 <b>Western Digital</b>	Document Number: 2096-001669	Page: 1 of 30
	<b>Document Title: Western Digital Product Environmental Compliance Engineering Specification &amp; Requirements for Materials, Parts, Products &amp; Product Protective Packaging</b>	Revision: BA

**Document Number: 2096-001669**

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**Revision: BA**


**Owner Department: Product Regulatory Engineering (PRE) and Corporate Quality Management Systems**

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Revision 02


Effective date: 06 March 2025

	Document Number: 2096-001669	Page: 2 of 30
	<b>Document Title: Western Digital Product Environmental Compliance Engineering Specification &amp; Requirements for Materials, Parts, Products &amp; Product Protective Packaging</b>	Revision: BA

## Table of Contents

Section	Page
1. Purpose	3
2. Objective and Scope	3
3. Responsibility	4
4. Affected Site (s)	5
5. Reference Documents	5
6. Flowchart	5
7. PEC Requirements	5
Table 7.1 Controlled Substances in Parts/Materials and/or Production Process Parts/Materials	6
Table 7.2 Controlled Substances in Packaging Materials	15
Table 7.3 Reportable Substances in Parts/Materials and/or Production Process Parts/Materials.	17
Table 7.4 Controlled Substances in Batteries	19
8. Regulatory Requirements	20
9. Requirements for Suppliers	21
10. Testing Requirements	24
11. Terms and Definitions	26
12. Homogeneous Material Definition and Examples	29
13. Western Digital MDDS Formats	29
14. Records and Record Retention	29
15. Software, Systems, Applications	30
16. Training Requirements	30
17. Key Process Indicators/Metrics	30
18. Key Risk Analysis	30
19. Environment, Health and Safety (EHS)	30
20. Revision History	30
21. Appendix	31

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	Document Number: 2096-001669  <b>Document Title: Western Digital Product Environmental Compliance Engineering Specification &amp; Requirements for Materials, Parts, Products &amp; Product Protective Packaging</b>	Page: 3 of 30
		Revision: BA

**1. Purpose**

- 1.1. Western Digital must guarantee environmental compliance for all materials, parts, products and Product Protective Packaging and materials used during the manufacture of the parts, products and Product Protective Packaging for Western Digital.
- 1.2. Information on environmental compliance allows Western Digital to:
  - Satisfy legal and regulatory requirements
  - Drive improvements in product design; and
  - Respond to inquiries from customers, product recyclers and other stakeholders
- 1.3. This document describes Western Digital’s specifications for prohibiting, restricting, and reporting certain chemical compounds/materials/substances in Western Digital’s products or manufacturing processes.
- 1.4. This document describes Western Digital supplier’s requirements for compliance to Western Digital’s Product Environmental Compliance Engineering Specification.
- 1.5. This revision of the specification applies to all parts and materials that are purchased by Western Digital & its subsidiaries and used in Western Digital products, effective August 1st, 2024. For parts that are already compliant to the previous revision, no action is required (with the exceptions of specific customer requirements on certain products)
- 1.6. **Disclaimer:** This document sets forth Western Digital’s minimum requirements for supplying components and/or products to Western Digital. Supplier is solely responsible for ensuring that its components and/or products comply with applicable international substance restriction directives, laws, and regulations and conformance with this document does not imply or ensure that the component meets all regulatory requirements. Western Digital does not assume any responsibility or liability for supplier’s compliance or the compliance of any supplier-manufactured component and/or product. Supplier is solely responsible and liable for any non-compliant component and/or product and resulting damages and/or corrective actions needed in accordance with the contract between Western Digital and the supplier.

This specification is divided into two product categories:

**Product Category 1:**

- Hard Disk Drive products [eHDD, cHDD and other HDD product lines, including Platform products] and all included components

**Product Category 2:**


- Content Solutions for all branded products [commercial and/or retail products] including External Storage Products and other retail ODM product lines

**2. Objective and Scope**

**2.1. OBJECTIVES**

- This document describes Western Digital's environmental policy objectives and, worldwide legal & regulatory and customer requirements.
- This document describes the restrictions on Materials, certain chemicals used in manufacturing.
- This document describes compliance requirements for the European Union (EU) Directive 2011/65/EU on the Restriction on the use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS).

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	Document Number: 2096-001669	Page: 4 of 30
	<b>Document Title: Western Digital Product Environmental Compliance Engineering Specification &amp; Requirements for Materials, Parts, Products &amp; Product Protective Packaging</b>	Revision: BA

- This document also describes Halogenated Flame Retardants BFR/CFR/PVC-Free and Low Halogen (Halogen Free) requirements for materials, parts, products and Product Protective Packaging supplied for Western Digital applications which are designed to meet “BFR/CFR/PVC-Free” requirements and Low Halogen or Halogen Free requirements.

**2.2. SCOPE**

- Western Digital Environmental Compliance Specification establishes baseline environmental requirements for:
- All materials, parts, products and Product Protective Packaging used in Western Digital -designed applications, products and/or those referencing this specification in a Statement of Work, print, contract or other procurement documents.
- Products designed, manufactured and sold by Western Digital.
- Products contracted to a third party by Western Digital for design and manufacturing and sold by Western Digital with its trademark/logo (including Branded Products).
- Repair or service parts.
- Instruction manuals
- Suppliers must ensure all material, parts, products and Product Protective Packaging comply with the requirements provided in this document.
- The supplier is responsible for compliance with this specification, including compliance of any subcontracted operations and procured materials used in the manufacture of parts, products and Product Protective Packaging for Western Digital applications.
- Suppliers are responsible to comply with all applicable legal and worldwide local, state, national, or international “Environmental Laws including laws, rules and regulations relating to environmental matters such as material restrictions, material bans, labeling, availability of product environmental information, and other similar requirements.
- Suppliers are required to disclose information about all the substances contained in the materials, parts, products and Product Protective Packaging shipped to Western Digital.
- All conflicts and deviations must be notified to Western Digital procurement and Product Environmental Compliance Team
- The approved drawings take precedence over this specification.

**3. Responsibility**

Roles	Responsibilities
Document Administration	This document is maintained and controlled by Western Digital PRE, Product Environmental Compliance group. Supplier questions regarding the requirements in this specification must be referred to Western Digital procurement and PRE, Product Environmental Compliance group

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**4. Affected Site (s)**

Sites Affected	
<input type="checkbox"/>	Corporate Headquarters Activities
<input checked="" type="checkbox"/>	Locations where Design (Research) activities occur
<input checked="" type="checkbox"/>	Locations where Development activities occur
<input checked="" type="checkbox"/>	Locations where Manufacturing activities occur
<input checked="" type="checkbox"/>	Locations where Service and Support activities occur
<input type="checkbox"/>	Remote non-WDC sites (e.g., Customer Locations)
<input type="checkbox"/>	Specific Affected Site(s): Define Specific Sites Affected

**5. Reference Documents – NA**

**6. Flowchart – N/A**

**7. PEC Requirements**

**Table 7.1 Controlled Substances in Parts/Materials and/or Production Process Parts/Materials**

Item #	Controlled Substance	Maximum Threshold limit (ppm) at Homogenous Level	
		Category 1	Category 2
7.101	Alkylphenols	Banned	-
7.102	Antimony/Antimony Compounds	700	-
7.103	Arsenic/Arsenic Compounds	Banned in wood products, paints and all surface usage. 50 for others. Exemption for parts of semiconductor (substrates and chips), metal alloy, glass, magnetic filter, copper foil for PCB & Substrate and battery	1000  For only wood and paint applications
7.104	Asbestos	Banned	Banned



