Material or Methods Specification Doc Number: EMS-0008				D 6		
TITLE:	Controlled and I	Reportable Materials Disclosur	e			
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ISSUE	ORIGINATOR	DETAILS	OF CHANG	E		DATE
A	W.Janisch	This specification serves to re-re- specification as a Motorola Mob of the original specification was provided on "Misc." reporting re- containing substance limits were provided for the use of DBT and provide a comprehensive list of substance limits found in Appen	elease the M ility Specifica simplified. A quirements, l e amended, I BFR's, and Motorola def dix C.	otorola 1202897 ation. The overa dditional detail v BFR&PVC& Tin exemptions were Annex E was ac fined Exemption	7W18 II text vas e dded to s to	01 April 2011
В	W.Janisch	This revision serves to modify S which will include the use of IPC Suppliers to apply multiple Exer following new Compliance Secti Links to Motorola reporting tools updated and additional guidance data reporting, and the use of C	Cupplier report C1752A data nptions provions: RoHS, and training e is provided r and Ni in th	rting requiremen reporting and re ided in Annex E I, II, V, and Surfa material were on the use of "N ne surface of pro	it equires for the ace. (Misc." oducts.)1 Decr2011
С	Jason Chen	Remove legacy business inform exemptions; add Prop 65 and lo RoHS 2 and W18 (surface); inte Mineral requirement; remove co	ation and ex w halogen re grate WPA I balt from W ²	pired RoHS egulations; spec REACH and Cor 18(surface).	ify nflict	19 Jan 2017
D	Jason Chen	Adding chlorinated flame retard retardants into section 5; separ SVHC/Authorization/Restriction surface exemptions.	ants and pho ately add RE link; update	osphorus flame ACH RoHS exemptio	ns and	19 Feb 2020
Е	Jason Chen	Add China VOC substances, up Expire Date	date RoHS e	exemptions, Upo	late	22 Oct 2020
6	Jason Chen	Add EU2019/2021, USA EPA-T Toxics in Packaging Legislation Remove EU2019/2021, Add PF section into Section V, update th table layout, change the issue fit	SCA substar , mineral oils CA and PFH ne exemptior rom letter to	nces, USA Mode in France packa (xS, combine Su n list, adjust REA number	el aging, Irface ACH	9 Aug 2022

1. SCOPE:

This specification sets forth Motorola Mobility LLC ("Motorola") materials disclosure requirements for items and materials used in the manufacture and delivery of products to Motorola customers. The list of substances that Motorola has targeted for exclusion, reduction or reporting is contained in Appendix A.

2. DEFINITIONS:

<u>Assembly</u> - An Assembly is a collection of components and materials that are not intended to be disassembled or cannot reasonably be disassembled without the use of a specialized tool by the end user. Products are considered as assemblies.

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Banned Substances - These substances are not allowed for use at any level unless noted as an exemption in the acceptance criteria.

<u>CAS Number</u> – or CAS (Chemical Abstract Service) Registry Number (CASRN) is a unique number identifying chemical substances. CASRNs, assigned by the CAS Registry, a division of the American Chemical Society, are the only method in existence for identifying discrete substances. CASRNs may be obtained from raw material suppliers or directly from the CAS Registry.

<u>Controlled Substances</u> - These substances are limited for use in the manufacturing process or in certain applications at the levels specified in Appendix C.

EEE – Electrical and Electronic Equipment

<u>Homogeneous Material</u> - A material, as defined by the European Union Technical Adaptation Committee, that cannot be mechanically disjointed into different materials; homogenous materials are materials "of uniform composition throughout." Ceramics, glass, metals, alloys, paper, board, resins, coatings are provided as examples. The term "mechanically disjointed" would mean "that the materials can be, in principle, separated by mechanical actions such as for example: unscrewing, cutting, crushing, grinding and abrasive processes."

The following examples are provided:

- A plated lead frame has two materials, the plating material and the lead frame, that must be independently evaluated for controlled materials.
- A plastic cover is a "homogeneous material" if it consists of one type of plastic that is not coated with, or has attached to it or inside it, any other kinds of materials. In this case, the Maximum Concentration Values (MCV) of the RoHS directive would apply to the plastic.
- An electric cable that consists of metal wires surrounded by non-metallic insulation materials is an
 example of a "non-homogeneous material," because the different materials could be separated by
 mechanical processes. In this case the MCVs would apply to each of the separated materials
 individually.
- A semiconductor package contains many homogeneous materials, including plastic molding material, tin-electroplating coatings on the lead frame, the lead frame alloy and gold-bonding wires.

<u>Motorola IPC Creator</u> - is a The Motorola IPC Creator is a spreadsheet-based tool for creating an IPC 1752A Homogeneous Material Declaration (Class D) in XML format. Its basic functions are to load a Motorola XML request header, enter and edit material content information and generate an output XML file suitable for submission to Motorola. Instructions and material declaration examples on how to complete this form can be found here:

https://www.motorola.com/us/about/corporate-responsibility-materials-disclosure#reportable-materialdisclosure

Intentionally Added - "Intentionally Added" shall mean "deliberately utilized in the formulation of a material or part where its continued presence is desired in the final product to provide a specific characteristic, appearance or quality". Intentionally Added substances and materials can occur at any point in the supply chain, i.e. a sub-tier supplier may add a material or substance that a tier 1 supplier must report to Motorola. Further, catalysts introduced during processing are always considered to be intentionally added materials. The use of recycled materials as feedstock for the manufacture of new products, where some portion of the recycled materials may contain amounts of regulated metals, is not to be considered as intentionally added.

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<u>Material</u> - A "Material" is made up of one or more "Substances". Note: Very few materials are composed of only one substance (e.g., all metals contain other substances at low concentrations either as unintentional contaminants or purposely introduced alloying agents).

<u>Part</u> - A Part is any item or assembly that a supplier sells to Motorola that is incorporated into Motorola's products.

Reportable Substances - These substances are not currently banned but must be reported for other purposes.

<u>Reporting Threshold</u> - Concentration level which defines the limit equal to or above which the presence of a substance or material must be reported.

