



Title:	<b>HEAVY METALS IN SURFACE COATINGS SPECIFICATION</b>			Number:	<b>SRS-012</b>
Revision:	<b>P</b>	Author:	<b>C. FISCHER</b>	Date:	<b>9/30/08</b>
Hasbro RI Approval:		Hasbro UK Approval:		Hasbro FE Approval:	

## 1.0 PURPOSE

To provide specifications that limit the heavy metal content of surface coatings to a quantity that minimizes the potential of a child's exposure to heavy metal elements and is also compatible with current manufacturing capabilities and analytical feasibility. In addition, conformance to this specification will ensure compliance to heavy metals requirements of U.S. Federal Regulation (CPSC) for lead, F963 ASTM (TMA) Specifications, and EN-71 (European Standard) Canadian Heavy Metal in Surface Coatings as well as various other international specifications, as well as various other specifications including ROHS (Europe), and the CSG (Council of State Governments, formally CONEG) regulations on packaging materials.

## 2.0 SCOPE

- 2.1 All surface coatings including paints, inks, hot stamped surfaces, vacuum metalized surfaces, labels etc. are included in the scope of this specification. A "surface coating" is defined as a fluid, semi-fluid, or other material, with or without a suspension of finely divided coloring matter, which changes to a solid film when a thin layer is applied to a metal, wood, stone, paper, leather, cloth, plastic, or other surface.

Also subject to the requirements of this specification are materials intended to leave a trace (e.g. the graphite materials in pencils and liquid ink in pens and markers).

- 2.2 Exempt from this specification are materials which actually become an integral part of the substrate, such as colorants in plastic articles, or those materials which are actually bonded to the substrate such as by electroplating or ceramic glazing. (Please note that Cd (cadmium) and its compounds are not exempt from this section. i.e. cadmium plating and cadmium ceramic glazes are not acceptable).

NOTE: Fabrics or other materials that are laminated to, glued to, or otherwise attached to other surfaces are NOT surface coatings.

NOTE: For Heavy Metals Specifications other than surface coatings please refer to SRS-044, SRS-047, SRS-052 or SRS-060.

NOTE: ROHS (Restriction of Hazardous Substances) Directive. It is Hasbro, Inc. policy that all components of subject electronic products comply with ROHS requirements. Compliance with limits indicated in TABLE SRS-012-1 will provide conformance to ROHS. However, it is also Hasbro, Inc. policy that ROHS compliance is attained by vendor certification that all components of subject electronic products are ROHS compliant. Therefore, Hasbro, Inc. testing for ROHS compliance is not a requirement. Nevertheless, ROHS verification testing may be performed on a discretionary basis.

### 3.0 PROCEDURE

- 3.1 Scrape the dry sample off the substrate with a sharp blade. (Liquid paints and inks are dried on glass and then removed with the blade).
- 3.2 Wet ash a weighed portion of the scrapings in nitric acid or a mixture of nitric and sulfuric acids.
- 3.3 Measure the total concentrations of lead, arsenic, antimony, cadmium, barium, mercury, chromium and selenium by AA, FGAA, ICP, or ICPMS.
- 3.4 Confirm the accuracy of the analyses by spiking or by another acceptable QA technique.
- 3.5 If a specific metal's total content exceeds the required limit (see Table SRS-012) then extract an additional portion of the scrapings according to the solubility method specified on Table SRS-012-1.

### 4.0 SPECIFICATION

- 4.1 The heavy metals listed in Table SRS-012 must not be intentionally added ingredients in Hasbro, Inc. surface coatings.
- 4.2 The incidental heavy metal content of surface coatings is acceptable if the required limits on table SRS-012 are not exceeded.

If a required limit is exceeded but the maximum limit is not exceeded, a retest of the surface coating must be immediately performed. If the retest results do not exceed the

maximum limit, the surface coating is acceptable but the vendor shall be immediately notified to take corrective action so that the required limit is not exceeded, on subsequent lots.

If a required limit is exceeded on a subsequent lot, that lot will be rejected.

If a maximum limit is exceeded in a first test or a retest, the surface coating is not acceptable and the lot will be rejected.

## **5.0 REFERENCES**

- 5.1 16 CFR 1303
- 5.2 F 963-07 (ASTM) SECTIONS 4.3.5 AND 8.3.
- 5.3 EN 71-3:1995, "Specification for the Migration of Certain Elements".
- 5.4 CSG Model Legislation on Toxics in Packaging Materials (e.g. California Assembly Bill 455, 10/9/03)
- 5.5 Canada Gazette Part II, vol. 139, No.9. Registration SOR/2005-109, April 19, 2005 Hazardous Products Act, "Surface Coatings Materials Regulations".

