

# Green Procurement Guidelines

Rev. 3

**双信電機株式会社**  
**SOSHIN ELECTRIC CO., LTD.**

Soshin Device Co., Ltd.

Risshin Electronics Co., Ltd.

Soshin Electronics (M) Sdn. Bhd.

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## Introduction

We at the Group of Soshin Electric companies are committed to continually endeavoring to preserve the global natural environment, which we regard as a key business issue, throughout our business activities covering the stages of product development, designing, manufacturing and marketing. Growing social concern about environmental issues and progression by the EU with environmental legislation have made requirements for fulfillment of social responsibilities by business enterprises more mandatory and stringent.

Having recognized that green procurement is an important role business enterprises must play, the Group of Soshin Electric companies has updated its Green Procurement Guidelines to facilitate procurement of products that least burden the environment. Our Green Procurement Guidelines constitute the base for our procurement activities of the least environmentally burdening products (parts, sub-materials, packaging materials, etc.) from supply sources which are actively and seriously exercising their efforts to reduce their burden on the environment. Successful achievement of our procurement policy outlined above totally depends upon cooperation from you, our valued suppliers. In this sense, your understanding and support, which we highly appreciate, are also essential for mutual benefits and prospect.

Soshin Electric Co., Ltd.  
Material Department  
Environment Control Room

## 1. Environmental activities of the Group of Soshin Electric companies

### Environmental Philosophy

**SOSHIN WAY - Connecting people with the future through communication -**

Toward “realization of a society where we can co-exist with the environment”, we are committed to protect the harmony between people and the earth through mutual trust.

Even smaller and more friendly

Each and every employee works voluntarily and actively to reduce greenhouse gas emissions, and achieve zero emissions, in order to realize “the Group Soshin Electric companies which stick to Green Parts.

### Environmental policy

1. Observance of laws, agreements and arrangements established with customers, and of self-defined standards,
2. Definition of environmental targets and their implementation by working together with local communities in an organized and continual manner for reduction of environmental loads together,
3. Development, designing, manufacturing and marketing of products friendly to the environment,
4. Exercising and monitoring of efforts for the prevention of environmental pollution, and
5. Further provision of education and enlightenment activities for employees of, and those who are involved in business with, the Group of Soshin Electric companies for higher level consciousness of their roles and responsibilities

## 2. Purpose of Green Procurement of the Group of Soshin Electric companies

Supply of environment-friendly products to our customers through the development and design of the least environment-burdening products by promoting Green Procurement is aimed for.

As a sphere of achievement efforts for the target, we will encourage procurement of the least environmentally burdening materials and parts from suppliers who work on environmental preservation. These Guidelines identify our basic ideas about Green Procurement and the specific requirements of the Group of Soshin Electric companies

that we request our suppliers to meet.

The Group of Soshin Electric companies will share with our suppliers environmental preservation activity-related issues in a bid to deal with such issues in cooperation with them, based on these guidelines. We would like to urge you to complete and submit to us as soon as possible responses to the survey documents we have sent to you. Failing to do so may result in a loss of business with us.

### **3. Scope of application of our Green Procurement Program**

- (1) Parts (electrical and mechanical parts, semiconductor devices, PWBs, etc.)
  - (2) Sub-materials for use in products (plastics, pastes, silicone, ink, paint, adhesive, wire, metal cases, screws, solder, etc.)
  - (3) Packaging materials (trays, reels, bags, cushions, cartons, tape, stickers, printing inks, etc.)
- \* Facilities, jigs and tools, and dies and molds for which there are no possibilities of being contained in products are exempted from application.

### **4. Date of application**

These guidelines will take effect on April 1, 2010.

### **5. Environmentally controlled substances**

- (1) The base of substances discussed here will be those listed in JIG (Joint Industry Guide) suggested for use by the Japan Green Procurement Survey Standardization Initiative (JGPSSI), with occasional additions by us at our discretion, as required by customer requirements and changes in legislation.

Table 1: Substances banned from use - Chemical substances banned from being contained in sub-materials

Table 2: Substances to be controlled - Chemical substances to be checked for the presence in parts or sub-materials and amounts of use

Table 3: Substances banned from use in packaging materials - Applicable to packing or packaging materials for parts or materials to be shipped to us (Applicable also to packaging materials we procure)

(2) Definition of terms

Homogeneous materials: Material that cannot be mechanically disjointed into different materials.

