

# IBM Halogenated Flame Retardants and Polyvinylchloride Material Substances Specification

EC N28742, Dec 20, 2010 - PN 46M2586

J Adams

[jackiea@us.ibm.com](mailto:jackiea@us.ibm.com)

IBM Corporation

720.397.5475

# IBM Halogenated Flame Retardants and Polyvinylchloride Material Substances Specification

<b>IBM Halogenated Flame Retardants and Polyvinylchloride Material Substances Specification</b>	
<b>Owner:</b> Jacklin A Adams, STSM and Chair for the Center of Excellence for Product Environmental Compliance	
<b>Approval List</b>	
Name	Title
<b>Reviewer List</b>	
Louis Ferretti	Project Executive CoE and SCSR
Debbie Horn	STG Lead, Product Environmental Steward
Dr. George Galyon	STSM STG Lead Development
Anne Brinkley	STSM, Manager, Corporate Environmental Affairs
Dr. Sophia Lau	Center of Excellence for Product Compliance Test Lead
Robert W. Griffin	Corporate Environmental and Product Safety
Curtis Grosskopf	SME Components AOP, Logic and Memory
Jane Edwards	ISC Legal Counsel
Carmen Rarden Josh Tennant	ISC Contracts

# **IBM** Halogenated Flame Retardants and Polyvinylchloride Material Substances Specification

## **Table of Contents**

<b>1.0 SCOPE</b>	4
<b>2.0 PURPOSE</b>	4
3.0 Precedence	4
<b>4.0 REQUIREMENTS (SUBSTANCES IN PRODUCTS)</b>	5
<b>4.1 Substances Restricted from Use in IBM Products and Parts</b>	
<b>Table 1</b> List of Organic brominated flame retardants other than Polybrominated biphenyls (PBBs) and Polybrominated diphenyl ethers (PBDEs)	
<b>Table 2</b> List of Some Chlorinated Organic Chemical Compounds used as Flame Retardants other than short chain chlorinated paraffins	
<b>Table 3</b> Polyvinylchloride (PVC)	
<b>5.0 EXCEPTION PROCESS</b>	7
<b>6.0 COMPLIANCE VERIFICATION</b>	7
<b>7.0 METRIC MEASUREMENT SYSTEM QUANTITIES FOR SOLIDS &amp; LIQUIDS</b>	7
<b>8.0 REFERENCES</b>	8

# **IBM** Halogenated Flame Retardants and Polyvinylchloride Material Substances Specification

## **1.0 SCOPE**

This specification applies to materials, parts, assemblies and products used in the fabrication of IBM logo or non logo products when this specification is referenced.

This specification does not apply to product packaging or shipping materials, which are covered by other IBM specifications. Note that IBM engineering specification 46G3772 supersedes this document for all other materials and their restrictions where the restriction requirement is more stringent than the applicable requirement stated in this document. When referring to IBM engineering specification 46G3772 the latest engineering release level applies. For IBM part numbers controlled by IBM Microelectronics Division, the controlling environmental specifications IBM engineering specification 46G3772 and 39R5038 supersede this document for all other materials and their restrictions where the restriction requirement is more stringent than the applicable requirement stated in this document. When referring to IBM engineering specification 46G3772 and IBM engineering specification 39R5038 the latest engineering release level applies.

This specification does not supersede any health, product safety, or qualification requirements currently required by other IBM specifications and the industry standards cited therein. (E.g. IBM anti-smoke, flammability, qualification requirements,)

## **2.0 PURPOSE**

The purpose of this specification is to communicate IBM's restrictions and reporting requirements associated with polyvinylchloride (PVC) and halogenated flame retardants (chlorinated and brominated).

## **3.0 Precedence:**

In case of conflict between IBM requirements, the most stringent applies. The below is meant for an example of precedence. The order of precedence provisions set forth in the Applicable agreement shall apply. In the event of an

# **IBM Halogenated Flame Retardants and Polyvinylchloride Material Substances Specification**

inconsistency in the technical requirements, the following order of precedence shall apply:

IBM Written Waivers (mutually agreed in writing by the appropriate procurement representative.)

IBM Part Number Drawing (or equivalent component description documentation)

This Specification

IBM engineering specification 46G3772 with any addendums

SQRD

Other IBM Specifications

Referenced Industry Standards

Supplier Technical Specifications – (including such items as: electrical performance specs, quality and reliability commitments etc.)