<u>Substance</u> - A "Substance" is a chemical element, compound, or polymer and has a CAS number. For example: stainless steel is a material typically composed of the following substances: Iron; Carbon; Manganese; Silicon; Chromium; Nickel; and others. The polymer Polycarbonate is a "Substance" because there is a CAS number (25037-45-0) for it. Lexan is the brand name for a Material. Lexan is not a "Substance" because it includes other constituents in addition to the Polycarbonate Substance and because it does not have a CAS number.

<u>Substance Concentration</u> – Concentration shall be expressed in parts per million (ppm) The formula for parts per million (ppm) is 1,000,000 * mass substance / mass of the homogeneous material. Concentrations are unitless, for example 100 ppm = 0.01% = 100 mg/kg.

<u>Sub-Tier</u> Supplier - Any company selling or providing a material or part that is incorporated into Motorola products but is not directly sold to Motorola.

<u>Supplier</u> - The Company selling or providing a material part, or assembly to Motorola that Motorola intends to use in its products. Supplier, tier 1 supplier, and vendor are used interchangeably.

3. MOTOROLA'S RESPONSIBILITIES:

It is the responsibility of Engineering or personnel who prepare component and/or specifications/contracts to:

- 3.1. Ensure the appropriate reference to this specification on all prints for Motorola Items as follows:
 - 3.1.1. All prints, specifications and contracts for Motorola parts must include a reference to the 1202897W18-MD.
 - 3.1.2. Print notes must include a reference to the appropriate section in Appendix C applicable to the Motorola Item, and should detail any exemptions which will be permitted.
 - 3.1.3. Print notes shall include the **1202897W18-MD** reference without revision.
 - 3.1.4. Recommended language for use in prints:

"Supplier must provide all required information and comply with Motorola's Controlled and Reportable Materials Disclosure 1202897W18-MD requirements. MOTOROLA WILL NOT QUALIFY PARTS THAT DO NOT MEET THE APPROPRIATE ACCEPTANCE CRITERIA AS OUTLINED IN APPENDIX C."

- 3.2. Ensure that materials and parts specified for designs comply with this specification, including OEM materials and parts.
- 4. SUPPLIER'S RESPONSIBILITIES:

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It is the responsibility of all suppliers to:

- 4.1. Comply with the reporting requirements detailed in Clause 5 of this specification for all parts and assemblies. Note that the specific acceptance criteria are defined by Appendix C as dictated by the specific Motorola Business.
- 4.2. The Motorola Mobility IPC Creator tool is recommended to declare Controlled and Reportable substances.
- 4.3. Material content data reported should be the worst case if more than one bill of material or production operation exists.
- 4.4. Cascade the requirements in this specification to their sub-tier suppliers. Sub-tier supplier data input is a must for complete material and substance data determination.
- 4.5. Report any change to the material content of an approved part or assembly by re-submitting an updated report using Motorola Mobility IPC Creator and complying with all other applicable Motorola change control requirements.
- 4.6. Motorola may allow the use of IPC1752A Class A Declaration (non-homogeneous material), in specific limited applications. The supplier must receive prior authorization from the in-business product compliance organization to report using any format other than the IPC1752A Declaration Class D (homogeneous material).
- 4.7. Completion of this report and submission to Motorola constitutes a testament that all the information is true and correct to the best of the supplier's knowledge.
- 4.8. Supplier agrees to notify Motorola of any changes to the product that could affect compliance and or material or substance makeup of the part as required under Motorola PCN process.
- 5. REPORTING:

Material content data reported by suppliers is not shared outside of Motorola at the part level (unless required for compliance or certification). Motorola reserves the right to use supplier material content data to report the material content of our products to our customers or regulatory agencies, without revealing supplier information unless required by law.

When a lab analysis is used to determine the composition of a homogeneous material, it should be performed per international standards, such as those currently under development by the IEC. Note: Material assay is not intended to fulfill all requirements of this specification.

- 5.1. Reporting instructions are as follows:
 - 5.1.1. Report 100% of all homogeneous materials that are in the part or assembly.

Note: Motorola requires the reporting of <u>all inks</u>, <u>adhesives</u>, <u>plating</u>, <u>and paints</u> as homogeneous materials; regardless of the medium onto which they are printed this includes adhesives on labels and tapes.

- 5.1.2. Report all Controlled and Reportable Substances with concentrations in excess of the reporting thresholds noted in Appendix A as contained within each homogenous material.
 - Example: A eutectic Sn/Pb solder coating is used as a finish on a capacitor. This would require reporting the Pb concentration based on the weight of that coating. Because this is

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a eutectic solder, the concentration of Pb is well known at 37%. In other cases, the weight of the homogeneous material (in this case Sn/Pb) would have to be known to calculate the concentration.

- 5.1.3. Apply appropriate exemptions from Appendix E if a compliance threshold is exceeded. This may require the application of multiple exemptions to a single substance if the substance category has overlapping restrictions in different Compliance sections outlined in Appendix C. (e.g. Section RoHS and Section V). Exemptions must be appropriate to the use of the substance in a material. (e.g. Lead solder exemption must not be used for lead in the ceramic of electronic components)
- 5.1.4. When reporting the composition of homogenous materials, the use of "MISC" (Miscellaneous) may be used for a substance when none of the Banned, Controlled, and Reportable substances per Appendix A of this specification are present in the material above the reporting thresholds. Reporting "MISC" at a material level is not acceptable and can only exceed 10% by weight in a single homogeneous material under the following circumstances:
 - 5.1.4.1. The actual CAS# or Name is known but cannot be reported due to Intellectual Property (IP) reasons. In this case, the supplier must provide a certification from the <u>manufacturer of the material</u> in question that the substance(s) are known but cannot be reported for IP reasons, and that none of the Banned, Controlled, and Reportable substances per Appendix A of this specification are present in the material above the reporting thresholds. As an alternative, an MSDS or material laboratory reports may be acceptable subject to review and approval by Motorola. Note, a RoHS only lab report is not sufficient to demonstrate compliance with W18 requirements.
 - 5.1.4.2. In all cases, Motorola reserves the right to reject a supplier submission that is lacking sufficient evidence to demonstrate compliance.
 - 5.1.4.3. Misc. substances must be reported as CAS# = "SYSTEM" and substance name = "MISC., NOT TO DECLARE". Any deviation from this exact text will result in an unknown CAS# error upon submission.
- 5.1.5. The supplier is responsible to ensure that any units used are consistent and provide an accurate accounting of the substance concentration.