The term “homogeneous” means “of uniform composition throughout”. Examples of “homogeneous materials” are individual types of plastics, ceramics, glass, metals, alloys, paper, board (unmounted PWBs), resins and coatings.

The term “mechanically disjointed” means that the materials can, in principle, be separated by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes.

Intentionally added: Deliberate use in the formulation of a product where its continued presence is desired to provide a specific characteristic, appearance or quality

Threshold level: Concentration level which defines the limit (equal to or) above which the presence of a substance in a product shall be declared based on the requirements of these Guidelines. Numerical threshold levels are provided in weight % (and parts per million, or ppm). The conversion to be used to calculate ppm is  $0.1 \% = 1000 \text{ ppm}$ .

Table 1: Substances banned from use (Chemical substances banned from being contained in sub-materials)

Compiled based on the Joint Industry Guide (JIG), No. JIG-101 Ed2.0 Japanese edition, amended on July 21, 2009, with the addition of requirements unique to Soshin Electric Co.

No.	Substance/ category	Threshold level	Examples of use
1	Cadmium/ cadmium compounds	5 ppm in homogeneous materials	Paint, ink, conductive pastes, plastics (including rubber, film, cable jackets, adhesive, adhesive tape, and insulation tape)
		20 ppm in homogeneous materials	Solder (purchased separately from anything else)
		75 ppm in homogeneous materials	For applications other than those mentioned above Surface finish (plating, coating), glass frits, glass paste, alloys containing zinc (brass and hot-dip galvanization)
2	Chromium VI/Chromium VI compounds	1000 ppm in homogeneous materials	Plating film, paint, ink and glass paste
3	Lead/lead compounds	100 ppm in homogeneous materials	Paint, ink, plastics (including rubber, film, cable jacket, adhesives, adhesive tape, and insulation tape)
		500 ppm in homogeneous materials	Solder (purchased separately from anything else)
		800 ppm in homogeneous materials	Lead in electroless nickel plating
		1000 ppm in homogeneous materials	For applications other than those mentioned above (surface finish materials for external terminals of parts and lead wires)
4	Mercury/ mercury compounds	1000 ppm in homogeneous materials	All applications (plastics, rubber, adhesives, adhesive tape, insulation tape and ink)
5	Nickel	Intentionally added	All applications if long-time contact is expected (exterior of portable electronic equipment)

Table 1 - continued

No.	Substance/ category	Threshold level	Examples of use
6	Tributyl tin oxide (TBTO)	Intentionally added	All applications (preservatives, anti-fungus agents, paint, ink, pigments, anti-staining agents, coolant, foaming agents, digestive aids, and cleaning agents)
7	Certain tributyl tin (TBT) and triphenyl (TPT)	Intentionally added	All applications (stabilization agents, anti-oxidizing agents, anti-bacteria and anti-fungus agents, anti-fouling agents, preservatives, paint, and dyes)
8	Polybrominated biphenyls (PBBs)	1000 ppm in homogeneous materials	All applications (plastic flame retardant)
9	Poly-brominated diphenyl-ethers (PBDEs) (including Deca BDE)	1000 ppm in homogeneous materials	All applications (plastic flame retardant)
10	Poly-chlorinated biphenyl (PCBs) and specific substitutes	Intentionally added	All applications (insulation oil)
11	Poly-chlorinated terphenyls (PCTs)	Intentionally added	All applications (insulation oil and electrical insulation materials)
12	Poly-chlorinated naphthalenes (more than 3 chlorine atoms)	Intentionally added	All applications (lubricants, paint, insulation materials and flame retardant)
13	Short chain chlorinated paraffins (C10 - C13)	Intentionally added	All applications (PVC plasticizers and flame retardant)