## **4.0 REQUIREMENTS (SUBSTANCES IN PRODUCTS)**

PVC and halogenated flame retardants are restricted from use in both IBM logo and non logo products and parts therein, unless approved by IBM procurement professional. For the purposes of this document halogenated flame retardants include all brominated flame retardants (BFRs), and chlorinated flame retardants (CFRs) except those PBBs, PBDEs, and short chain chlorinated paraffins which are prohibited by specific legislation as stated in IBM engineering specification 46G3772.

Specifically, the substances identified in Section 3.1 below are restricted from use in IBM products and parts if their concentration is equal to or greater than 1000ppm by weight of the plastic material containing the substance.

Alternative materials used in place of PVC or halogenated flame retardants shall meet IBM's assessment requirements. An alternative can be considered viable if it eliminates the halogenated flame retardant or PVC to less than 1000ppm. This must be done without compromise to the product's or part's safety, as well as its electrical and mechanical attributes as designated by that commodities' engineering specification. Contact your IBM Procurement Professional for verification and approvals.

# IBM Halogenated Flame Retardants and Polyvinylchloride Material Substances Specification

## 4.1 Substances Restricted from Use in IBM Products and Parts

Below is a representation of some BFRs noted in table 1.0, CFRs noted in table 2.0 and PVC noted in table 3.0 all with their corresponding CAS numbers.

**Table. 1** An Example of Organic brominated flame retardants other than Polybrominated biphenyls (PBBs), and Polybrominated diphenyl ethers (PBDEs)

Brominated Flame Retardants (other than PBBs or PBDEs)	CAS Numbers
Brominated flame retardant which comes under notation of number FR(14) [Aliphatic/alicyclic brominated compounds]	ISO 1043-4 code
Brominated flame retardant which comes under notation of ISO 1043-4 code number FR(15) [Aliphatic/alicyclic brominated compounds in combination with antimony compounds]	-
Brominated flame retardant which comes under notation of ISO 1043-4 code number FR(16) [Aromatic brominated compounds excluding brominated diphenylether and biphenyls]	-
Brominated flame retardant which comes under notation of ISO 1043-4 code number FR(17) [Aromatic brominated compounds excluding brominated diphenyl ether and biphenyls) in combination with antimony compounds]	-
Brominated flame retardant which comes under notation of ISO 1043-4 code number FR(22) [Aliphatic/alicyclic chlorinated and brominated compounds]	-
Brominated flame retardant which comes under notation of ISO 1043-4 code number FR(42) [Brominated organic phosphorus compounds]	-
Tris(2-chloroethyl) phosphate	115-96-8
Poly(2,6-dibromo-phenylene oxide)	69882-11-7
Tetra-decabromo-diphenoxy-benzene	58965-66-5
1,2-Bis(2,4,6-tribromo-phenoxy) ethane "	37853-59-1
3,5,3,5-Tetrabromo-bisphenol A (TBBA)	79-94-7
TBBA, unspecified	30496-13-0
TBBA-epichlorhydrin oligomer	40039-93-8
TBBA-TBBA-diglycidyl-ether oligomer	70682-74-5
TBBA carbonate oligomer	28906-13-0
TBBA carbonate oligomer, phenoxy end capped	94334-64-2
TBBA carbonate oligomer, 2,4,6-tribromo-phenol terminated	71342-77-3
TBBA-bisphenol A-phosgene polymer	32844-27-2
Brominated epoxy resin end-capped with tribromophenol	139638-58-7 135229-48-0
TBBA-(2,3-dibromo-propyl-ether)	21850-44-2
TBBA bis-(2-hydroxy-ethyl-ether)	4162-45-2
TBBA-bis-(allyl-ether)	25327-89-3
TBBA-dimethyl-ether	37853-61-5
Tetrabromo-bisphenol S	39635-79-5
<b>TBBS-bis-(2,3-dibromo-propyl-ether)</b>	42757-55-1
2,4-Dibromo-phenol	615-58-7
2,4,6-tribromo-phenol	118-79-6

# IBM Halogenated Flame Retardants and Polyvinylchloride Material Substances Specification

Pentabromo-phenol	608-71-9
2,4,6-Tribromo-phenyl-allyl-ether	3278-89-5
Tribromo-phenyl-allyl-ether, unspecified	26762-91-4
Bis(methyl)tetrabromo-phthalate	55481-60-2
Bis(2-ethylhexyl)tetrabromo-phthalate	26040-51-7
2-Hydroxy-propyl-2-(2-hydroxy-ethoxy)-ethyl-TBP	20566-35-2
TBPA, glycol-and propylene-oxide esters '	75790-69-1
N,N-Ethylene -bis-(tetrabromo-phthalimide)	32588-76-4
Ethylene-bis(5,6-dibromo-norbornane-2,3-dicarboximide)	52907-07-0
2,3-Dibromo-2-butene-1,4-diol	3234-02-4
Dibromo-neopentyl-glycol	3296-90-0
Dibromo-propanol	96-13-9
Tribromo-neopentyl-alcohol	36483-57-5
Poly tribromo-styrene	57137-10-7