Finally, do not confuse Acceptance Criteria and the related exemptions with reporting requirements. Reporting a substance or material is always required even if it is exempt or meets the Part Acceptance Criteria. For example, lead in ceramics must be reported.

6. PART ACCEPTANCE CRITERIA:

Motorola will assign a compliance status for parts based on the acceptance criteria of the various sections of Appendix C. This status will determine the acceptability of parts for use. Motorola requires all parts to meet the acceptance criteria as outlined in Appendix C unless granted a formal waiver as defined in the internal exception policies (e.g.- for some spare and replacement parts, customer specification required parts, specific markets, etc.). This applies to parts that reference this specification and the corresponding acceptance criteria of this specification. Please note that compliance with multiple sections is required for every part/product.

Note that reporting per this specification is always required, regardless if the acceptance criteria is met.

7 CHANGE MANAGEMENT

The organization shall control planned changes and review the consequences of unintended changes,

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taking action to mitigate any adverse effects, as necessary.

8. APPROVALS:

Organization	Approver Name	Approver Signature	Date
Regulatory Affairs - Global	Paul Didcott		
MBG Regulatory Compliance	Jeff Narducci		

8. APPENDICES:

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Appendix A: Banned, Controlled and Reportable Substances

Motorola defines the following minimum Reporting Thresholds for the following Banned, Controlled or Reportable Substance families. Please reference Section V of Appendix C to obtain compliance Acceptance Thresholds, and reference Appendix E for exemptions to those Thresholds as noted.

Substances	Motorola Category	Reporting Threshold (ppm at a homogenous level unless otherwise indicated)
Asbestos, asbestos compounds	Banned	0
Chlorofluorocarbons and halons (Class I and II ozone depleting Chemicals). Must also be reported used in any processing of a part	Banned	0
Dimethylfumerate or dimethylformamide	Banned	0
Halogenated dioxins and furans	Banned	0
Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulfur Hexafluoride (SF6)	Banned	0
Phenol, 2-(2H-benzotriazol-2-yl)-4,6-bis(1,1-imethylethyl)-	Banned	0
Polychlorobiphenyls and derivatives (PCBs)	Banned	0
Polychloroterphenyls and derivatives (PCTs)	Banned	0
REACH Annex XVII	Banned	0
Alkyl Hydrocarbon	Controlled	100
Alkyl nitrite	Controlled	100
Anthracene	Controlled	100
Antimony and antimony compounds	Controlled	100
Aromatic compounds as monomers (except where listed separately)	Controlled	100
Arsenic and arsenic compounds	Controlled	100
Azo Dyes in leathers and textiles	Controlled	1
Barium and barium compounds	Controlled	100

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Brominated Flame Retardants (other than PBBs or PBDEs) (e.g. Tetrabromobisphenol-A)	Controlled	100		
Chlorinated flame retardants	Controlled	100		
Chromium and chromium compounds	Controlled	100		
Cobalt and cobalt compounds, except cobalt dichloride	Controlled	100		
Cobalt dichloride	Controlled	10		
Cadmium and cadmium compounds	Controlled	10		
Chromium (VI) compounds	Controlled	100		
Chromium (VI) compounds in leather and textiles	Controlled	1		
Ethylene Glycol, its Ether and its acetate	Controlled	1		
Formaldehyde	Controlled	100		
Halogenated hydrocarbon	Controlled	100		
Latex and latex compounds	Controlled	100		
Lead and lead compounds	Controlled	100		
Lead in cable jackets	Controlled	100		
Mercury and mercury compounds that are intentionally added	Controlled	1		
Methanol	Controlled	100		
2-Methyloxirane	Controlled	100		
1-Methyl-2-pyrrolidone (NMP)	Controlled	100		
Mineral Oil Aromatic Hydrocarbons (MOAH)	Controlled	1000		
Naphthalene	Controlled	50		
2-nitropropane	Controlled	100		
Nickel and nickel compounds	Controlled	100		
Naphthalene	Controlled	100		

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Perfluoro alkyl sulfonates (PFAS), and derivatives (including PFOS)	Controlled	100
C9–C14 Perfluoroalkyl carboxylic acids (PFCAs) and Perfluorohexanesulfonic acid (PFHxS)	Controlled	0.0025
Polybrominated biphenyls (PBBs)	Controlled	100
Polybrominated diphenyl ethers (PBDEs) (including Nonabromodiphenyl ether)	Controlled	100
Phthalates	Controlled	100
PVC and vinyl chloride monomer	Controlled	100
phosphorus flame retardants	Controlled	100
Proposition 65 List that exposes to end consumers	Controlled	1
REACH SVHC	Controlled	100
Selenium and selenium compounds	Controlled	100
Short-chain chloroparaffins – chlorinated alkanes with 10–13 carbon atoms in the chain and a minimum of 48 percent chlorine by weight	Controlled	100
Tin and tin compounds	Controlled	100
Aluminum and aluminum compounds	Reportable	100
Amines, aliphatic	Reportable	100
Aniline salts	Reportable	100
Aromatic amines and dyes	Reportable	100
Aromatic (Poly) Hydrocarbons (PAH and PCAH)	Reportable	100
4-Aminobiphenyl	Reportable	100
Beryllium and beryllium compounds	Reportable	100
Bismuth and bismuth compounds	Reportable	100
Certain short and medium chained chlorinated paraffins	Reportable	100
Copper and copper compounds	Reportable	100
Ferrosilicon and alloys	Reportable	100