**Document Title: Western Digital Product  
Environmental Compliance Engineering  
Specification & Requirements for Materials,  
Parts, Products & Product Protective Packaging**

Item #	Controlled Substance	Maximum Threshold limit (ppm) at Homogenous Level	
		Category 1	Category 2
7.105	Aromatic Amines, Azo Colorants, Azo Dyes and Azo Compounds	Banned (The substances which are used in parts or articles that may come into direct and prolonged contact with the human skin) 30 for others	30 for textile or leather article except 1000 for CAS #118685-33-9 and C46H30CrN10O20S2.3Na
7.106	Barium or its compounds	100 in surface preparations of products and parts intended to come into direct and prolonged contact with the skin.	-
7.107	Benzene (CAS# 71-43-2)	Banned	-
7.108	Benzidine and its Salts	Banned	-
7.109	Benzotriazole	Banned	-
7.110	Beryllium and Its compounds (Except Beryllium oxide)	Banned Impurities 200	-
7.111	Beryllium oxide	Banned	-
7.112	Bis(chlorometyl) ether (CAS# 542-88-1)	Banned	-
7.113	Bisphenol-A (CAS # 80-05-7)	150 for external plastic; non-use in thermal paper 1000 for others	1000
7.114	Bromine and Chlorine (found in same homogeneous material)	1500	-
7.115	Bromine and its compounds (including in BFRs)	900	-
7.116	Cadmium/Cadmium Compounds	Banned in plating, surface coating and wood-based materials 5 for rubber, plastic, paints, inks, and plastic surface treatment, adhesives, tape, label, paper 20 in solder 50 in other application	5 for plastics, inks, paints, textiles, rubber, resins  100 for all other materials
7.117	Chlorine and its Compounds (including in CFRs)	900	1000

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Specification & Requirements for Materials,  
Parts, Products & Product Protective Packaging**

Item #	Controlled Substance	Maximum Threshold limit (ppm) at Homogenous Level	
		Category 1	Category 2
7.118	Chromium III and chromium compounds	100 Controlled in surface preparations of products and parts intended to come into direct and prolonged contact with the skin	-
7.119	Dechlorane plus (13560-89-9, 135821-03-3, 135821-74-8)	Banned	Banned
7.120	Creosote, coal tar, tar oils and anthracene substances	Prohibited for the treatment of wood	-
7.121	Decabromodiphenyl ethane (DBDPE) (CAS 84852-53-9) - All new products that begin development after 31 August 2022	Banned	-
7.122	Dibutyltin (DBT) compounds and Dioctyltin (DOT) compounds	Banned	1000 of Tin
7.123	Dimethylfumarate (DMF)	Banned	0.1
7.124	Di- $\mu$ -oxo-di-n-butylstanniohydroxyborane (DBB) [also known as dibutyltin hydrogen borate]	1000	-
7.125	Ethylene Glycol Monoethyl Ether and its acetate Ethylene Glycol Monomethyl Ether and its acetate	5	5
7.126	Fluorinated greenhouse gases (PFC, SF6, HFC)	Banned	-
7.127	Formaldehyde and formaldehyde-releasing substances	Banned for wood products 5 in textiles and leather	Banned for wood products 5 in textiles and leather

**Document Title: Western Digital Product  
Environmental Compliance Engineering  
Specification & Requirements for Materials,  
Parts, Products & Product Protective Packaging**

Item #	Controlled Substance	Maximum Threshold limit (ppm) at Homogenous Level	
		Category 1	Category 2
7.128	Halogenated Aromatic Substances	Banned from use in capacitors and transformers above 500 for mono halogenated in materials of the component. Banned from use in capacitors and transformers 50 for polyhalogenated aromatic substances in material of the component	-
7.129	Halogenated dioxins and furans polychlorinated dibenzo-p-dioxins/furans (PCDD/Fs) and polybrominated dibenzo-p-dioxins/furans (PBDD/Fs)	Banned	900
7.130	Halogenated Diphenyl Methanes (Ugilec141, Ugilec 121/Ugilec 21 and DBBT)	Banned	Banned
7.131	Hexabromocyclododecane(HBCDD) and all major diastereoisomers	Banned	1000
7.132	Hexachlorobenzene (CAS# 118-74-1)	Banned	-
7.133	Hexachlorobutadiene	Banned	-
7.134	Hexachlorocyclohexane isomers (HCH)	Banned	-
7.135	Hexachloroethane	Banned in manufacturing or processing of nonferrous metals	Banned in manufacturing or processing of nonferrous metals
7.136	Hexavalent Chromium/Hexavalent Chromium Compounds	Banned in plating, paints, inks and plastic resins 500 for others	10 for leather and textiles 1000 for all other materials
7.137	Latex and latex compound	100 Banned in surface	-

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Specification & Requirements for Materials,  
Parts, Products & Product Protective Packaging**

Item #	Controlled Substance	Maximum Threshold limit (ppm) at Homogenous Level	
		Category 1	Category 2
7.138	Lead/Lead Compounds	50 in polymeric materials, paints, inks, non-metallic, non-ceramic coatings, stabilizer, pigment, drying agent, and visual display units, cable jacket 100 in Polyvinyl Chloride (PVC) coating of external cables, wires and cords 90 in wood-based materials 800 in Solder (bar/wire/cream solder, solder ball) 1000 in other applications	100 for plastics, inks, paints, textiles, rubber and resins  1000 for all other materials
7.139	Mercury and its Compounds	Banned	5 for plastics, inks, paints, textiles, rubber and resins  1000 for all other materials
7.140	Medium chained Chlorinated Paraffins (MCCP- C14-17 alkyl chain)	Banned	Banned
7.141	Methyl-phenol compounds	10 ppm (all materials)	
7.142	MOAH (Mineral Oil Aromatic Hydrocarbon)	MOAH with 1 to 7 aromatic rings: 0.1% (1000 ) MOAH with 3 to 7 aromatic rings: 0.0001% = 1	-
7.143	MOSH (Mineral Oil Saturated Hydrocarbons)	1000	-
7.144	musk xylene and musk ketone	Banned	-
7.145	N,N'-ditolyl-p-phenylenediamin, N-tolyl-N'-xylyl-p-phenylenediamine or N,N'-dixylyl-p-phenylene diamine	Banned	-
7.146	Nickel and its Compounds	Banned on surfaces that are designed to be in prolonged contact with skin	Banned on surfaces of products/parts that are intended to come into direct contact with skin
7.147	Nonylphenol/ethoxylates(NP/NPEs) and related substances	Intentionally added	-

