

Guideline Regarding Non-Containment Management on Fujitsu Group Specified Chemical Substances

June 20, 2009 (Edition 3.0)

Fujitsu Limited

1. Objectives of This Guideline

It is expected that regulations regarding chemical substances contained in products, such as RoHS Directive in EU, Japanese “J-Moss”, and “China RoHS”, will be becoming stricter worldwide.

In response to this, Fujitsu Group revised “Fujitsu Group Green Procurement Direction” in May 2007 and has requested its suppliers to conform to its requirements specified in the direction regarding chemical substances contained in products to Fujitsu Group, or used in manufacturing processes of the products. In the revised direction, Fujitsu Group has specified chemical substances in five categories: “Banned Substances”, “Control Substances”, “Banned Substances for packaging Materials”, “Prohibited Substances in Manufacturing Process”, and “Other Restricted Substances in Delivery Destination Countries or Areas”.

As it is necessary to observe legal regulations, especially, non-containment of Banned Substances in products to Fujitsu Group shall be severely managed. In this regard, this guideline provides suppliers with basic ideas and methods how to verify and manage containment of the Banned Substances.

Please note that judgment whether or not products to Fujitsu Group comply with “Fujitsu Group Green Procurement Direction” shall be subject to the direction it self.

Moreover analysis methods for the evaluation and management of products to Fujitsu Group conform to “Guideline regarding analysis on Fujitsu Group specified chemical substances” (<http://www.fujitsu.com/global/about/procurement/green/>).

2. Scope

This guideline applies to all deliverables (hereinafter “Deliverables”) such as materials, components, units, accessories, software packages and packaging materials that are equipped to Fujitsu Group’s products, or OEM products.

3. Definition of Terms

3.1 Containment:

A chemical substance exists in Deliverables.

3.2 Non-containment:

Deliverables meet all of “Standards of ban” of “Banned Substances” specified in “Fujitsu Group Green Procurement Direction” per material.

3.3 Impurities:

substances that are contained in natural materials and cannot be eliminated during processes in which they are manufactured into industrial sources

3.4 Material:

homogeneous material which cannot be decomposed further more or composite materials which can be regarded as homogeneous in order to fulfill its specific function(s),

for which it is set or formed at particular position

3.5 Concentration:

content rate of chemical substances; the denominator on calculating concentration is mass of Material and the numerator is mass of the applicable chemical substance. In the case of metal alloy, a metal element in the metal alloy will be the numerator. Its unit is used with [ppm] (parts per million by weight) or [wt%] (weight percent).

3.6 Intentional addition:

deliberate use in the formulation of Deliverables where its presence is desired to provide a specific characteristic, appearance or quality regardless of concentration of the chemical substance

4. Non-Containment Management Principles for Specified Chemical Substances

The basic concepts of management that Deliverables do not contain Banned Substances (which are defined in “Fujitsu Group Green Procurement Direction”) are as follows:

Source management:	Every effort shall be made to eliminate Banned Substances via strict management at Material level.
Traceability:	Only identified Materials shall be used.
Management responsibility:	Suppliers who sell or supply Deliverables shall be responsible for verifying, by appropriate means, whether or not their supplying information about the contained chemical substances is correct.

5. Management Level

Concentration of Banned Substances shall be managed per Material of which Deliverables consist. Accordingly, in case that Fujitsu Group Green Procurement Direction specifies certain permissible concentrations in “Standards of ban”, concentration of Banned Substances “per Material” in Deliverables must be below the concentrations specified in “Standards of ban”. In this case, “per Material” means the minimum unit which is unable to be decomposed further. Examples of such minimum unit are as follows. (Refer to Figure 1.)

5.1 Examples of materials that should be managed as different Materials

- Base metal that is a structure member or sheet metal material vs. plating films, chromate coating, and paint coating
- Formed plastics vs. surface-printed inks or paint coating
- Metal used on printed wiring boards or LSI wirings vs. insulator resin or glass

5.2 Examples of materials that should be managed as one Material

- Alloys composed of two or more metal elements
- Plastics that is a mixture of polymer and inorganic particles or low-molecular

- compounds
- Glass fiber reinforced epoxy resin used as the core material for printed wiring boards
- Conductive adhesives that are composite materials including metal powder and polymer
- Inks and paints that are composite materials including colorants, shields, and polymer vehicles

6. Management Phases for Banned Substances

Since it is unrealistic to verify all Materials of all Deliverables, Materials that are produced from the same raw materials through the same manufacturing processes are regarded as equivalent each other. On the assumption that Banned Substances are not attached, mixed, or produced during manufacturing processes, the management at Material level shall be normally conducted as below. If management at Material level is difficult, it is permitted to manage the containment of Banned Substances based on the result of material-element analysis for manufactured items using analytical techniques with adequate sensitivity at statistically sufficient frequency.