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Gold and compounds	Reportable	100
Halogenated aromatic compounds as monomers (including Polychlorinated Naphthalenes)	Reportable	100
Halogenates that produce acidic vapor with water	Reportable	100
Iron and iron compounds	Reportable	100
Magnesium and magnesium compounds	Reportable	100
Organic azo and azo-oxy compounds	Reportable	100
Organic halogen compounds (except where listed separately) Reportable	100
Organic phosphorous compounds	Reportable	100
Organic silicon compounds	Reportable	100
Palladium and palladium compounds	Reportable	100
Perchlorates	Reportable	6 ppb
Perfluorocarbons	Reportable	100
Polybrominated Terphenyls	Reportable	100
Radioactive substances	Reportable	100
Rubidium and rubidium compounds	Reportable	100
Silver and silver compounds	Reportable	100
Small Fibers – All parts containing fibers or fibrils 5um (micro in diameter with a length: diameter ratio equal to or greater th	ns), or less, nan 3:1 Reportable	100
Sulfur Hexafluoride	Reportable	100
Tantalum and tantalum compounds	Reportable	100
Tellurium and tellurium compounds	Reportable	100
Tetramethylthiuram disulfide (Thiram)	Reportable	100
Thallium and thallium compounds	Reportable	100
Zinc and zinc compounds	Reportable	100

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Appendix B: Reserved

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Appendix C: Acceptance Criteria

Section RoHS 2: Product Acceptance Criteria

Substances	Motorola Category	Acceptance Threshold (ppm at a homogenous level unless otherwise indicated)	Reference
Cadmium	Controlled	100*	EU Directive 2011/65/EU (ROHS 2)
Hexavalent chromium	Controlled	1000*	EU Directive 2011/65/EU (ROHS 2)
Lead	Controlled	1000*	EU Directive 2011/65/EU (ROHS 2)
Mercury	Controlled	1000*	EU Directive 2011/65/EU (ROHS 2), Swiss Ordinance on Reduction of Risk from Chemical Products, Various US states
Polybrominated biphenyls (PBBs)	Controlled	1000*	Canada Regulation, EU Directive 2011/65/EU (ROHS 2)
Polybrominated diphenyl ethers (PBDEs)	Controlled	1000*	EU Directive 2011/65/EU (ROHS 2), Various US states
Bis (2-ethylhexyl) phthalate (DEHP)	Controlled	1000*	EU Directive 2011/65/EU (ROHS 2)
Benzyl butyl phthalate (BBP)	Controlled	1000*	EU Directive 2011/65/EU (ROHS 2)
Dibutyl phthalate (DBP)	Controlled	1000*	EU Directive 2011/65/EU (ROHS 2)
Diisobutyl phthalate (DIBP)	Controlled	1000*	EU Directive 2011/65/EU (ROHS 2)

* Exemptions may apply for specific usages above the given threshold. Please refer to Appendix E for a comprehensive list of available exemptions.

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Section REACH: Product Acceptance Criteria

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Substances	Motorola Category	Acceptance Threshold (ppm at product level)	Reference
REACH SVHC (Candidate)*	Controlled	1000**	EC 1907/2006
REACH Authorization*	Controlled	0**	EC 1907/2006
REACH – Restriction*	Banned / Controlled	0**	EC 1907/2006

* Latest REACH SVHC refer to https://echa.europa.eu/candidate-list-table

* Latest REACH Authorization refer to https://echa.europa.eu/authorisation-list

* Latest REACH Restriction refer to https://echa.europa.eu/substances-restricted-under-reach

** Exemptions may apply for specific usages above the given threshold. Please refer to Appendix E for a comprehensive list of available exemptions.

Section Proposition 65: Product Acceptance Criteria

Substances	Motorola Category	Acceptance Threshold	Reference
Ethylene Glycol Monomethyl Ether and its acetate	Controlled	5	Motorola Initiative
Ethylene Glycol Monoethyl Ether and its acetate	Controlled	5	Motorola Initiative
Bisphenol A (BPA)	Controlled	300	Motorola Initiative
Lead in cable jackets	Controlled	300	Motorola Initiative
Proposition 65 list (Except the above) *	Controlled	0*	Motorola Initiative

* Latest Prop 65 regulated substances refer to this link, http://oehha.ca.gov/proposition-65/proposition-65-list

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Section USA TSCA: Product Acceptance Criteria				
Substances	Motorola Category	Acceptance Threshold	Reference	
Decabromodiphenyl ether (DecaBDE)	Banned	-	USA EPA TSCA	
Hexachlorobutadiene (HCBD)	Banned	-	USA EPA TSCA	
Phenol, isopropylated phosphate (3:1) (PIP (3:1))	Banned	-	USA EPA TSCA	
Pentachlorothiophenol (PCTP)	Banned	-	USA EPA TSCA	
2,4,6-Tris(tert-butyl)phenol (2,4,6-TTBP)	Banned	-	USA EPA TSCA	
1,3-Butadiene	Controlled	1000	USA EPA TSCA	
1,1,2-Trichloroethane	Controlled	1000	USA EPA TSCA	
Dichlorobenzene compounds	Controlled	1000	USA EPA TSCA	
Ethylene dibromide	Controlled	1000	USA EPA TSCA	
Halogenated hydrocarbon	Controlled	5000	USA EPA TSCA	
1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8- hexamethylcyclopenta [g]-2-benzopyran (HHCB)	Controlled	1000	USA EPA TSCA	
Formaldehyde	Controlled	1000	USA EPA TSCA	
Phthalic anhydride	Controlled	1000	USA EPA TSCA	
1,1,2-Trichloroethane	Controlled	1000	USA EPA TSCA	

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Note: Exemptions may apply for specific usages above the given threshold. Please refer to Appendix E for a comprehensive list of available exemptions.

Section II: Reserved Section III: Reserved Section IV: Reserved

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Section V: Mobile Devices Business Compliance Acceptance Criteria

The following substances that are listed cannot exceed the specified limit except where exemptions are noted. Please reference Appendix E for exemptions to thresholds if noted.