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Item #	Controlled Substance	Maximum Threshold limit (ppm) at Homogenous Level	
		Category 1	Category 2
7.148	Ozone Depleting Substances- Class I (CFCx, HBFCs, etc)	Banned	Banned
7.149	Ozone Depleting Substances- Class II (HCFCs)	Banned	Banned
7.150	PAH	1 individually: Acenaphthene 83-32-9 Acenaphthylene 208-96-8 Anthracene 120-12-7 Benzo(a)anthracene 56-55-3 Benzo(a)phenanthrene (chrysene) 218-01-9 Benzo(a)pyrene 50-32-8 Benzo(b)fluoranthene 205-99-2 Benzo(e)pyrene 192-97-2 Benzo(g,h,i)perylene 191-24-2 Benzo(j)fluoranthene 205-82-3 Benzo(k)fluoranthene 207-08-9 Benzo(j,k)fluorene (Fluoranthene) 206-44-0 Benzo(r,s,t)pentaphene 189-55-9 Dibenz(a,h)acridine 226-36-8 Dibenz(a,j)acridine 224-42-0 Dibenzo(a,h)anthracene 53-70-3 Dibenzo(a,e)fluoranthene 5385-75-1 Dibenzo(a,e)pyrene 192-65-4 Dibenzo(a,h)pyrene 189-64-0 Dibenzo(a,l)pyrene 191-30-0 7H-Dibenzo(c,g)carbazole 194-59-2 Fluorene 86-73-7 Indeno(1,2,3-cd)pyrene 193-39-5 5-Methylchrysene 3697-24-3 Naphthalene 91-20-3 Phenanthrene 85-01-8 10 for sum of total PAH	1 individually: Acenaphthene 83-32-9 Acenaphthylene 208-96-8 Anthracene 120-12-7 Benzo(a)anthracene 56-55-3 Benzo(a)phenanthrene (chrysene) 218-01-9 Benzo(a)pyrene 50-32-8 Benzo(b)fluoranthene 205-99-2 Benzo(e)pyrene 192-97-2 Benzo(g,h,i)perylene 191-24-2 Benzo(j)fluoranthene 205-82-3 Benzo(k)fluoranthene 207-08-9 Benzo(j,k)fluorene (Fluoranthene) 206-44-0 Benzo(r,s,t)pentaphene 189-55-9 Dibenz(a,h)acridine 226-36-8 Dibenz(a,j)acridine 224-42-0 Dibenzo(a,h)anthracene 53-70-3 Dibenzo(a,e)fluoranthene 5385-75-1 Dibenzo(a,e)pyrene 192-65-4 Dibenzo(a,h)pyrene 189-64-0 Dibenzo(a,l)pyrene 191-30-0 7H-Dibenzo(c,g)carbazole 194-59-2 Fluorene 86-73-7 Indeno(1,2,3-cd)pyrene 193-39-5 5-Methylchrysene 3697-24-3 Naphthalene 91-20-3 Phenanthrene 85-01-8 10 for sum of total PAH
7.151	Pentachlorobenzene (PeCB, CAS# 608-93-5)	Banned	-
7.152	Pentachlorophenol (PCP) and its salts and esters	Banned	-

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Environmental Compliance Engineering  
Specification & Requirements for Materials,  
Parts, Products & Product Protective Packaging**

Item #	Controlled Substance	Maximum Threshold limit (ppm) at Homogenous Level	
		Category 1	Category 2
7.153	Pentachlorothiophenol (PCTP)	Banned	-
7.154	Perchlorates	Banned	-
7.155	Perfluorooctane sulfonate (PFOS) and its salts	Banned	1000
	C8F17SO2X (X=OH, metal salt, halide, amide, and other derivatives including polymers)		-
7.156	Perfluorohexane sulfonic acid 355-46-4 (PFHxS), its salts, and PFHxS-related compounds Perfluorohexanoic Acid (PFHxA) its salts, and related substances	0.025 (for PFHxS & PFHxA and its salts) 1 (for PFHxS & PFHxA related compounds: sum of concentrations of all PFHxS & PFHxA related compounds in substances, mixtures or articles)	-
7.157	Perfluorinated carboxylic acid (PFCA) (C9-C14 PFCA including their salts and any combinations thereof)	Banned	Banned
7.158	LC-PFCA (Long-chain-PFCA)	Banned LC-PFCA (Long-chain-PFCA: C9-C21)	-
7.159	Long-Chain Perfluoroalkyl Carboxylate ("LCPFACs") and Perfluoroalkyl Sulfonate Chemicals	Banned	-
7.160	Perfluorooctanoic acids (PFOAs) and its salts	Banned	-
7.161	Phenol, 2- (2H - benzotriazol -2-yl)-4,6 bis (1,1-dimethylethyl) CAS# 3846-71-7	Banned	-
7.162	Phenol, isopropylated phosphate (PIP) (3:1) (68937-41-7)	Banned	-

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Environmental Compliance Engineering  
Specification & Requirements for Materials,  
Parts, Products & Product Protective Packaging**

Item #	Controlled Substance	Maximum Threshold limit (ppm) at Homogenous Level	
		Category 1	Category 2
7.163	Phthalates DBP (Dibutylphthalate) BBP (Benzyl butyl phthalate) DEHP (Bis(2-ethylhexyl) phthalate) DIBP (Diisobutylphthalate)	800 each	800 each
7.164	Phthalates Diisononyl phthalate (DINP) Diisodecyl phthalate (DIDP) Di-n-hexyl phthalate (DnHP) Di-isopentyl phthalate (DIPP) Dipentyl phthalate (DPP) Dialkyl (C7-11-branched and linear) phthalate (DHNUP) Di-N-hexyl phthalate Diisohexyl phthalate Di(methoxyethyl) phthalate (DMEP) Diisoheptyl phthalate (DIHP) Diisooctyl phthalate (DIOP) N-pentyl-isopentyl phthalate 1,2-benzenedicarboxylic acid, di- C6-10-alkyl esters; 1,2- benzenedicarboxylic acid, mixed decyl and hexyl and octyl diesters with ≥ 0.3% of dihexyl phthalate (EC No. 201-559-5) 1,2-Benzenedicarboxylic acid, dipentylester, branched and linear Di-n-octyl phthalate (DNOP) Dicyclohexyl phthalate (DCHP) Other Ortho phthalates	1000 each 1000 ppm total content as Plasticizers including 7.164	1000 each
7.165	Polybrominated Biphenyls (PBBs)	Banned	1000
7.166	Polybrominated Diphenylethers (PBDEs)	Banned	1000
7.167	Polychlorinated Biphenyls (PCBs)	Banned	900

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Item #	Controlled Substance	Maximum Threshold limit (ppm) at Homogenous Level	
		Category 1	Category 2
7.168	Polychlorinated Naphthalenes (PCNs >3 chlorine atoms)	Banned	900
7.169	Polychlorinated Terphenyl (PCT)	Banned	50
7.170	Polyvinyl Chloride (PVC)	Banned Except CAS#9003-22-9	-
7.171	Radioactive Substances	Banned	Banned
7.172	Red Phosphorus (Red-P) flame retardants	Banned	-
7.173	Siloxanes	0.1% by weight (1000 ppm) in homogeneous material	
7.174	Shortchain Chlorinated Paraffins (SCCP)	Banned	900
7.175	Tetrabromo bisphenol-A (TBBPA)	900	-
7.176	Toluene	1000 for Adhesive, paint	-
7.177	Tributyl Tin (TBT) and Triphenyl Tin (TPT) and compounds	Banned	Banned
7.178	Tributyl Tin Oxide (TBTO)	Banned	Banned
7.179	Trichloroethylene (TCE) CAS#79-01-6	Banned	Banned
7.180	Tris(2-chloroethyl) phosphate (CAS No. 115-96-8) Tri(2-chloro-1-methylethyl) phosphate (CAS No. 13673-84-5) Tris (1,3-dichloro-2-propyl) phosphate (CAS# 13674-87-8)	1000	1000 for adhesive, paint
7.181	Tri-substituted organostannic compounds(except where listed separately)	1000	-
7.182	Yellow phosphorus	Banned	-

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Document Number: 2096-001669

Page: 14 of 30

**Document Title: Western Digital Product Environmental Compliance Engineering Specification & Requirements for Materials, Parts, Products & Product Protective Packaging**