6.1 If a “starting material” is processed to the Material which forms a part of the Deliverables or the Deliverables itself along with no composition change during manufacturing processes, such starting material shall be managed to control containment of the chemical substances.

- Resin pellets prior to injection molding
- Metal plates, blocks, etc. prior to pressing/cutting

6.2 If a “starting material” is processed to the Material which forms a part of the Deliverables or the Deliverables itself along with composition change during manufacturing processes, such starting material shall be managed with taking into account the composition changes to control containment of the chemical substances.

- Printings, paintings, and adhesive joints
If ink, paints, or adhesives used on these parts contains an organic solvent, water, or other volatile component, they shall be managed based on its dry mass resulting from the elimination of the volatile constituents.
- Electrodeposition coating
Coating liquid shall be managed based on the quantity of the electrodeposited element contained in the coating.
- Plating
Plating liquid shall be managed to ensure that the concentrations of lead, cadmium, and mercury contained in it are sufficiently low. "Sufficiently low" here means that the concentrations of lead, cadmium, and mercury contained in the plated Materials are guaranteed to be lower than those specified in Section 7 "Concentrations That Suggest Intentional Addition".
- Vapor-deposited films and sputtered films
“The target” of vapor-deposition or sputtering shall be managed with taking into account the evaporation of each substance or the sputtering efficiency.

6.3 Chromate coating that may be subjected to chromium oxidation-reduction reactions shall be managed based on conducting chemical analysis of test pieces having chromate coating that are prepared under the same or equivalent conditions (substrate, treatment liquid, and treatment processes) as those of the Deliverables. In this case, the shapes of the test pieces don't matter, even if they are different from those of the Deliverables.

7. Concentrations That Suggest Intentional Addition

In the Fujitsu Group Green Procurement Direction, it is specified that a part of Banned Substances is allowed to be contained in Deliverables in case that either containment of the substances are applicable to the "Exempted applications", or the substances are contained as impurities whose concentration don't exceed certain permissible values given in the Direction. Considering JIS (Japanese Industrial Standards) regulations, other authorized standards, and the generally accepted materials and manufacturing methods, it is assumed that concentrations of the substances as impurities contained in materials that are distributed at present are sufficiently lower than those indicated in Table 1. Therefore, other than being applicable to the "Exempted applications", if the concentration of a substance exceeds the values indicated in Table 1, it is likely that the substance was intentionally added, otherwise attached, mixed, or produced during a certain phase of the supply chain. In this case, it is necessary to identify the cause of such containment and defuse it unless it results from impurities.

Please note that the concentrations given in Table 1 are not the standards of ban for Materials, but rough indications for suppliers to have general ideas whether the substances are intentionally added, otherwise attached, mixed, or produced in the supply chain.

Table 1 Concentrations that suggest intentional addition, or attachment, etc. in supply chain (unit: ppm)

Material		Lead	Cadmium	Mercury	Hexavalent chromium
Base metal	Iron alloy	200	75	100	
	Aluminum alloy	100			
	Copper alloy	500			
	Other metal	200			
Metal plating film (including lead-free solder plating)		200	75	100	
Chromate coating		-	-	-	See Chapter 8.
Solder for mounting		1000	75	100	
Resin and plastics		100	50	100	200
Paint and ink		100	50	100	200
Glass and ceramics		500	75	100	200

Any concentration analysis method is acceptable if it is verified to have both the lower detection limit lower than the concentrations shown in Table 1 and the enough accuracy for this quantitative analysis.

About analysis which is widely used, please also refer to “Guideline regarding analysis on Fujitsu Group specified chemical substances” (<http://www.fujitsu.com/global/about/procurement/green/>).

8. Judging Whether a Chromate Coating Contains Hexavalent Chromium

No useful analysis technology has been established to determine the concentration of hexavalent chromium in chromate coating. Therefore, the judgment whether hexavalent chromium is contained in the chromate coating should be conducted by the methods defined in “Guideline regarding analysis on Fujitsu Group specified chemical substances”. That is, conduct the dissolution test on the specimen by the method of JIS H8625 Annex 2 or IEC 62321 Annex B.5.2. Then, quantitatively analyze the concentration of Hexavalent chromium by 1.5-diphenylcarbazine absorption spectroscopy, ion-chromatography, or iron coprecipitation separation, which are specified in ICP-AES in EPA 7199A, EPA 7196A, JIS K0400-65-20, etc. The detection limit of the above method is 0.01 $\mu\text{g}/\text{cm}^2$, which is less than the stable quantitative determination limit. Therefore hexavalent chromium is judged as not contained if its dissolution concentration is 0.1 $\mu\text{g}/\text{cm}^2$ or lower.

9. Revision history

November 1, 2004 (Edition 1) : Created

May 1, 2007 (Edition 2) : Revised in part

June 20, 2009 (Edition 3) : Revised in part

Figure 1 Examples of materials that should be managed as different Materials
(Each text box, each item in a text box as well, are regarded as different Materials.)