Substances	Motorola Category	Acceptance Threshold (ppm at a homogenous level unless otherwise indicated)	Reference
Asbestos, asbestos compounds	Banned	-	United States Toxic Substances Control Act
Chlorofluorocarbons and halons (Class I and II ozone depleting chemicals)	Banned	-	EU Regulation (EC) No. 2037/2000; 1990 amendments of the Clean Air Act (United States)
Dimethylfumerate	Banned	-	EU Directive 2009/251/EC
Halogenated dioxins and furans	Banned	-	German Regulation
Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulfur Hexafluoride (SF6)	Banned	-	EU Directive 842/2006/EC; Austrian Regulation BGBI. II No 447/2002
Perfluoroalkyl and Polyfluoroalkyl substances (PFAS)	Banned	-	USA Model Toxics in Packaging Legislation
Phenol, 2-(2H-benzotriazol-2-yl)-4,6-bis(1,1- imethylethyl)-	Banned	-	Japanese law – <u>Article 13 of</u> the Law concerning the <u>Evaluation of Chemical</u> <u>Substances and Regulation</u> of their Manufacture, etc.
Polychlorobiphenyls and derivatives (PCBs)	Banned	-	Norway Regulations; Canada regulations, et al
Polychloroterphenyls and derivatives (PCTs)	Banned	-	Norway Regulations; Canada regulations, et al
Alkyl Hydrocarbon	Controlled	150000	China VOC regulation, GB 30981-2020, GB 38507- 2020, GB 33372-2020 and GB 38508-2020
Alkyl nitrite	Controlled	20000	China VOC regulation, GB 30981-2020, GB 38507- 2020, GB 33372-2020 and GB 38508-2020
Anthracene	Controlled	500	China VOC regulation, GB 30981-2020, GB 38507- 2020, GB 33372-2020 and GB 38508-2020
Aromatic compounds as monomers (except where listed separately)	Controlled	3000	China VOC regulation, GB 30981-2020, GB 38507- 2020, GB 33372-2020 and GB 38508-2020

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Brominated Flame Retardants (other than PBBs or PBDEs)	Controlled	1000*	Motor	ola Initiative	
Chlorinated Flame Retardants	Controlled	1000*	Motor Chem (2016	ola Initiative, Swedish ical Tax Act :1067)	
Cadmium, Chromium (VI), Lead and Mercu metals and compounds in packaging	ry Controlled	sum of metals not to exceed 100 ppm based on total package weight	<u>EU Re</u> variou	egulation 94/62/EC; Is US states	
Cadmium and cadmium compounds in "portable" batteries	Controlled	20 ppm of the total battery cell weight.	EU Re	egulation 2006/66/EC	
Chromium (VI) compounds in leather and textiles	Controlled	3	Germand C	any - § 30 of the Food ommodities Law G)	
Ethylene Glycol, its Ether and its acetate	Controlled	10000	China 30981 2020, GB 38	VOC regulation, GB -2020, GB 38507- GB 33372-2020 and 3508-2020	
Formaldehyde	Controlled	5000	China 30981 2020, GB 38	VOC regulation, GB -2020, GB 38507- GB 33372-2020 and 3508-2020	
Halogenated hydrocarbon	Controlled	5000	China 30981 2020, GB 38	VOC regulation, GB -2020, GB 38507- GB 33372-2020 and 3508-2020	
Mercury and mercury compounds	Controlled	1000*	Swiss Reduce Chem US state	Ordinance on ction of Risk from ical Products, Various ates	
Mercury and mercury compounds in batteries	Controlled	5 ppm of the total battery cell	<u>EU Re</u> <u>2006//</u> <u>on Re</u> <u>Chem</u> US sta	<u>agulation</u> 66/ECSwiss Ordinance duction of Risk from ical Products, Various ates	
Methanol	Controlled	10000	China 30981 2020, GB 38	VOC regulation, GB -2020, GB 38507- GB 33372-2020 and 3508-2020	
2-Methyloxirane	Controlled	20000	China 30981 2020, GB 38	VOC regulation, GB -2020, GB 38507- GB 33372-2020 and 3508-2020	
1-Methyl-2-pyrrolidone (NMP)	Controlled	20000	China 30981 2020, GB 38	VOC regulation, GB -2020, GB 38507- GB 33372-2020 and 3508-2020	
Mineral Oil Aromatic Hydrocarbons (MOAH) Controlled	10000	Frenc	h Law	



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Naphthalene	Controlled	500	China 30981 2020, GB 38	VOC regulation, GB I-2020, GB 38507- GB 33372-2020 and 3508-2020
2-Nitropropane	Controlled	20000	China 30981 2020, GB 38	VOC regulation, GB 1-2020, GB 38507- GB 33372-2020 and 3508-2020
C9–C14 Perfluoroalkyl carboxylic acids (PFCAs) and Perfluorohexanesulfonic acid (PFHxS)	Controlled	0.025	Switz	erland ChemRRV
Phosphorus Flame Retardants	Controlled	1000*	Motor Chem	ola Initiative, Swedish iical Tax Act
PVC and vinyl chloride monomer	Controlled	1000*	Motor	ola Initiative
Phthalates	Controlled	1000*	Motor EU Di	ola Initiative, irective 2015/863
Phthalates	Controlled	100*	Mode Legisl	l Toxics in Packaging lation
Polybrominated biphenyls (PBBs)	Controlled	1000	Cana Motor	<u>da Regulation,</u> ola Initiative
Polybrominated diphenyl ethers (PBDEs)	Controlled	1000	USA	Regulation
Perfluoro alkyl sulfonates (PFAS), and derivatives (including PFOS)	Controlled	100	<u>EU Di</u> 2006/	irective 122/ECEU Regulation
Short-chain chloroparaffins – chlorinated alkanes with 10–13 carbon atoms in the chain and a minimum of 48 percent chlorine by weight compounds	Controlled	1000	<u>Norwa</u> <u>FOR-</u> <u>Ordina</u> <u>Risk f</u> <u>Produ</u>	ay Product Regulations 2004-06-01-922/ Swiss ance on Reduction of rom Chemical ucts
Bromine (Br) in Printed Circuit Board (PCB) and substrate laminates	Controlled	900	IEC 6	1249-2-21
Chlorine (CI) in Printed Circuit Board (PCB) and substrate laminates	Controlled	900	IEC 6	1249-2-21
Total Br+Cl in Printed Circuit Board (PCB) and substrate laminates	Controlled	1500	IEC 6	1249-2-21
Antimony and Antimony compounds	Controlled	0*	Motor	ola Surface Initiative
Arsenic and arsenic compounds	Controlled	0*	Motor	ola Surface Initiative
Barium compounds	Controlled	0*	Motor	ola Surface Initiative
Cadmium and Cadmium compounds	Controlled	0*	Motor	ola Surface Initiative
Chromium and Chromium compounds	Controlled	0*	Motor	ola Surface Initiative

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Latex and latex compounds	Controlled	0*	Moto	rola Surface Initiative				
Lead and Lead compounds	Controlled	0*	Moto	rola Surface Initiative				
Mercury and Mercury compounds	nds Controlled 0			rola Surface Initiative				
Selenium and selenium compounds	Controlled	0*	Moto	rola Surface Initiative				

* Exemptions may apply for specific usages above the given threshold. Please refer to Appendix E for a comprehensive list of available exemptions.