Revision: BA

Item #	Controlled Substance	Maximum Threshold limit (ppm) at Homogenous Level	
		Category 1	Category 2
7.183	Chemicals listed in China VOC standards: GB 30981-2020 (for industrial protective coatings), GB 33372-2020 (for adhesives), GB 38507-2020 (for printing inks) and GB 38508-2020 (for cleaning agents)	Banned as per threshold limits mentioned in the listed China VOC standards	Banned as per threshold limits mentioned in the listed China VOC standards
7.184	2,4,6-Tris(tert-butyl)phenol (TTBP) (732-26-3)	Banned	-
7.185	UV-328: Phenol, 2-(2H-benzotriazol-2-yl)-4,6-bis(1,1-dimethylpropyl) (25973-55-1)	Banned	Banned
7.186	Bumetrizole (UV-326)	1000	

**Notes:**

1. "Chlorine" includes, but not limited to, Polyvinyl Chloride (PVC), and other chlorinated compounds.
2. "Bromine" includes, but not limited to, Brominated Flame Retardants (other than PBBs or PBDEs), Tetrabromobisphenol A (TBBPA), Hexabromocyclododecane (HBCDD), Hexabromobenzene, and other brominated compounds.
3. "Antimony" includes Antimony and all its compounds (typically Antimony Trioxide).

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**Table 7.2 Controlled Substances in Packaging Materials**

Item #	Controlled Substance	Maximum Threshold limit (ppm)	
		Category 1	Category 2
7.201	Arsenic Compounds	Banned	-
7.202	Asbestos	Banned	-
7.203	Benzo[a]pyrene	0.5 milligrams per kilogram in wood of dry matter	-
7.204	Brominated and chlorinated flame retardants	No intentional use	
7.205	Brominated flame retardants (BFRs)	All BFRs in external case plastic parts are banned PBBs, PBDEs including DecaBDE are banned Others not intentional use (Br<900)	-
7.206	Cadmium, Chromium VI, Lead and Mercury compounds	Sum:100	Sum:100
7.207	Certain Azo Colorants	Banned	-
7.208	Chlorine type bleaching reagent	Banned	-
7.209	Cobalt dichloride (CoCl <sub>2</sub> )	Banned in humidity indicator cards Cl 900/Co 1000 for silica-gel	-
7.210	Dechlorane plus	1ppm	
7.211	Dibutyltin (DBT) compounds	1000	-
7.212	Dimethylfumarate (DMF)	Banned in Moisture prevention agents, mildew-proofing agents	-
7.213	Diocetyl tin (DOT) compounds	1000	-
7.214	Expanded polystyrene (EPS) foam	Banned (applicable to South Korea only)	-
7.215	Halogen compounds and halogen resins	Banned in Flame retardants, adhesive	-
7.216	Halogenated Chlorofluorocarbons(CFC's)	Banned	-
7.217	Halogenated Diphenyl Methanes	Banned	-
7.218	Halogenated Plastics or Polymers	Banned	-
7.219	Hydrogenated Chlorofluorocarbons (HCFC's)	Banned	-
7.220	Isocyanate	Banned	-

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Item #	Controlled Substance	Maximum Threshold limit (ppm)	
		Category 1	Category 2
7.221	Methyl bromide for fumigation	Banned	-
7.222	Mineral Oils	MOAH 1-7 aromatic rings: 1000 ppm for C1-C7 1 ppm for C3-C7  MOSH C16-C35: 1000 ppm  Inks used in packaging and paper printing 1,000 ppm (uncured ink)	
7.223	Nickel on external surfaces	Banned	-
7.224	Ortho-phthalates	No intentional use; 100 ppm if incidentally present	
7.225	Ozone depleting substances except listed separately (Class I & Class II CFCs and HCFCs)	Banned	-
7.226	Perfluorooctane sulfonate (PFOS) and PFOS-related compounds	Banned	1000
7.227	PFOA	Banned in coating materials for packaging materials	-
7.228	Phenol, 2-(2H-benzotriazol-2-yl)-4,6-bis(1,1-dimethylethyl) CAS# 3846-71-7	Banned	-
7.229	Polychlorinated biphenyls (PCBs) and specific substitutes	Banned	-
7.230	Polychlorinated naphthalenes (more than 3 chlorine atoms)	Banned	-
7.231	Polychlorinated terphenyls (PCTs)	Banned	-
7.232	Polyurethane	Banned	-
7.233	Polyvinyl Chloride (PVC) CAS# 9002-86-2	<del>Banned</del> No intentional use; 100 ppm Cl for incidentally present for packaging	900

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Environmental Compliance Engineering  
Specification & Requirements for Materials,  
Parts, Products & Product Protective Packaging**

Item #	Controlled Substance	Maximum Threshold limit (ppm)	
		Category 1	Category 2
7.234	Radioactive Substances	Banned	-
7.235	Shortchain chlorinated paraffins	1000	-
7.236	Tributyl tin oxide (TBTO)	Banned	-
7.237	Tri-substituted organostannic compounds	Tributyl Tin (TBT) and Triphenyl Tin (TPT) are banned, others<1000	-
7.238	Urea Formaldehyde based resin	0.05	-
7.239	Zinc/Zinc Compounds	100	-

**Table 7.3 Reportable Substances in Parts/Materials and/or Production Process Parts/Materials**

Item #	Reportable Substance	Maximum Threshold limit (ppm)
7.301	4-[4,4'-bis(dimethylamino) benzhydrylidene] cyclohexa- 2,5-dien-1-ylidene] dimethylammonium chloride (C.I. Basic Violet 3)	1000
7.302	4-aminobiphenyl and its salt	100
7.303	4-nitrobiphenyl and its salt	1000
7.304	Acrylamide	1000
7.305	Aluminum/Aluminum Compounds	Any presence
7.306	Amines, Aliphatic	100
7.307	Aniline Salts	100
7.308	Anthracene(Except for wood treatment)	1000
7.309	Aromatic Amines and Dyes	100
7.310	Aromatic Compounds as monomers (except where listed separately)	100
7.311	2-Butanone oxime(CAS# 96-29-7)	1000
7.312	n-Butyl glycidyl ether(CAS# 2426-08-6)	1000
7.313	Barium Compounds (except barium sulfate)	100
7.314	Benzenamine, N-phenyl-, reaction products with styrene and 2,4,4-trimethylpentene (CAS# 68921-45-9)	1000
7.315	Benzophenone	1000
7.316	Beta-naphthylamine and its salts	1000
7.317	Bis(2-ethylhexyl)tetrabromophthalate (TBPH or BEHTBP) (CAS# 26040-51-7)	1000
7.318	Bismuth/Bismuth Compounds	100

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Environmental Compliance Engineering  
Specification & Requirements for Materials,  
Parts, Products & Product Protective Packaging**