**Table 2 List** of Some Chlorinated Organic Chemical Compounds used as Flame Retardants other than short chain chlorinated paraffins

Chlorinated Flame Retardants (other than short chain chlorinated paraffins)	CAS Numbers
2,2-Bis(chloromethyl)trimethylene bis[bis (2-chloroethyl) phosphate]	38051-10-4
Chlorendic acid	115-28-6
Tetrakis(2-chloroethyl)dichloroisopentyldiphosphate	38051-10-4
Tris(2-chloroethyl) phosphate	115-96-8
Tris(1-chloro-2-propyl)phosphate [CAS No. 13674-84-5]	13674-84-5
Tris(2,3-dichloro-1-propyl)phosphate	66108-37-0
Hexachlorocyclopentadienyl-dibromocyclooctane	51936-55-1
Tetrakis(2-chloroethyl)dichloroisopentyldiphosphate	38051-10-4

**Table 3** Polyvinylchloride (PVC)

# **IBM** Halogenated Flame Retardants and Polyvinylchloride Material Substances Specification

<b>Polyvinylchloride</b>	<b>CAS Numbers</b>
Polyvinylchloride	9002-86-2

## **5.0 EXCEPTIONS**

If a functionally equivalent alternative substance is not available that meets the product's or part's safety, as well as its electrical and mechanical attributes you must immediately report this to your IBM procurement professional with a mutually agreed upon schedule and plan to supply an alternative to IBM that meets all current physical, mechanical, electrical and safety attributes. Any exceptions to the requirements in this document must be approved and documented by the appropriate IBM procurement organization, prior to supplier implementation.

## **6.0 COMPLIANCE VERIFICATION**

It is the responsibility of the supplier to comply with this specification when referenced and provide complete and accurate compliance information per IBM ES 46G3772. For IBM part numbers controlled by IBM Microelectronics Division, per the controlling environmental specifications IBM engineering specification 46G3772 and IBM engineering specification 39R5038. IBM reserves the right to review and/or audit a Supplier's process used to ensure compliance.

## **7.0 METRIC MEASUREMENT SYSTEM QUANTITIES FOR SOLIDS AND LIQUIDS**

### **METRIC SYSTEM QUANTITIES**

#### **For Solids**

1 kilogram (kg) = 1 million milligrams (mg)  
so: 1 mg/kg = 1 part per million

1 kilogram (kg) = 1 billion micrograms (ug)  
so: 1 ug/kg = 1 part per billion

#### **For Liquids**

1 liter (l) of water weighs exactly 1 kg  
so: 1 mg/l = 1 part per million and  
1 ug/l = 1 part per billion

# **IBM** Halogenated Flame Retardants and Polyvinylchloride Material Substances Specification

1 kg = about 2.2 pounds

1 l = about 1 quart

## **7.0 References**

[1] Joint Industry Guide (JIG-101 Ed 2.0), April 28, 2009 (or latest version

<http://www.CE.org/JIG>

[2] Directive 2002/95/EC of the European Parliament and of the Council on the restriction of the use of Hazardous Substances

[http://ec.europa.eu/environment/waste/weee/legis\\_en.htm](http://ec.europa.eu/environment/waste/weee/legis_en.htm)

[3] Regulation (EC) No 1907/2006 of the European Parliament and of the Council

concerning the

Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), December 18, [http://echa.europa.eu/reach/legislation\\_en.asp](http://echa.europa.eu/reach/legislation_en.asp)

[4] JEDEC JEP709, A Guideline for Defining "Low-Halogen" Solid State Devices

(Removal of BFR/CFR/PVC)

[5] ES Specification 46G3772 and other IBM Information for Suppliers:

<http://www03.ibm.com/procurement/proweb.nsf/ContentDocsByTitle/United+States-Information+for+suppliers>

[6] IBM Engineering Specification 5897661 - Recyclable Packaging Materials, Selection and Identification

<Http://www03.ibm.com/procurement/proweb.nsf/ContentDocsByTitle/United+States-Information+for+suppliers>