Section Conflict Minerals: Conflict Minerals Product Acceptance Criteria

Substances	Motorola Category	Acceptance Threshold (ppm at a homogenous level unless otherwise indicated)	Reference
Tin	Banned	0*	Dodd–Frank Wall Street Reform and Consumer Protection Act
Tungsten	Banned	0*	Dodd–Frank Wall Street Reform and Consumer Protection Act
Tantalum	Banned	0*	Dodd–Frank Wall Street Reform and Consumer Protection Act
Gold	Banned	0*	Dodd–Frank Wall Street Reform and Consumer Protection Act

* Exemptions may apply for the usages from non-restricted regions. Motorola suggest an EICC form to be required for all parts that contain those metals and conflict free smelters need to be identified. EICC form can be found here: www.eicc.info.

Appendix E: Exemptions to Motorola Compliance Acceptance Criteria

The following provides Exemptions to the Compliance Criteria found in Appendix C. These exemptions are to be applied by a Supplier in the Motorola IPC Creator file submitted to Motorola and will be reviewed by the Motorola Regulatory Compliance team prior to file acceptance. Please note for

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overlapping Substance categories, the suppliers must apply applicable exemptions in each exemption class.

Section RoHS: EU RoHS Exemptions*

Controlled Substance Category	PPM	#	Expiration Date	Exemption Description
CADMIUM AND CADMIUM COMPOUNDS	100	8(b)-l	07/22/2021	Cadmium and its compounds in electrical contacts
CADMIUM AND CADMIUM COMPOUNDS	100	13(b)-(II)	07/22/2021	Cadmium in striking optical filter glass types, excluding applications falling under point 39 of this annex
CADMIUM AND CADMIUM COMPOUNDS	100	13(b)-(III)	07/22/2021	Cadmium and lead in glazes used for reflectance standards
CADMIUM AND CADMIUM COMPOUNDS	100	21(a)	07/22/2021	Cadmium when used in color-printed glass to provide filtering functions, used as a component in lighting applications installed in displays and control panels of EEE
CADMIUM AND CADMIUM COMPOUNDS	100	21(b)	07/22/2021	Cadmium in printing inks for the application of enamels on glasses, such as borosilicate and soda lime glasses
HEXAVALENT CHROMIUM	1000	9(a)-I	05/03/2021	Hexavalent chromium as an anti-corrosion of the carbon steel cooling system in absorption refrigerators
HEXAVALENT CHROMIUM	1000	9(a)-II	07/22/2021	Hexavalent chromium as an anti-corrosion of the cooling system in absorption refrigerators
LEAD AND LEAD COMPOUNDS	1000	5(b)	07/22/2021	Lead in glass of fluorescent tubes not exceeding 0.2% by weight
LEAD AND LEAD COMPOUNDS	1000	6(a)-I	07/22/2021	Lead as an alloying element in steel for machining purposes containing up to 0.35 percent lead by weight and in batch hot dip galvanized steel components containing up to 0.2 percent lead by weight
LEAD AND LEAD COMPOUNDS	1000	6(b)-I	07/22/2021	Lead as an alloying element in aluminum containing up to 0.4 percent lead by weight, provided it stems from lead-bearing aluminum scrap recycling
LEAD AND LEAD COMPOUNDS	1000	6(b)-II	05/18/2021	Lead as an alloying element in aluminum for machining purposes with a lead content up to 0.4 percent by weight



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LEAD AND LEAD COMPOUNDS	1000	6(c)	07/22/202	21 Copper alloy containing up to 4 percent lead by weight		
LEAD AND LEAD COMPOUNDS	1000	7(a)	07/22/202	Lead in high melting temperature type solders (i.e. lead based alloys containing 85 percent by weight or more lead)		
LEAD AND LEAD COMPOUNDS	1000	7(c)-l	07/22/202	Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound		
LEAD AND LEAD COMPOUNDS	1000	7(c)-ll	07/22/20	21 Lead in dielectric ceramic in capacitors for a rated voltage of 125 V AC or 250 V DC or higher		
LEAD AND LEAD COMPOUNDS	1000	7(c)-IV	07/22/202	Lead in PZT-based (lead-zirconium-titanate) dielectric ceramic materials for capacitors which are part of integrated circuits or discrete semiconductors		
LEAD AND LEAD COMPOUNDS	1000	13(a)	07/22/202	21 Lead in white glasses used for optical applications		
LEAD AND LEAD COMPOUNDS	1000	13(b)-(l)	07/22/20	Lead in ion-colored optical filter glass types		
LEAD AND LEAD COMPOUNDS	1000	13(b)-(III)	07/22/202	21 Cadmium and lead in glazes used for reflectance standards		
LEAD AND LEAD COMPOUNDS	1000	15(a)	07/22/20	21 Lead in solders to complete a viable electrical connection		
LEAD AND LEAD COMPOUNDS	1000	18(b)	07/22/202	Lead as activator in the fluorescent powder (1 percent lead by weight or less) of discharge lamps when used as sun tanning lamps containing phosphors such as BSP (BaSi ₂ O ₅ :Pb)		
LEAD AND LEAD COMPOUNDS	1000	18(b)-l	07/22/202	Lead as activator in the fluorescent powder (1 percent lead by weight or less) of discharge lamps containing phosphors such BSP(BaSi2O5:Pb) when used in medical phototherapy equipment		
LEAD AND LEAD COMPOUNDS	1000	21(c)	07/22/202	Lead in printing inks for the application of enamels on other than borosilicate glasses		
LEAD AND LEAD COMPOUNDS	1000	24	07/22/202	Lead in solders for the soldering to machine through hole discoidal and planar array ceramic multilayer capacitors		