Item #	Reportable Substance	Maximum Threshold limit (ppm)
7.319	Boron and its compounds, including alloy	1000
7.320	Cobalt/Cobalt Compounds	Any presence
7.321	Copper/Copper Compounds	Any presence
7.322	Di (2-ethylhexyl) adipate	1000
7.323	Ferrosilicon and Alloys	100
7.324	Flame Retardants	Any intentional use (All materials)
7.325	Siloxanes	1000
7.326	Gold/Gold Compounds	Any presence
7.327	Indium phosphide (CAS# 22398-80-7)	1000
7.328	Iron/Iron Compounds	Any presence
7.329	Long chained chlorinated paraffins (LCCP; generally, C 18-28) (e.g., CAS# 85535-86-0)	1000
7.330	Magnesium/Magnesium Alloys	Any presence
7.331	Natural Rubber	1000
7.332	n-Hexane (CAS# 110-54-3)	1000
7.333	Octachlorostyrene(CAS# 29082-74-4)	1000
7.334	Organic Azo and Azo-oxy Compounds	100
7.335	Organic Halogen Compounds (except where listed separately)	100
7.336	Organic Phosphorus compounds	100
7.337	Organic Silicon Compounds	100
7.338	Organochlorine and Organobromine compounds	1000
7.339	Palladium and palladium compounds	Any presence
7.340	Perfluorocarbons	100
7.341	Perfluamine	1000
7.342	Polybrominated Terphenyls	100
7.343	Rare Earth Elements(Lanthanides, Scandium, Neodymium, Dysprosium, Praseodymium and Yttrium)	Lanthanides, Scandium, Dysprosium and Yttrium: 10 Neodymium: Any presence Praseodymium: 1000
7.344	Rubidium and rubidium compounds	100
7.345	Silver or its compounds	Any presence
7.346	Selenium/Selenium Compounds	1000
7.347	Surfactants(DTDMAC, DODMAC(DSDMAC) and DHTDMAC)	100
7.348	Tantalum and tantalum compounds	Any presence
7.349	Tellurium or its compounds	100


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Environmental Compliance Engineering  
Specification & Requirements for Materials,  
Parts, Products & Product Protective Packaging**

Item #	Reportable Substance	Maximum Threshold limit (ppm)
7.350	Tetramethylthiuram Disulfide (Thiram)	100
7.351	Thallium or its compounds	100
7.352	Tin/Tin Compounds (Except where listed separately)	Any presence
7.353	Tri-n-butyl phosphate (TNBP) (126-73-8)	1000
7.354	Triclosan	10
7.355	Volatile Organic Compound	100
7.356	White phosphorus	1000
7.357	Zinc/Zinc Compounds	Any presence
7.358	Nanomaterials	Any presence
7.359	Chlorinated Organic Solvents	1000
7.360	Bisphenol F & Bisphenol S	100
7.361	Diethyl phthalate	1000
7.362	Nickel sulfate and nickel sulfamate	1000
7.363	Toluene Diisocyanate	1000
7.364	Wood, Paper and other plant-based product	Any presence
7.365	PFAS ( per- and polyfluoroalkyl substances)	Any presence
7.366	Triphenyl Phosphate (TPHP)	1000

**Table 7.4 Controlled Substances in Batteries**

Item #	Controlled Substance	Maximum Threshold limit (ppm)
7.41	Cadmium	<del>10</del> <sup>5</sup>
7.42	Cobalt and its compounds	Banned (Batteries used in computer servers and online data storage product)
7.43	Lead	40
7.44	Mercury and its compounds	Banned
7.45	Perchlorate	Banned
7.46	Polyvinylidene fluoride (PVDF)	1000 ppm as measured by fluorine
7.47	1,3-propane sulfone	1000 ppm


	Document Number: 2096-001669	Page: 20 of 30
	<b>Document Title: Western Digital Product Environmental Compliance Engineering Specification &amp; Requirements for Materials, Parts, Products &amp; Product Protective Packaging</b>	

## 8. Regulatory Requirements

### 8.1. References for Regulatory Requirements

- EU RoHS Directive: <http://ec.europa.eu/environment>
- EU Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS - Recast)
- EU Directive 2015/863 of the European Parliament and of the Council of 31 March 2015 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
- EU Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)
- **EU: Substances that Deplete the Ozone Layer, Regulation (EU) 2024/590**
- **EU: Batteries and Waste Batteries, Regulation (EU) 2023/1542**
- United States Clean Air Act Section 611 of the 1990 amendments; 40 CFR Part 82
- California Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986
- Canada Prohibition of Certain Toxic Substances Regulations, 2012
- ISO 11469 "Plastics - Generic identification and marking of plastics products"
- IEC 61249-2-21: <http://www.iec.ch/>
- **EU: Packaging and Packaging Waste, Regulation (EU) 2025/40**
- IEC 62321 Procedures for the Determination of Regulated Substances in Electro technical Product
- China RoHS
- China VoC standards: GB 30981-2020 (for industrial protective coatings), GB 33372-2020 (for adhesives), GB 38507-2020 (for printing inks) and GB 38508-2020 (for cleaning agents)
- ODC (Ozone Depleting Chemicals) Free manufacturing processes, as per Montreal Protocol
- EU WEEE Directive
- Nanomaterial Compliance as defined by 2011/696/EU
- EPEAT Criteria
- Directive (EU) 2023/2668 of the European Parliament and of the Council of 22 November 2023 amending Directive 2009/148/EC on the protection of workers from the risks related to exposure to asbestos at work
- EU: Safety Standards for Protection from Exposure to Ionizing Radiation, Directive 2013/59/EURATOM
- Recycle Marking on Plastic Parts weighing > 25g as per ISO 11469 – “Plastics – Generic identification and markings of plastic products”.
- California Packaging Recycling CalRecycle
- Directive (EU) 2019/904 of the European Parliament and of the Council on the reduction of the impact of certain plastic products on the environment (Oxo degradable Plastics)
- Persistent Organic Pollutants (POP) standards: EU Regulation (EU) 2019/1021 and its amendments
- Lacey Act and EU Timber Regulation
- USA Regulation of Persistent, Bio accumulative, and Toxic Chemicals Under TSCA Section 6(h) Information on biocidal materials used for antimicrobial/antiseptic/preservative purposes required and should not be declared confidential; 3rd party test report to be submitted according to food contact standards for each country- Effective date of the ban on the delivery: October 1, 2022, All [Canada] Prohibition of Certain Toxic Substances Regulations

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	Document Number: 2096-001669	Page: 21 of 30
	<b>Document Title: Western Digital Product Environmental Compliance Engineering Specification &amp; Requirements for Materials, Parts, Products &amp; Product Protective Packaging</b>	Revision: BA

- EU PFAS restriction proposal: <https://echa.europa.eu/documents/10162/f605d4b5-7c17-7414-8823-b49b9fd43aea>
- US Maine Department of Environmental Protection PFAS requirement
- Minnesota Pollution Control Agency (MPCA) to ban nonessential use of per- and polyfluoroalkyl substances (PFAS)- <https://www.pca.state.mn.us/get-engaged/pfas-ban>
- Endocrine Disrupting Chemicals (EDCs) - FR CE Art 13 and Decree No. 2021-1110 of August 23, 2021

### 8.2. Restriction of Hazardous Substances (RoHS)

- All homogeneous material in parts and products must be RoHS compliant as per EU Directive. Note: Phthalates testing required for plastic/rubber materials suspected to contain Phthalates.

- **EU RoHS Exemptions**

All exemptions under the EU RoHS Recast Directive 2011/65/EU must be clearly disclosed in the reporting documents submitted to Western Digital. EU decision on the status of current exemptions must be diligently monitored. All materials currently under exemptions must be phased out and replaced with alternative RoHS compliant materials based on the feasibility and availability of exemption free materials.