Table 1 - continued

No.	Substance/ category	Threshold level	Examples of use
14	Perchlorate	0.006 ppm in products	All applications (coin-type cells)
15	Perfluoro-oc tane sulfonate (PFOS)	Intentionally added	All applications (photolithography, photograph coating materials, hydraulic fluid, metal plating, detergents and digestive aids)
16	Fluorinated greenhouse gases (PFC, SF6 and HFC)	Intentionally added	All applications (coolant, digestive aids, cleaning agents and insulation materials)
17	Asbestos	Intentionally added	All applications (insulating materials, fillers, abrading agents, dyes and heat insulating materials)
18	Azo dyes and pigments forming specific amines	Intentionally added	Textile products/leather products
19	Ozone layerdeplet-i ng substances	Intentionally added	All applications (coolant, foaming agents, digestive aids and cleaning agents)
20	Radioadctive substances	Intentionally added	All applications [optical characteristics (thorium), measuring instruments, smoke sensors, gages and detectors]
21	Form-aldeh yde	Intentionally added	Composite wood products or parts (when contents are 75 ppm or greater in textile products)
22	Phenol,2-(2 H-benzitriaz ol-2-yl)-4,6-b is(1,1-dimet hyl-ethyl)	Intentionally added	All applications (adhesives, paint, printing inks, plastics, ink ribbons, putty, cauking and sealing fillers (ultraviolet absorbers)

Table 2: Substances to be controlled (chemical substances to be checked if used in parts and sub-materials and the mounts of use)

No.	Substance/ category	Threshold level	Examples of use
1	Beryllium oxide (BeO)	1000 ppm in products	Ceramic materials
2	Diarsenic pentoxide	1000 ppm in products	All applications (semi-conductor substrates, glass defoaming agents, pigments, dyes and flame retardant)
3	Diarsenic trioxide	1000 ppm in products	All applications (semi-conductor substrates, glass defoaming agents, pigments, dyes and flame retardant)
4	Hexabromocyclo-dodecane (HBCDD) and all major diastereo-isomers	1000 ppm in products	All applications (flame retardant: used primarily for expanded polystyrene and certain types of fibers)
5	Brominated flame retardant (except for PBBs, PBDEs and HBCDDs)	1000 ppm in products	All applications (plastic flame retardant, multi-layered PWBs and connectors)
6	Tris (2-chloroethyl) phosphate (TCEP)	1000 ppm in products	All applications (flame retardant)
7	Polyvinyl chloride (PVC)	1000 ppm in products	All applications (insulation materials)
8	Phthalates DEHP, DBP and BBP	1000 ppm in products	All applications (plasticizers, dyes, pigments, paint, ink, adhesives and lubricants)
9	Phthalates DINP, DIDP and DNOP	1000 ppm in products	All applications (plasticizers, dyes, pigments, paint, ink, adhesives and lubricants)

- Please refer to JIG-101 Ed2.0 available from JGPSSI for details of substance names listed in Tables 1 and 2.
- Polyvinyl chloride is banned from use in some applications and we will conduct an additional survey as needed.

Table 3: Packaging materials

Substances banned from use (Applicable to packaging or packing materials for parts or materials to be shipped to us, and also to packaging materials we procure)

No.	Substance/ category	Threshold level	Examples of use
1	Substances banned from use, Nos. 1 - 11, as listed in Table 1	Ref. Table 1	Ref. Table 1
2	Halogenated compounds and resins	Intentionally added	Brominated flame retardant, chlorinated flame retardant, polyvinyl chloride (PVC) and fluorine-based resins
3	Cobalt chloride	Intentionally added	Temperature indicators used for desiccant agents (silica gels)
4	Dimethyl fumarate	Intentionally added	Desiccant agents (insect repellents, anti-fungus agents and silica gels)

Additional notes for packaging materials

- Table 1: Mercury, cadmium, chromium VI and lead among banned substances No. 1 - No. 22 are banned from use if their total concentration exceeds 100 ppm. However, the concentration of cadmium and lead in plastic paint (including rubber paint) and ink must meet the limits.
- Halogenated compounds and fluorine additives are exempted if they are used as colorants for stickers and printing inks. However, halogenated compounds contained are exempted if they fall under banned substances per Table 1.

Note: For liquid materials (conductive paste and ink), threshold levels listed in Tables 1 and 3 are applicable if they are dried, hardened and fired.

