl	-	75-88-7
			C04033	HCFC-141	C2H3FCI2	-	430-57-9
			C04034	HCFC-141b*6	CH3CFCI2	-	1717-00-6
			C04035	HCFC-142	C2H3F2Cl	-	25497-29-4
			C04036	HCFC-142b*6	CH3CF2Cl	-	75-68-3
			C04037	HCFC-151	C2H4FCI	-	1615-75-4
			C04038	HCFC-221	C3HFCI6	-	134237-35-7
			C04039	HCFC-222	C3HF2Cl5	-	134237-36-8
			C04040	HCFC-223	C3HF3Cl4	-	134237-37-9
			C04041	HCFC-224	C2HF4Cl3	-	134237-38-0
			C04042	HCFC-225	C3HF5Cl2	-	431-86-7
			C04043	HCFC-225ca*6	CF3CF2CHCl2	-	422-56-0
			C04044	HCFC-225cb*6	CF2ClCF2CHClF	-	507-55-1
			C04045	HCFC-226	C3HF6Cl	-	134308-72-8
			C04046	HCFC-231	C3H2FCI5	-	134190-48-0
			C04047	HCFC-232	C3H2F2Cl4	-	134237-99-1
			C04048	HCFC-233	C3H2F3Cl3	-	134237-40-4
			C04049	HCFC-234	C3H2F4Cl2	-	127564-83-4
			C04050	HCFC-235	C3H2F5Cl	-	134237-41-5
			C04051	HCFC-241	C3H3FCI4	-	134190-49-1
			C04052	HCFC-242	C3H3F2Cl3	-	134237-42-6
			C04053	HCFC-243	C3H3F3Cl2	-	134237-43-7
			C04054	HCFC-244	C3H3F4Cl	-	134190-50-4
			C04055	HCFC-251	C3H4FCI3	-	134190-51-5
			C04056	HCFC-252	C3H4F2Cl2	-	134190-52-6
			C04057	HCFC-253	C3H4F3Cl	-	134237-44-8
			C04058	HCFC-261	C3H5FCI2	-	134237-45-9
			C04059	HCFC-262	C3H5F2Cl	-	134190-53-7
			C04060	HCFC-271	C3H6FCI	-	134190-54-8
			C04061	Dibromofluoromethane	CHFBr2	-	75-61-6
			C04062	Bromodifluoromethane	CHF2Br	-	1511-62-2
			C04063	Bromofluoromethane	CH2FBr	-	-
			C04064	Tetrabromofluoroethane	C2HFB4	-	-
			C04065	Tribromodifluoroethane	C2HF2Br3	-	-
			C04066	Dibromotrifluoroethane	C2HF3Br2	-	-
			C04067	Bromotetrafluoroethane	C2HF4Br	-	-
			C04068	Tribromofluoroethane	C2H2FBr3	-	-
			C04069	Dibromodifluoroethane	C2H2F2Br2	-	-
			C04070	Bromotrifluoroethane	C2H2F3Br	-	-
			C04071	Dibromofluoroethane	C2H3FB2	-	-
			C04072	Bromodifluoroethane	C2H3F2Br	-	-
			C04073	Bromofluoroethane	C2H4FBr	-	-
			C04074	Hexabromofluoropropane	C3HFB6	-	-
			C04075	Pentabromodifluoropropane	C3HF2Br5	-	-
			C04076	Tetrabromotrifluoropropane	C3HF3Br4	-	84-74-2
			C04077	Tribromotetrafluoropropane	C3HF4Br3	-	117-81-7
			C04078	Dibromopentafluoropropane	C3HF5Br2	-	-
			C04079	Bromohexafluoropropane	C3HF6Br	-	-
			C04080	Pentabromofluoropropane	C3H2FBr5	-	-
			C04081	Tetrabromodifluoropropane	C3H2F2Br4	-	-
			C04082	Tribromotrifluoropropane	C3H2F3Br3	-	-
			C04083	Dibromotetrafluoropropane	C3H2F4Br2	-	-
			C04084	Bromopentafluoropropane	C3H2F5Br	-	-

Classification	No.	Substance Group	No.	Substance	Chemical Formula	Metal conversion factor	CAS. No.
			C04085	Tetrabromofluoropropane	C3H3FBr4	-	-
			C04086	Tribromodifluoropropane	C3H3F2Br3	-	-
			C04087	Dibromotrifluoropropane	C3H3F3Br2	-	-
			C04088	Bromotetrafluoropropane	C3H3F4Br	-	-
			C04089	Tribromofluoropropane	C3H4FBr3	-	-
			C04090	Dibromodifluoropropane	C3H4F2Br2	-	-
			C04091	Bromotrifluoropropane	C3H4F3Br	-	-
			C04092	Dibromofluoropropane	C3H5FBr2	-	-
			C04093	Bromodifluoropropane	C3H5F2Br	-	-
			C04094	Bromofluoropropane	C3H6FBr	-	-
			C04095	Chlorobromomethane	CH2BrCl	-	-
			C04096	Methyl bromide	CH3Br	-	74-83-9
	C05	Phthalate esters	C05001	Dibutyl phthalate	C16H22O4	-	84-74-2
			C05002	Diethyl phthalate	C24H38O4	-	117-81-7
			C05997-9	Other phthalate	-	-	-
	C06	Radioactive substances	C06001	Uranium	U	-	7440-61-1
			C06002	Plutonium	Pu	-	-
			C06003	Radon	Rn	-	-
			C06004	Americium	Am	-	-
			C06005	Thorium	Th	-	7440-29-1
			C06997-9	Other radioactive substances	-	-	-

\*1: Chromium compounds other than chromium VI compounds and metal chromium

\*2: Nickel compounds other than metal nickel

\*3: Halogenated resin additives except for chlorinated paraffins, PBBs and PBDEs

\*4: Azo dyes forming certain amines

(Certain amines are quoted from BedarfsgegV = Act on food commodities = Bedarfsgegenstände-Verordnung)

\*5: Substances listed in the Montreal Protocol

\*6: These substances have the highest potentials to be used commercially.

\*7: For chemical substances which the metal conversion factors cannot be specified, it is settled as "1"