### 8.3. EU REACH Regulation Substances

- **REACH Authorization chemicals**

Western Digital prohibits REACH authorization chemicals usage in its parts and products in article level at or above 1000 . Western Digital requires suppliers to report the authorized chemical content with MDDS deliverables. The latest list of REACH authorized substances as published by the European Chemicals Agency is located at: <https://echa.europa.eu/authorisation-list>

- **Candidate List of substances of very high concern for Authorization**

Western Digital requires suppliers to identify if there is any SVHC substances present in an Article. Suppliers are required to report the name, CAS number and the quantity of the SVHC candidate present. The threshold concentration is 1000 at the article level for all applications, unless otherwise stated. The latest candidate list of REACH SVHC as published by the European Chemicals Agency is located at: <https://echa.europa.eu/candidate-list-table>

- **Restricted Substances**

Western Digital prohibits REACH restricted chemicals usage in its parts and products. Western Digital requires suppliers to report the restricted chemical content with MDDS deliverables. The latest list of REACH restricted substances as published by the European Chemicals Agency is located at: <https://echa.europa.eu/substances-restricted-under-reach>

## 9. Requirements for Suppliers

- Procurement and Manufacturing of Materials & Parts
  - Western Digital policy requires all suppliers and contracted manufacturers (CMs) for Western Digital parts and materials to comply with these environmental requirements. The suppliers supplying IDM and Equipment tools used in factories should comply with RoHS and Halogen requirements as defined in this document

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- All suppliers and CMs are required to provide all of the following documents for every item supplied to Western Digital or any Western Digital’s contracted manufacturers (including all indirect materials):
  - Material declaration data sheet (MDDS) in Western Digital format [refer to the format in Section 11];
  - Environmental Declaration of Conformity (EDoC) in Western Digital Format [Embedded in MDDS template]
  - Homogeneous material level lab test reports (ICP) are required for all the homogenous materials listed in table below:

Table 9.1: Test parameters required for each homogenous material in the selected category

Test Parameters	Category 1		Category 2		
	All components	Packaging materials	All components except earphones and USB Cables	Earphones and USB cables	Packaging materials
Lead	√	√	√	√	√
Mercury	√	√	√	√	√
Cadmium	√	√	√	√	√
Hexavalent Chromium	√	√	√	√	√
Sum of PBBs (Non-metals only)	√		√	√	
Sum of PBDEs (Non-metals only)	√		√	√	
Chlorine	√				
Bromine	√				
Total Fluorine testing for PFAS (Section 9.4)	√	√	√	√	√
Four Phthalates (DEHP, BBP, DBP and DIBP) in product level for Non-metals only	√		√		
Seven phthalates (DEHP, DBP, BBP, DINP, DIDP, DNOP, DNHP) in product level for Non-metals only				√	


- In addition, we require component and/or homogeneous chemical analysis lab test reports of controlled/reportable substances listed in this document for all parts supplied to Western Digital within fifteen (15) business days, upon request. Western Digital maintains an ongoing compliance monitoring program and will execute these requests under this program.
- The validity of lab test reports is of 1 year. Suppliers are required to provide the updated lab test reports for expired ones.

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	<p>Document Number: 2096-001669</p>	<p>Page: 23 of 30</p>
	<p><b>Document Title: Western Digital Product Environmental Compliance Engineering Specification &amp; Requirements for Materials, Parts, Products &amp; Product Protective Packaging</b></p>	<p>Revision: BA</p>

- Western Digital only accepts lab test reports from ISO17025 certified 3<sup>rd</sup> party laboratories.
- Supplier are required to comply with China VoC standards GB 30981-2020 (for industrial protective coatings), GB 33372-2020 (for adhesives), GB 38507-2020 (for printing inks) and GB 38508-2020 (for cleaning agents) and provide required documentation along with the completed MDDS. In addition, we require component and/or homogeneous chemical analysis lab test reports of all chemicals in above listed China VoC standards for all parts supplied to Western Digital within fifteen (15) business days, upon request.
- Suppliers are required to comply with EU single use plastics directive that is intended to prevent and reduce the impact of certain plastic products on the environment and the late addition of Oxo-degradable plastics ban to the directive. This prohibits placing on the market of Oxo-degradable plastics from 3<sup>rd</sup> July 2021. Oxo-degradable plastics are defined as plastic materials that include additives which, through oxidation, lead to the fragmentation of the plastic material into micro-fragments or to chemical decomposition.
- Persistent Organic Pollutants (POP) standards: Suppliers are required to comply with the EU Regulation (EU) 2019/1021 and its amendments. Annex I substances to be prohibited and Annex II substances are to be restricted based on the control measures provided in the directive
- Suppliers must disclose 100% of all the materials used at homogenous level and provide applicable CAS numbers to all substances listed in the MDDS. All fields in the Western Digital MDDS format must be completed. All submitted MDDS will be reviewed and approved by Western Digital PEC Team.
- All homogeneous materials lab testing results must be disclosed in the MDDS report with test date and RoHS exemptions.
- Western Digital requires suppliers to notify and report in case of REACH SVHC substances and Authorization substances present in articles.
- Western Digital requires suppliers to disclose the complete information regarding conflict minerals present in the products supplied to Western Digital.
- Any changes of materials must go through supplier PCN process, in which updated documents must be provided by suppliers.
- Packaging materials must not contain any wood material (including materials used to make paper items), or other wild plant material that was illegally sourced from its country of origin. Examples of illegally sourced materials include but are not limited to: wood or wild plant materials stolen from parks, reserves, or other protected areas; materials harvested without permission or contrary to applicable harvesting regulations; materials for which the applicable royalties, taxes, or fees were not paid; and materials exported in violation of log or other export bans. This requirement applies to all wood materials and products or packaging made thereof (including wood from planted forests) but does not apply to common food crops.
- Periodic Auditing
  - Western Digital periodically performs chemical analyses on samples taken from product families to ensure that Western Digital environmental compliance is being maintained.

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	Document Number: 2096-001669	Page: 24 of 30
	<b>Document Title: Western Digital Product Environmental Compliance Engineering Specification &amp; Requirements for Materials, Parts, Products &amp; Product Protective Packaging</b>	Revision: BA

- Verification of New Products
  - Western Digital reviews the compliance of new products to these requirements before release.

## 10. Testing Requirements

### 10.1. RoHS Testing

- All homogeneous materials must be tested for RoHS Substances: Cadmium (Cd), Chromium hexavalent (Cr VI), Lead (Pb), Mercury (Hg). PBB & PBDE and Phthalates (if applicable).
- Metals, Glass & Ceramics are exempted for PBB, PBDE and Phthalates tests.
- RoHS Testing of all homogeneous materials must be performed in accordance with the latest version of IEC 62321 Electrotechnical products

Analysis method acronyms:

- ICP: Inductively coupled plasma
- AA: Atomic Absorption Spectroscopy
- GC-MS: gas chromatography - mass spectrometry
- XRF: X-Ray Fluorescence Spectroscopy
- Spot test or PAK® test: Drip diphenylcarbazide colorimetric solution; then observe color change for several minutes

### 10.2. Phthalates Testing

- Phthalates (DEHP, DBP, BBP, DIBP) testing required for Non-Metals materials suspected to contain Phthalates.


### 10.3. Halogen Testing

- All homogeneous materials except metals/glass/ceramics, must be tested for Bromine and Chlorine wherever applicable.
- Bromine and Chlorine must be tested as per EN 14582, IEC 61189-2, IPC TM-650, and EN 50267-2-1(2).
- Metals, Glass & Ceramic materials are exempted from Halogen testing requirements.
- Testing for PVC is not required, because PVC is difficult to detect using standard test methods. Suppliers must have control measures to ensure compliance with this specification and provide a declaration stating this compliance.