Table 4 Exempted applications of heavy metals identified by a RoHS Directive

<p>1. Cadmium/cadmium compounds</p> <p>8. Cadmium and its compounds in electrical contacts and cadmium plating except for applications banned under Directive 91/338/EEC amending Directive 76/76/EEC relating to restrictions on marketing and use of certain dangerous substances and preparations</p> <p>13. Lead and cadmium in optical and filter glass</p> <p>21. Lead and cadmium in printing inks for application of enamel on borosilicate glass</p> <p>30. Cadmium alloys as electrical/mechanical solder joints to electrical conductors located directly on voice coils in transducers used in high-power loudspeakers with sound pressure levels of 100 dB (A) and more</p> <p>35. Cadmium in photo resistors for optical couplers applied to professional-use audio equipment, until December 31, 2009</p> <p>38. Cadmium and cadmium oxide in thick film paste used on aluminum bonded beryllium oxide</p>
<p>2. Chromium VI/Chromium VI compounds</p> <p>9. Chromium VI as an anti-corrosion agent of carbon steel cooling systems in absorption refrigerators</p>
<p>3. Lead/lead compounds</p> <p>5. Lead in glass of cathode ray tubes, electronic parts and fluorescent tubes</p> <p>6. Lead as an alloying element in steel containing up to 0.35% lead by weight, aluminum containing up to 0.4% lead by weight and as a copper alloy containing up to 4% lead by weight</p> <p>7.-1 Lead in high melting temperature type solders (i.e. lead based alloys containing 85% by weight or more lead)</p> <p>7.-2 Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signaling and transmission</p> <p>7.-3 Lead in electronic ceramic parts (e.g. piezoelectric devices)</p> <p>9b. Lead in lead-bronze bearing shells and bushes (cylindrical elements for insertion into a hole).</p> <p>11. Lead used in compliant pin connector systems</p> <p>12. Lead as a coating material for thermal conduction module C-rings</p> <p>13. Lead and cadmium in optical and filter glass</p> <p>14. Lead in solders consisting of more than two elements for connection between pins and package of microprocessors with a lead content of more than 80% and less than 85% by weight</p>

15. Lead in solders to complete a viable electrical connection between a semiconductor die and carrier within integrated circuit flip chip packages
16. Lead in linear incandescent lamps with silicate coated tubes
17. Lead halide as a radiant agent in high intensity discharge (HID) lamps for professional reprography applications
19. Lead as an activator in the fluorescent powder (1% lead by weight or less) of discharge lamps when used as sun tanning lamps containing phosphors such as BSP ( $\text{BaSi}_2\text{O}_5:\text{Pb}$ ) as well as when used as specialty lamps for diazo-printing reprography, lithography, insect traps, photochemical and curing processes containing phosphors such as SMS ( $(\text{Sr},\text{Ba})_2\text{MgSi}_2\text{O}_7:\text{Pb}$ )
21. Lead in  $\text{PbBiSn-Hg}$  and  $\text{PbInSn-Hg}$  in specific compositions as a main amalgam and in  $\text{PbSn-Hg}$  as an auxiliary amalgam in very compact energy saving lamps (ESL)
22. Lead oxide in glass used for bonding front and rear substrates of flat fluorescent lamps used for liquid crystal displays (LCDs)
23. Lead and cadmium in printing inks for application of enamels on borosilicate glass
24. Lead as impurity in RIG (rear earth iron garnet) Faraday rotators used for fiber optic communications systems, until December 31, 2009
27. Lead in finishing materials of fine-pitch components other than connectors with a pitch of 0.65 mm or less with NiFe lead frames and lead in finishing materials of fine-pitch components other than connectors with a pitch of 0.65 mm or less with copper lead frames
28. Lead in solders for soldering to machined through-hole discoidal and planar array ceramic multilayer capacitors
29. Lead oxide used in structural elements; notably in front and rear glass dielectric layers, bus electrodes, black stripes, address electrodes, barrier ribs, seal frit and frit rings as well as in print pastes, in plasma display panels (PDPs) and surface conduction electron emitter displays (SED)
30. Lead oxide in glass envelopes of black light blue (BLB) lamps
31. Lead alloys as solder for transducers used in high-power (designed to operate for several hours at acoustic power levels of 125 dB SPL and above) loudspeakers
29. Lead bound in crystal glass as defined in Annex I (Categories 1, 2, 3 and 4) of the Council Directive 69/493/EEC