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LEAD AND LEAD COMPOUNDS	1000	29	07/22/2021	Lead bound in crysta Annex I (Categories Council Directive 69/	Lead bound in crystal glass as defined in Annex I (Categories 1, 2, 3 and 4) of Council Directive 69/493/EEC		
LEAD AND LEAD COMPOUNDS	1000	32	07/22/2021	Lead oxide in seal fri window assemblies for argon and kryptor	Lead oxide in seal frit used for making window assemblies for argon and krypton laser tubes		
LEAD AND LEAD COMPOUNDS	1000	34	07/22/2021	Lead in cermet-base potentiometer eleme	d trimmer nts		
LEAD AND LEAD COMPOUNDS	1000	37	07/22/2021	Lead in the plating la diodes on the basis of a zinc borate glass	yer of high voltage s body		
LEAD AND LEAD COMPOUNDS	1000	41	03/31/2022	Lead in solders and termination finishes of electrical and electronic components and finishes of printed circuit boards used in ignition modules and other electrical and electronic engine control systems, which for technical reasons must be mounted directly on or in the crankcase or cylinder of hand- held combustion engines (classes SH:1, SH:2, SH:3 of Directive 97/68/EC of the European Parliament and of the Council)			
MERCURY AND MERCURY COMPOUNDS	1000	1(a)	07/22/2021	For general lighting purposes < 30 W: 2.5 mg			
MERCURY AND MERCURY COMPOUNDS	1000	1(b)	07/22/2021	For general lighting purposes ≥ 30 W and < 50 W: 3.5 mg			
MERCURY AND MERCURY COMPOUNDS	1000	1(c)	07/22/2021	For general lighting purposes ≥ 50 W and < 150 W: 5 mg			
MERCURY AND MERCURY COMPOUNDS	1000	1(d)	07/22/2021	For general lighting p	ourposes ≥ 150 W: 15		
MERCURY AND MERCURY COMPOUNDS	1000	1(e)	07/22/2021	For general lighting p or square structural shape and mm: 7 mg	ourposes with circular tube diameter ≤ 17		
MERCURY AND MERCURY COMPOUNDS	1000	1(f)	07/22/2021	For special purposes	:: 5 mg		
MERCURY AND MERCURY COMPOUNDS	1000	1(g)	07/22/2021	For general lighting p lifetime equal or above 20,000 h: 3.5	ourposes < 30 W with a mg		
MERCURY AND MERCURY COMPOUNDS	1000	2(a)(1)	07/22/2021	Tri-band phosphor w a tube diameter < 9 mm (e.g. T2): 4 n	ith normal lifetime and ng		



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MERCURY AND MERCURY COMPOUNDS	1000	2(a)(2)	07/22/20	07/22/2021 Tri-band phosphor with a tube diameter ≥ 9 mm and ≤ 17 mm (th normal lifetime and (e.g. T5): 3 mg	
MERCURY AND MERCURY COMPOUNDS	1000	2(a)(3)	07/22/2021		Tri-band phosphor with normal lifetime and a tube diameter > 17 mm and ≤ 28 mm (e.g. T8): 3.5 mg		
MERCURY AND MERCURY COMPOUNDS	1000	2(a)(4)	07/22/2021		Tri-band phosphor with normal lifetime and a tube diameter > 28 mm (e.g. T12): 3.5 mg		
MERCURY AND MERCURY COMPOUNDS	1000	2(a)(5)	07/22/20)21	Tri-band phosphor with long lifetime (≥ 25,000 h): 5 mg		
MERCURY AND MERCURY COMPOUNDS	1000	2(b)(3)	07/22/2021		Non-linear tri-band phosphor lamps with tube diameter > 17 mm (e.g. T9): 15 mg		
MERCURY AND MERCURY COMPOUNDS	1000	2(b)(4)	07/22/2021		Lamps for other general lighting and special purposes (e.g. induction lamps): 15 mg		
MERCURY AND MERCURY COMPOUNDS	1000	3(a)	07/22/20)21	Short length (≤ 500 mm): 3.5 mg		
MERCURY AND MERCURY COMPOUNDS	1000	3(b)	07/22/2021		Medium length (> 500 mm and ≤ 1,500 mm): 5 mg		
MERCURY AND MERCURY COMPOUNDS	1000	3(c)	07/22/20)21	Long length (> 1,500 mm): 13 mg		
MERCURY AND MERCURY COMPOUNDS	1000	4(a)	07/22/20	21	21 Mercury in other low pressure discharge lamps (per lamp): 15 mg		
MERCURY AND MERCURY COMPOUNDS	1000	4(b)-l	07/22/2021		Mercury in high Pressure Sodium (vapor) lamps for general lighting purposes < 155 with improved color rendering index Ra > 6 (after 2011: not exceeding 30 mg per lamp		
MERCURY AND MERCURY COMPOUNDS	1000	4(b)-II	07/22/20	07/22/2021 Mercury in high Pressu amps for general lighti and > 155 W with impre- index Ra > 60 (> 2011: mg per lamp)		sure Sodium (vapor) ting purposes < 405 W proved color rendering 1: not exceeding 40	



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MERCURY AND MERCURY COMPOUNDS	1000	4(b)-III	07/22/202	07/22/2021 Mercury in high Pressure Sodium (vapor 07/22/2021 lamps for general lighting purposes > 40 with improved color rendering index Ra (> 2011: not exceeding 40 mg per lamp)	
MERCURY AND MERCURY COMPOUNDS	1000	4(c)-I	07/22/202	22/2021 Mercury in other High Pressure Sodium (vapor) lamps for general lighting purpos < 155W (> 2011: not exceeding 25 mg po lamp)	
MERCURY AND MERCURY COMPOUNDS	1000	4(c)-II	07/22/202	Mercury in other High Pressure Sodium (vapor) lamps for general lighting purpos < 405 W and > 155 W (> 2011: not exceeding 30 mg per lamp)	
MERCURY AND MERCURY COMPOUNDS	1000	4(c)-III	07/22/202	Mercury in other High Pressure Sodium (vapor) lamps for general lighting purposes > 405 W (> 2011: not exceeding 40 mg per lamp)	
MERCURY AND MERCURY COMPOUNDS	1000	4(e)	07/22/202	1 Mercury in metal hal	ide lamps (MH)
MERCURY AND MERCURY COMPOUNDS	1000	4(f)	07/22/202	1 Mercury in other disc specifically mentione	charge lamps not ed in this list