### 10.4. Total Fluorine test methods for PFAS screening

- Total Fluorine testing may be used as an indication of PFAS but may also indicate inorganic or organic Fluorine compounds that are not PFAS. Methods must have an MDL of at most 50 measured as fluoride anion (F<sup>-</sup>). If test data shows F<sup>-</sup> is over the 50-limit stated in the pre-published draft for the EU PFAS restriction, but it is certain that the reading comes from a non-PFAS fluorinated compound, proof must be produced that the reading is not coming from a PFAS compound. This may include:
  - A test report showing the presence of the non-PFAS fluorinated compound at a similar level as the measured total fluoride anion
  - Complete material composition submission through MDDS or a declaration showing the specific CAS number of the non-PFAS fluorinated compound and an explanation for why the fluorinated compound is present in the material

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	Document Number: 2096-001669	Page: 25 of 30
	<b>Document Title: Western Digital Product Environmental Compliance Engineering Specification &amp; Requirements for Materials, Parts, Products &amp; Product Protective Packaging</b>	Revision: BA

#### 10.5. Red Phosphorus Testing

- Testing for Red Phosphorus is not required, because red phosphorus is difficult to detect using standard test methods. Suppliers must have control measures to ensure compliance with this specification and provide a declaration stating this compliance.

#### 10.6. Mineral Oil Testing

- **Testing requirement: JRC GL 2019 (JRC115694) or equivalent, analysis performed by HPLC-GC-FID.**
- **Must be tested in wet formulation state**

#### 10.7. All homogeneous materials


- All homogeneous materials must be tested in finished good condition
- Metal alloys, Glass and Ceramic are to be tested as homogeneous material after high temp processing.
- Plastic and rubber materials must be tested after forming/molding.
- Adhesive, Epoxy, Resin, Solder, Flux, Ink, Paint, Paste, Coating, and Plating etc must be tested to represent the actual manufacturing condition such as after mixing, drying, curing, and baking.

#### 10.8. Recommended Test Report Contents

Lab Test reports must include following details:

- Lab Test Reports must be in English
- Laboratory Name and location
- Lab Test Report Number
- Operator name,
- Lab Representative name
- Date of sample receipt
- Sample Analysis date (must be the most recent dated)
- Name and description of Sample tested
- Signature of responsible person
- Sample preparation or pre-conditioning methods (e.g. drying, curing, grinding, digestion solution, etc.) for total dissolution.
- Analysis method used (Reference to methods in 62321)
- Analysis Flowchart of test methods with a statement on the degree of dissolution of, with the words of the material or layer being analyzed "sample was completely dissolved" or "no residual precipitates.
- Measurement result.
- Detection limit of each method and for each material analyzed
- Picture of sample tested
- If you are unable to test the part in the finished condition, then the following will apply:
  - If in the raw condition, the RoHS and Halogen Free test data is reported as "Not Detected (ND.)", then the raw sample test data is acceptable. A confirmation statement is required.
  - If in the raw condition, the RoHS and Halogen Free test data is reported as "Detected", the raw sample test data is acceptable. A confirmation statement is required even if the weight of the sample does not change during the manufacturing operation.

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	Document Number: 2096-001669	Page: 26 of 30
	<b>Document Title: Western Digital Product Environmental Compliance Engineering Specification &amp; Requirements for Materials, Parts, Products &amp; Product Protective Packaging</b>	Revision: BA

- If in the raw condition, the RoHS and Halogen Free test data is reported as “Detected”, the raw sample test data is acceptable. A confirmation statement is required when the calculated concentration is below Western Digital criteria.
- **Re-Testing Requirements**  
Any changes in design, materials (including material source), manufacturing methods, production locations, etc. must be communicated to Western Digital in writing and revised documents must be provided for review and qualification after retesting.

## 11. Terms and Definitions


- **Article:** an object which during production is given a special shape, surface, or design which determines its function to a greater degree than does its chemical composition. [Source: EU Regulation 1907/2006 concerning the Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH)]. In reference to EU REACH Substances of Very High Concern (SVHC), when a product is made up of more than one constituent Article, the SVHC concentration above 0.1% weight by weight applies to each constituent Article making up the product. [Source: Judgement of the European Court for EU Regulation 1907/2006 (REACH) Articles 7(2) and 33, 10 September 2015]
- **Banned:** The substances are banned to use in WD products at any level of threshold limit concentration. Not to be added intentionally.
- **BFRS & CFRs:** Brominated/chlorinated flame retardants. These substances contain or are treated with bromine and/or chlorine. They are typically added to reduce the flammability of substances such as epoxy resins and thermoplastics. Examples include, but are not limited to, Tetrabromo-bisphenol-A (TBBP-A), brominated epoxy resins and Polybrominated diphenyl ethers (PBDEs).
- **CAS Number:** CAS numbers are unique numerical identifiers for chemical substances assigned by the Chemical Abstracts Service (CAS) for its chemical substance registry system.
- **Chemical:** a substance, whether by itself or in a mixture, or a mixture, whether manufactured or obtained from nature, but does not include living organisms, which belongs to either of the following categories:
  - Pesticides, including severely hazardous pesticide formulations.
  - Industrial chemicals.
- [Source: EU Regulation 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of hazardous chemicals.
- **Conflict Minerals:** In 2010, the U.S. Dodd-Frank Act was passed concerning “Conflict Minerals” originating from the Democratic Republic of the Congo (DRC) or adjoining countries. The SEC has published final rules associated with the disclosure of the source of Conflict Minerals by U.S. publicly traded companies (see the rules at <http://www.sec.gov/rules/final/2012/34-67715.pdf>). The rules reference the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas, which guides suppliers to establish policies, due diligence frameworks, and management systems.
- **Contained:** Contained refers to a substance which is added to or blended with a part or material.
- **Controlled:** Restricts the use of these controlled substances with the homogeneous concentration [unless otherwise stated] above the threshold level stated
- **EDoC:** Environmental Declaration of Conformity Sheet is the form used by Western Digital to collect supplier environmental information as attached in MDDS documents
- **Flame Retardants:** Substances that are intentionally incorporated into materials to prevent or slow down the spread of fire by reducing flammability or delaying combustion

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	Document Number: 2096-001669	Page: 27 of 30
	<b>Document Title: Western Digital Product Environmental Compliance Engineering Specification &amp; Requirements for Materials, Parts, Products &amp; Product Protective Packaging</b>	