<ul style="list-style-type: none"> <li>31. Lead in soldering materials in mercury-free flat fluorescent lamps (which e.g. are used for liquid crystal displays, design or industrial lighting)</li> <li>32. Lead oxide in seal frits used for making window assemblies for argon and krypton laser tubes</li> <li>33. Lead in solder for soldering of thin copper wires of a 100 <math>\mu</math>m diameter and less in power transformers</li> <li>34. Lead in cermet-based trimmer potentiometer elements</li> <li>37. Lead in plated layers of high-voltage diodes on the base of zinc borat glass bodies</li> </ul>
<ul style="list-style-type: none"> <li>4. Mercury/mercury compounds <ul style="list-style-type: none"> <li>1. Mercury in compact fluorescent lamps not exceeding 5 mg per lamp</li> <li>2. Mercury in straight fluorescent lamps for general purposes not exceeding <ul style="list-style-type: none"> <li>- 10 mg with halophosphate lamps (white phosphor)</li> <li>- 5 mg with triphosphate lamps with a normal lifetime (three-wavelength fluorescent body with a normal lifetime)</li> <li>- 8 mg with triphosphate lamps with a long lifetime (two-wavelength fluorescent body with a long lifetime)</li> </ul> </li> <li>3. Mercury in special purpose straight fluorescent lamps</li> <li>4. Mercury in other lamps not specifically mentioned in Annexes</li> </ul> </li> <li>36. Mercury used as a cathode sputtering inhibitor in DC plasma displays with a content up to 30 mg per display, until 1 July 2010</li> </ul>

Notes : Information about the exempted items indicated above is valid as of June 30, 2009, and it does not assure the provisions stipulated in the relevant laws.

The numbers of applications exempted by the RoHS Directive are classification numbers in the EU Directive.

## 6. Request to suppliers

### (1) Management system for environmental substances

We will assess this system before commencement of business and on a regular basis thereafter. For this, submission of a completed assessment sheet of management systems (survey report of supplier's facilities) is necessary, as are our visits to supplier's facilities as needed. On this occasion, provision by the supplier of support for our surveyors is to be ensured.

(2) Environmental materials to be submitted

Materials to be submitted	Parts	Sub-materials	Packaging materials
Certificate for non-use	○	○	○
Survey report for contents of chemical substances JGPSSI Survey and Response Tool (JAMP's AIS as necessary)	○	○	○
MSDS (or ingredient list) (JAMP and MSDSplus as necessary)	○	○	○
Analysis data of banned substances	△	△	△

○: To be submitted

△: To be submitted if requested by us or our customer

(3) Certificate for non-use

Substances banned from use per Table 1 and substances banned from use in packaging materials per Table 3 should be controlled to prevent them from mixing or contamination. Submission of a certificate for non-use can be sought upon our request. (The form of the certificate for non-use will be made accessible upon our request for submission.)

(4) Survey of contained chemical substances

Submission of information concerning the presence and amounts of environmental burdening substances identified by the Group of Soshin Electric companies is requested. Request for survey and submission of such information may also be made if our major customers request us to do so.

This request is sent to our suppliers. Collection and submission of necessary information are the responsibility of our suppliers. Should no such information be readily available, please approach your suppliers for it and organize it before submission to us.

Responses from our suppliers to us should include the amounts of contents of chemical substance groups listed in the Survey Response Tool, ver, 4 generated by JGPSSI. The Joint Industry Guide (JIG), the Survey Response Manual and the Survey Response Tool are available from the following URL:

[http://210.254.215.73/jeita\\_eps/green/greenTOP.html](http://210.254.215.73/jeita_eps/green/greenTOP.html)

A survey may have to be made for substances defined by JAMP (Joint Article Management Promotion-consortium) using JAMP's AIS (Article Information Sheet) if requested by our customers for their observance of the REACH requirements. These JAMP-related materials to be controlled and AIS-related materials will be available from JAMP web site accessible from:

<http://www.jamp-info.com/>

(5) MSDS (or ingredient list)

Submission is requested for a management purpose of chemical substances during our manufacturing processes or for submission to our customers. In case of a lack of MSDSs, a list of contained ingredients is to be submitted. And, submission of MSDSplus using the JAMP form may occasionally be requested to meet our customers' requests. Materials relating to MSDSplus are available from the JAMP web site.