**TABLE SRS - 012- 1**  
**HEAVY METAL LIMITS FOR SURFACE COATINGS**

<b><u>ELEMENT</u></b>	<b><u>REQUIRED LIMIT</u></b>	<b><u>MAXIMUM LIMIT</u></b>
LEAD* (TOTAL)**	0.005% (50 PPM)	0.007% (70 PPM)
LEAD (SOLUBLE)	0.005% (50 PPM)	0.007% (70 PPM)
ANTIMONY (SOLUBLE)	0.0025% (25 PPM)	0.006% (60 PPM)
ARSENIC (SOLUBLE)	0.001% (10 PPM)	0.0025% (25 PPM)
BARIUM (SOLUBLE)	0.035% (350 PPM)	0.035% (350 PPM)
SELENIUM (SOLUBLE)	0.020% (200 PPM)	0.050% (500 PPM)
CADMIUM (SOLUBLE)	0.003% (30 PPM)	0.004% (40 PPM)
CADMIUM* (TOTAL)**	0.003% (30 PPM)	0.004% (40 PPM)
CHROMIUM* (SOLUBLE)	0.004% (40 PPM)	0.006% (60 PPM)
CHROMIUM* (TOTAL)**	0.05% (500 PPM)	0.075% (750 PPM)
MERCURY* (SOLUBLE)	0.001% (10 PPM)	0.001% (10 PPM)
MERCURY* (TOTAL)**	0.001% (10PPM)	0.001% (10 PPM)

**\*On packaging material only** - the sum of total lead (Pb), total Cadmium (Cd), total Chromium (Cr), and total Mercury (Hg), must not exceed 100ppm. If the total exceeds 100ppm then soluble testing must be performed and the soluble total of the 4 elements must not exceed 100ppm.

**\*\*** On Electronic products the total Lead, Cd, Cr. and Hg limits are as specified to provide compliance with European ROHS requirements.  
(ROHS = Restriction of the use of certain hazardous substances)

### **METHOD TO DISSOLVE SOLUBLE MATTER PER EN 71-3, 1995 SECTION 3 (SURFACE COATINGS)**

Scrape the coating off the laboratory sample and comminute it at room temperature. Obtain a test portion of not less than 100 mg. passing through a metal sieve with an aperture of 0.5mm.

If the laboratory sample is not uniform (e.g. differs in color or substance) in its coating, obtain a test portion from each different coating as specified above.

In the case where there is insufficient uniform coating to produce the test portion of 100 mg., scrape off the available coating. The test portion so obtained shall be comminuted in order to maximize the mass of the test portion which is recorded. The mass shall be reported.

In the case of coatings that by their nature cannot be comminuted (e.g. elastic/plastics paint) remove a test portion from the laboratory sample without comminuting the coating.

Mix the test portion so prepared with 50 times its mass of an aqueous solution of 0.07 mol/l hydrochloric acid at 37 plus/minus 2 degrees C. In the case of a test portion of less than 100 mg., mix the test portion with 5.0 ml. of this solution at the given temperature. Shake for one minute.

Method to dissolve soluble matter - The coating material to be assessed shall be in the dried or cured state. Pulverize the dry coating in such a way so that it can pass through the 0.5 mm. mesh of a metallic sieve (500 micron) aperture. Weigh the pulverized coating. Mix the pulverized coating in a solution of hydrochloric acid containing 0.25 by weight of hydrogen chloride (0.07N HCL) at 37 plus/minus 2 degrees C. Shake for one minute.

Check the acidity of the mixture. If the pH is greater than 1.5, add dropwise with shaking an aqueous solution of 2 mol/l (7.3% m/m) hydro-chloric acid until the pH is 1.5 or less. Protect the mixture from light.

Shake the mixture efficiently for 1 hour continuously and then allow the mixture to stand for 1 hour at 37 plus/minus 2 degrees C.

NOTE:

It has been shown that the extraction of soluble cadmium can show a 2 fold increase when extraction is carried out in the light rather than in dark.

If problems with adequate temperature control arise, the mixing, shaking and standing can be performed at room temperature. However, when the final results so obtained are between 50% and 100% of the required limits in table SRS-012 the test shall be repeated at 37 degrees C. as these conditions form the basis for acceptance or rejection.

If necessary, centrifuge the mixture and separate the solids from the mixture by filtration through a membrane filter with a pore size of 0.45 um and examine the resulting solution to determine the presence and quantity of the appropriate elements. If it is not possible to examine the solution within one working day, take care to ensure the stability of the solution.

## **6.0 REVISION LOG**

<b><u>REVISION LETTER</u></b>	<b><u>SECTION REVISED</u></b>	<b><u>REVISION SUMMARY</u></b>	<b><u>BY</u></b>	<b><u>DATE</u></b>
I	2.2, Table SRS-012	Revised section 2.2 to eliminate Cd (cadmium) exemption. Added 100ppm total Cd max limit (75ppm require limit). Revision addresses the non-applicability of electroplating/ceramic glazing exemption to Cd.	CJF	7/10/03
	1.0, Table SRS-012, and added reference	Added specification to provide for explicit compliance to CSG (Council of State Governments, formerly CONEG) regulations on packaging materials	CJF	12/2/03
K	Table SRS-012	Revised requirement for packaging materials to test for “total” initially, then, if necessary, soluble.	CJF	5/12/04
L	TABLE SRS-012	Added new Canadian mercury requirements – total Hg not to exceed 10 PPM	CJF	6/7/05
M	1.0, 2.0, Table SRS-044	Added ROHS information	CJF	4/17/06
N	2.2, Table SRS-012-1	Added “NOTE” on “Fabrics and other materials”. Lowered Barium, 350 max limits to ppm; required limit to 350ppm.	CJF	10/11/07
O	Table SRS-012-1	Reduced max. limit on Pb from 300ppm to 90ppm; reduced required limit from 90ppm to 60ppm	CJF	02/12/08
P	Table SRS-012	Reduced max limit on Pb from 90 to 70 ppm; reduced required limit to 50 ppm. Reduced Cd limits to 40 ppm max and 30 ppm required	CJF	9/30/08