*Please apply for latest RoHS exemption referred to <u>https://ec.europa.eu/environment/waste/rohs_eee/legis_en.htm</u>



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Section V: Global Compliance Acceptance General Exemptions

Controlled Substance Category	PPM	#	Expiration Date	Exemption Description
CADMIUM AND CADMIUM COMPOUNDS	20	500	NA	Cadmium not in batteries or packaging covered by EU RoHS
ARSENIC AND ARSENIC COMPOUNDS	0	502	NA	Arsenic NOT in wood products as a preservative per 2003/2/EC
Phthalates	100	504	NA	Phthalates not controlled in this specific application. Exemption approved by MDB Product Safety Compliance.
PVC and vinyl chloride monomer	1000	505	NA	PVC and/or vinyl chloride monomer not controlled in this specific application. Exemption approved by MDB Product Safety Compliance.
Cd, Hg, Pb and CrVI	0	509	NA	The sum of Cd, Hg, Pb and CrVI does not exceed 100 ppm based on total package mass per 94/62/EC
C9–C14 Perfluoroalkyl carboxylic acids (PFCAs) and Perfluorohexanesulfonic acid (PFHxS)	0	510	NA	PFCAs or PFHxS not controlled in this specific application. Exemption approved by MDB Product Safety Compliance.
MERCURY AND MERCURY COMPOUNDS	5	515	NA	Mercury in batteries per EU Directive 98/101/EC not to exceed 5 ppm of total battery cell weight
MERCURY AND MERCURY COMPOUNDS	5	516	NA	Mercury in batteries per EU Directive 98/101/EC not to exceed 2% (20,000 ppm) for button cells
AZO DYES	30	517	NA	Usage of azodyes is NOT in leather and/or textiles per EU Directive 2002/61/EC
LEAD AND LEAD COMPOUNDS	70	518	NA	Lead NOT in cable jackets or packaging; covered by RoHS
HEXAVALENT CHROMIUM	3	519	NA	Cr(VI) and Cr(VI) Compound not in leather and textiles per Germ"n "Food and Commodities "aw"; up to 1000 ppm in EEE allowed per EU ROHS 2002/95/EC; heavy metals in packaging restricted under 94/62/EC
Antimony, Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium	0	528	NA	Part contains one or more substances among ASTM F963 regulation for 8 heavy metals(Chromium, Barium, Selenium, Antimony, Cadmium, Lead, Mercury and Arsenic) but will not have prolonged contact with skin (i.e. surface mount parts)
Antimony, Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium	0	529	NA	Part contains one or more substances among ASTM F963 regulation for 8 heavy metals(Chromium, Barium, Selenium, Antimony, Cadmium, Lead, Mercury and Arsenic), manufacturer certifies it meets ASTM F963-03



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Latex	0	534	NA	Part contains Latex by prolonged contact with mount parts)	ւt will not have ո skin (i.e. surface		
Short-chain chloroparaffins	1000	544	NA	Short-chain chloroparaffins not controlled this specific application. Exemption approved by MDB Product Safety Compliance			
Perfluoro alkyl sulfonates (PFAS) and derivatives	0	545	NA	Perfluoro alkyl sulfona derivatives is < 0.1% not applied in packagi	ites (PFAS) and of the article weight or ng		
Cadmium compound	20	550	NA	Cadmium is < 0.002% cell weight	of the total battery		
Mineral Oil Aromatic Hydrocarbons (MOAH)	10000	551	NA	Mineral Oil Aromatic Hydrocarbons (MOAH) is used not in packaging printing ink			
Bromine	900	901	NA	Br<900 ppm; Exemption approved by MDB Product Safety Compliance			
Brominated Flame Retardants	1000	902	NA	Brominated Flame Retardants are not used in PCB or plastic part			
Chlorine	900	903	NA	CI<900 ppm; Exemption approved by MDB Product Safety Compliance			
Chlorinated Flame Retardants	1000	904	NA	Chlorinated Flame Retardants are not used in PCB or plastic part			
Additive Phosphorus Flame Retardants	1000	905	NA	Additive Phosphorus Flame Retardants are not used in PCB or plastic part			
n-Hexane	150000	1501	NA	Alkyl Hydrocarbon (n- is compliance with Ch 33372	Hexane) in adhensive ina VOC regulation GB		
Isopropyl nitrite or Butyl nitrite	20000	1502	NA	Isopropyl nitrite or But is compliance with Ch 38507	yl nitrite in printing ink ina VOC regulation GB		
Anthracene	500	1503	NA	Anthracene in coating China VOC regulation	is compliance with GB 30981		
Aromatic compounds	3000	1504	NA	Aromatic compounds as monomers in Coating or Printing ink or adhesive or cleaning agent is compliance with China VOC regulations GB 30981, GB 38507, GE 33372 and GB 38508			
Ethylene Glycol, its Ether and its acetate	10000	1505	NA	Ethylene Glycol, its Ether and its acetate in coating or printing ink is compliance with China VOC regulation GB30981 and GB 38507			



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				Formaldehyde in Cleaning agent is		
Formaldehyde	5000	NA 1506		compliance with China VOC regulation GB 38508		
Halogenated hydrocarbon	5000	1507	NA	Halogenated hydrocarbon in coating or printing ink or adhesive or Cleaning agent is compliance with China VOC regulation GB30981, GB 38507, GB 33372 and GB 38508		
Methanol	10000	1508	NA	Methanol in Inorganic coating is compliance with China VOC regulation GB 30981		
2-Methyloxirane	20000	1509	NA	2-Methyloxirane in printing ink is compliance with China VOC regulation GB 38507		
1-Methyl-2-pyrrolidone (NMP)	20000	1510	NA	1-Methyl-2-pyrrolidone (NMP) in printing ink is compliance with China VOC regulation GB 38507		
Naphthalene	500	1511	NA	Naphthalene in coating is compliance with China VOC regulation GB 30981		
2-Nitropropane	20000	1512	NA	2-Nitropropane in printing ink is compliance with China VOC regulation GB 38507		