(6) Analysis data of banned substances

We may ask you to submit measurement data proving that, for parts and side-materials, the total content of 6 substances banned by the RoHS Directive (lead, cadmium, chromium VI, mercury, PBBs and PBDEs) does not exceed 100 mg, and for packaging materials, the total content of lead, cadmium, mercury and chromium VI does not exceed 100 mg in compliance with the Council Directive on packaging and packaging waste (94/62/EC), if requested by our customers. When analyses of plating film are requested, no more than film may be analyzed. Analysis results between plating film and the base material, and film alone will differ a lot.

**[Items to be stated in the report]**

Acceptable reports should contain the following items:

- ① Method of pre-processing: State its name if a universal analysis method is used, or the specific name if a method other than a universal analysis method is used.
- ② Measurement method: State either the name of the measurement method or the universal analysis method.
- ③ Names of the people who took measurements, the person who bears responsibility for measurement services, and of the organization which provided the services.

- ④ Date of measurement (Measurements must not be older than one year to be acceptable.)
- ⑤ Measurement result (State the value of the lower limit of determination in case of ND.)
- ⑥ Measurement flowchart (essential for lead and cadmium)
 

For lead and cadmium, a statement stating that such substances were completely solved during preprocessing, meaning that “they were put into a liquid form”, must be inserted in the measurement report or measurement flowchart.

## [Measurement method]

### 1. Cadmium

#### (1) Preprocessing

The following are four typical pre-processing methods:

1. Incineration method under the presence of sulfuric acid,
2. Pressurized acid decomposition method in a sealed container (including a microwave decomposition method, e.g. EN 13346: or EPA3052:1996),
3. Acid decomposition method through the use of nitric acid, hydrogen peroxide solution or hydrochloric acid , e.g. EPA3050B Rev. 2:1996, and
4. Wet decomposition method through the use of sulfuric acid, nitric acid or hydrogen peroxide solution, e.g. use of BS EN1122: 2001

(Note) Should a deposit (undesired substances) develop during pre-processing of cadmium contained in plastics, it must be turned into solution by solving it completely by any means (an alkali fusion method may be one).

#### (2) Measurement method

The following are three typical measurement methods:

1. Inductive coupling - plasma emission spectroscopy analyzer (ICP-AES and ICP-OES), e.g. EN ISO 11885:1998,
  2. Atomic absorption spectrometer (AAS), e.g. EN ISO 5961:1995, and
  3. Coupling - plasma mass spectrometer (ICP-MS)
- Combinations of pre-processing and measuring instruments other than the above will be acceptable if they can ensure that the lower limit of determination of cadmium is less than 5 ppm. Cadmium and lead can be analyzed at the same time if a method other than the above AAS is used.

(Note) Dissolution methods represented by EN71-3:1994, ASTM F963-96a and ISO 8124-3 are not applicable for pre-processing.

JIS K0102-55, Testing Method for Industrial Wastewater, is designed for nothing but measurement methods, requiring separate stipulation of a pre-processing method.

## 2. Lead

### (1) Pre-processing

The following are four typical pre-processing methods:

1. Incineration method in the presence of sulfuric acid,
2. Pressurized acid decomposition method in a sealed container (including a microwave decomposition method, e.g. EN 13346: or EPA3052:1996),
3. Acid decomposition method through the use of nitric acid, hydrogen peroxide solution or hydrochloric acid , e.g. EPA3050B Rev. 2:1996, and
4. Wet decomposition method through the use of nitric acid or hydrogen peroxide solution

(Note) Should a deposit (undesired substances) develop during pre-processing of lead contained in plastics, it must be turned into solution by solving it completely by any means (an alkali fusion method may be one).

### (2) Measurement method

The following are three typical measurement methods:

1. Inductive coupling - plasma emission spectroscopy analyzer (ICP-AES and ICP-OES), e.g. EN ISO 11885:1998,
  2. Atomic absorption spectrometer (AAS), e.g. EN ISO 5961:1995, and
  3. Inductive coupling - plasma mass spectrometer (ICP-MS)
- Combinations of pre-processing and measuring instruments other than the above will be acceptable if they can ensure that the lower limit of determination of lead is less than 30 ppm. Cadmium and lead can be analyzed at the same time if a method other than the above AAS is used.