- **Full Material Disclosure:** Disclosure of all chemical substances, by Chemical Abstract System (CAS) number, present in each homogenous material in a part or assembly
- **Halogen Free (HF)/Low Halogen:** 900 maximum chloride (Cl), 900 maximum bromine (Br), and 1500 maximum total chlorine and bromine (Cl+Br). Refer to IEC 64249-2-21: (<http://www.iec.ch/>)
- **Homogeneous material:** means one material of uniform composition throughout or a material, consisting of a combination of materials that cannot be disjoined or separated into different materials by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes. [Source: EU Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment]
- **ICP:** Inductively Coupled Plasma: chemical analysis method
- **Impurity:** An impurity is a substance with is present in a natural material or generated in a synthetic process, neither of which can be removed by technical means.
- **Indirect Material (IDM):** Material that is used during fab, assembly, test process, but it won't be incorporated into finished goods, or which will not be shipped or seen by customers
- **Intentionally Added:** Intentionally introduced or 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.
- **Materials:** Includes chemicals or substances that are assembled into a product, such as structural plastics, metals, materials for printed circuit boards and wafers, etc.; materials that are used on a product, such as coatings, paints, pastes, etc.
- **Mechanically Disjoined:** Mechanically disjoined means mechanically separated by cutting, unscrewing, grinding, crushing, etc.
- **MDDS:** Material Declaration Data Sheet: form to disclose the full chemical content of a part or material at homogeneous level (AIS date form can use when it is accepted by Western Digital PEC Engineer.)
- **Mixture:** a mixture or solution composed of two or more substances. [Source: EU Regulation No 1272/2008 on classification, labeling and Product Protective Packaging of substances and mixtures]
- **Nanoparticles:** A natural, incidental or manufactured material that contains particles in an unbound state or as an aggregate or as an agglomerate and where, for 50% or more of the particles in the number size distribution, one or more external dimensions are in the range 1nm-100nm
- **Not Detected:** below the detection limit of established test standards or appropriate industry wide test methods. In general, these test standards/ methods should achieve trace level detection or at the lowest detection capabilities of the specific sample matrix.
- **Not Detectable:** Not detectable means that the substance is not detected t is using the specified analytical technique.
- **Non-Ferrous Metals:** Any metal, including alloys, that does not contain iron in appreciable amounts
- **Ortho-phthalates:** Any members of the class of organic chemicals that are esters of 1,2-benzenedicarboxylic acid (phthalic acid), or as equivalent, containing two carbon chains located in the ortho position.
- **Packaging:** All products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer. 'Non-returnable` items used for the same purposes shall also be considered to constitute packaging.  
'Packaging' consists only of: (a) sales packaging or primary packaging (b) grouped packaging or secondary packaging (c) transport packaging or tertiary packaging

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	Document Number: 2096-001669	Page: 28 of 30
	<b>Document Title: Western Digital Product Environmental Compliance Engineering Specification &amp; Requirements for Materials, Parts, Products &amp; Product Protective Packaging</b>	

- **Particle:** A minute piece of matter with defined physical boundaries. [Source: EU Commission Recommendation 2011/696/EU on the definition of nanomaterial]
- **Parts:** Any components and assemblies that are supplied to Western Digital/ HGST for use in Western Digital applications.
- **Plastic:** Material that contains, as an essential ingredient, one or more organic polymeric substances of large molecular weight, is solid in its finished state, and, at some stage in its manufacture or processing into finished articles, can be shaped by flow. [Source: National Sanitation Foundation International Draft Standard NSF/ANSI 426]
- **ppm:** Parts per million, unit of measurement for weight percentage. 1 ppm = 1mg/kg = 0.0001% by weight. The parts per million thresholds listed in this specification refer to the weight of the material in a specific part, not the weight of the material in an entire system.
- **Preparation:** a mixture or solution composed of two or more substances, for example: paint, lubricant or ink. [Source: EU Regulation 1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)]
- **Products:** All original equipment manufacturer (OEM) manufactured products supplied to Western Digital for sale with the Western Digital logo.
- **Prohibited:** Banned or Use not allowed.
- **RoHS:** European Union Directive 2002/95/EC and the recast RoHS Directive 2011/65/EU, “Restriction on the use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment”. The RoHS substances regulated at this time include lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated biphenyl ethers and 4 phthalate substances (DEHP, BBP, DBP and DIBP).
- **Reportable:** Western Digital requires disclosure of the presence of reportable substances at the homogeneous level in the form of MDDS if over the threshold level stated
- **REACH:** An acronym for European Commission Regulation Number 1907/2006 concerning the Registration, Evaluation, Authorization, and Restriction of Chemicals and amendments. (Current as of the date of this specification, current list maintained in the latest REACH regulation and its amendments)
- **Substance:** A chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition. [Source: EU Regulation 1907/2006 concerning the Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH)] Substance includes such examples as ethanol and metals.
- Note: metals are included here not in the form of a part or product such as a heat sink or sheet metal cover but as a metal such as aluminum or aluminum alloy. Substance goes beyond a pure chemical compound defined by a single molecular structure. The definition of substance includes different constituents such as impurities. Also note the word “substance” is used throughout this specification, only the “Substance” with a capital letter refers to this specific definition.
- Substance(s) of Very High Concern (SVHC):
  1. Substances meeting the criteria for classification in accordance with EU Directive 67/548/EEC:
    - Carcinogenic category 1 or 2
    - Mutagenic category 1 or 2
    - Toxic for reproduction category 1 or 2.

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2. Substances which are persistent, bio accumulative and toxic (PBT) or very persistent and very bio accumulative (vPvB) in accordance with the criteria set out in Annex XIII of the EU REACH Regulation.

3. Substances- such as those having endocrine disrupting properties or those having PBT properties or vPvB properties which do not fulfill the criteria of 2 above - for which there is scientific evidence of probable serious effects to human health or the environment which give rise to an equivalent level of concern to those of other substances listed in 1 or 2 and which are identified on a case-by-case basis in accordance with the procedure set out in Article 59 of REACH. [Source: EU REACH Regulation, Article 57]

- **Threshold:** The level of a reportable material above which its presence must be measured and reported to Western Digital. Threshold levels are based on their presence in each individual homogeneous layer.
- **WEEE:** European Union Directive 2002/96/EC of the European Parliament and of the Council on Waste Electrical and Electronic Equipment.

## 12. Homogeneous Material Definition and Examples



Homogenous  
Material.pdf

## 13. Western Digital MDDS Formats

For direct and indirect material suppliers:



For CMs and ODMS:




## 14. Records and Record Retention

Record Name	Storage Location	Filing Index	Minimum Retention
Direct Materials MDDS/ Packaging Materials MDDS/ CMDDS	CMAP	Component part numbers	Ll+15 years
Supplier Component MDDS (indirect materials)	CMAP	Component part numbers	Ll+15 years

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	Document Number: 2096-001669 <b>Document Title: Western Digital Product Environmental Compliance Engineering Specification &amp; Requirements for Materials, Parts, Products &amp; Product Protective Packaging</b>	<b>Page: 30 of 30</b>
		<b>Revision: BA</b>

Western Digital Product Level MDDS	CMAP	Product part numbers	LI+15 years
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**15. Software, Systems, Applications - NA**

**16. Training Requirements**

Training Name	Training Method	Location of Training Material	Quiz	Participants (Function/Group)	Training Records	Monitoring Plan	Training Frequency
Western Digital Product Environmental Compliance Engineering Specification	LMS	<u>LMS</u>	N/A	Quality Systems, Supplier Quality, Packaging Engineering, Manufacturing Engineering, Procurement, Legal, Program Management, Product Management, Customer Quality, Product Quality, Reliability, Marketing	<u>LMS Dashboard</u>	N/A	SPEC revision change (Annual refresher for existing employees)

**17. Key Process Indicators/Metrics – N/A**

**18. Key Risk Analysis- N/A**

**19. Environment, Health and Safety (EHS) -N/A**

**20. Revision History**

Revision	Changes	Originator	Function
AU	C28711	Rowena Jones	Product Environmental Compliance (PEC)
AV	C34321	Rowena Jones	Product Environmental Compliance (PEC)
AW	C40736	Rowena Jones	Product Environmental Compliance (PEC)
AX	C50145	Rowena Jones	Product Environmental Compliance (PEC)
AY	C61418	Rowena Jones	Product Environmental Compliance (PEC)
AZ	C72860	Rowena Jones	Product Environmental Compliance (PEC)
BA	C95452	Rowena Jones	Product Regulatory Engineering (PRE), PEC

**21. Appendix -N/A**

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