(Note) Dissolution methods represented by EN71-3:1994, ASTM F963-96a and ISO 8124-3 are not applicable for pre-processing.

EN 1122 is not applicable for pre-processing of lead.

JIS K0102-55, Testing Method for Industrial Wastewater, is designed only for measurement methods, needing separate stipulation of a pre-processing method.

## 3. Mercury

### (1) Pre-processing

The following are three typical pre-processing methods.

1. Pressurized acid decomposition method in a sealed container (including a microwave decomposition method, e.g. EPA3052:1996),
2. Heat vaporization-cold-atomic-absorption method, and

3. Wet decomposition method with sulfuric acid or nitric acid by using a decomposition flask featuring a reflux condenser (Kjeldahl method)

(Note) Whatever the method, attention must be paid not to allow mercury to sublimate. A deposit, should it develop, must be turned into solution by solving it by any means.

(2) Measurement method

As with cadmium and lead, analysis by reduction-evaporation atomic-absorption method, ICP-AES (ICP-OES) with a hydride-generation equipment, or an ICP-MS method is considered to be adequate if low concentration is expected to be mixed.

- Combinations of pre-processing and measuring instruments other than the above will be acceptable if they can ensure that the lower limit of determination of mercury is less than 5 ppm.

#### 4. Chromium VI

For chromium, analysis must be made to ascertain that the total amount of chromium is less than 100 ppm, and for packaging materials, the sum of 4 elements of cadmium, lead, mercury and total chromium is less than 50 ppm. In this case, pre-processing may occur at the same time with cadmium and lead. If the analysis reveals that the total amount of chromium is more than 100 ppm, then analyze chromium VI in the total chromium to confirm that its amount is less than the value of the lower limit of determination. If the amount of the 4 elements is 50 ppm or greater for packaging materials, confirmation must be made that the total amount minus the measured amount of the total chromium is less than 50 ppm. Further, it must be determined that the chromium is chromium VI. Conclusively, no chromium VI must be detected.

#### Detection method of chromium VI

(1) Pre-processing

Dissolution method (warm-water extraction method or alkali extraction method (e.g. EPA 3060A))

(2) Measurement method

Ultra-violet visible spectroscopy (e.g. EPA 7196A)

- Combinations of pre-processing and measuring instruments other than the above will be acceptable if they can ensure that the lower limit of determination of the total chromium is less than 5 ppm. Cadmium, lead and total chromium can be analyzed at the same time if a method other than the above AAS is used.

## 5. PBBs and PBDEs

For specific brominated flame retardant PBBs and PBDEs, a gas chromatograph mass spectrometer (GC-MS) is to be used for analyses to confirm that the value of the lower limit of determination (10 ppm) is not exceeded. (Also acceptable is measurement as the total Br using an X-ray fluorescence analyzer (EDX) to prove absence.)

## 6. Additional analysis method of packaging materials

The total amount of mercury, cadmium, chromium VI and lead must be less than 100 ppm.

Chromium VI must be analyzed as the total chromium and the total of the 4 elements must be confirmed to be less than 100 ppm.

In this case, pre-processing may occur at the same time with cadmium and lead.

If the total of the 4 elements is 100 ppm or greater, confirm that the total content of cadmium, lead and mercury is less than 100 ppm. Further, chromium VI must be checked if present. Conclusively, no chromium VI must be detected.

## 7. For more information, please contact us at:

Environment Control Room

TEL 81-267-67-4580

FAX 81-267-68-4553

E-mail [environment@soshin.co.jp](mailto:environment@soshin.co.jp)

### Revision history:

Originally issued on May 21, 2004

Revised and 2nd edition issued on Sept. 19, 2006

Major change: Survey Substance List changed to comply with Ver. 3, which is JIG compatible, from JGPSSI Ver. 2.

Revised and 3rd edition issued on Jan. 13, 2010

Major changes: Survey Substance List changed to comply with Ver. 4 of No.JIG-101 Ed2.0. JAMP AIS and MSDSplus employed for compatibility with REACH requirements