TABLE OF CONTENT

1 OBJECTIVES / PURPOSE

Nexperia's requirements for hazardous substances in products and packaging are guided by both national and international regulations, as well as specific customer requirements. Substances may either be completely prohibited, meaning they cannot be used under any circumstances, or prohibited only above certain thresholds, where they are allowed up to specific limits set by this standard but cannot exceed them. In some cases, substances are subject to restricted use, where they are permitted only in specific applications. Additionally, certain substances must be declared when present, even if they are not entirely prohibited or restricted, ensuring transparency and regulatory compliance.

2 SCOPE

This document is applicable to all materials, parts, (semi-)finished goods, subassemblies and packaging materials delivered and used for Nexperia products (ICs, discretes, and modules) which are either intended to be put on the market or intended to be used by the business for evaluation purposes.

3 RESPONSIBILITIES AND RISKS

3.1 Responsibility Assignment Matrix

The basic responsibilities are shown in the RACI matrix in Table 1. A more detailed process description can be found in the internal document XPR-0318.

Table 1: RACI matrix for the main tasks during environmental compliance review; R: Responsible; A: Accountable; C: Consulted, I: Informed;

Task	Vendor	ECO-Products	Business Group
Define environmental compliance requirements	I	A	I
Fulfil environmental compliance requirements for products and packaging in accordance with this standard over the entire product lifecycle	R	C	A
Request required documentation from vendor	I	C	A
Confirm compliance towards this procedure and provide required documentation	R	C	A
Identify and inform about any non-compliance cases	A	C	C
Perform environmental compliance reviews	C	R	A
Maintain internal documentation		C	A

3.2 Risks

Non-compliance with regulations in Nexperia's products poses a significant risk to the company, both financially and in terms of reputation. The immediate financial risks are covered by our standard Terms & Conditions of Sales, but a failure to adhere to regulations could result in negative publicity and loss of business. The consequences of non-compliance, such as shipment blockages, fines, facility closures, and potential legal action, can have severe consequences and must be avoided.

4 FLOWCHART

n/a

5 PROCEDURE

This document provides a comprehensive overview of Nexperia's Hazardous Substances Control Standard. Substance groups may either be finite and self-contained, such as those governed by REACH Annex XIV at a specific point in time, or they may consist of an extensive, potentially limitless number of representatives, such as per- and polyfluoroalkyl substances (PFAS). XPR-0534 serves as a supporting document, providing comprehensive lists for self-contained groups of substances and illustrative examples for open substance groups.

All threshold limit values (TLVs) mentioned herein shall apply at the respective homogeneous material level. If multiple TLVs can be derived, the strictest of available requirements shall be applied. Consider the example of a metallic product-related material containing lead. Lead is: i) a substance of very high concern (SVHC) and ii) listed under Proposition 65 and therefore declarable at 100 ppm (section 5.4); iii) restricted at 500 ppm in metals (Table B1); iv) classified as a reproductive toxicant, category 1 A, thus restricted at 1000 ppm (Table B1). Consequently, the applicable threshold limit value (TLV) for lead is 500 ppm.

5.1 Legal and Regulatory Background

This standard is continuously being updated to meet the following requirements:

1. California: Proposition 65
2. Canada: Proposed Prohibition of Certain Toxic Substances Regulations (PCTSR), 2022
3. China: Chinese ACPEIP ("China RoHS")
4. EU: REACH Regulation (EC 1907/2006), specifically Annexes XIV and XVII, including Appendices 1—6, and the SVHC list published in accordance with Article 59(10)
5. EU: RoHS Directive (EU 2011/65)
6. EU: ELV Directive (EG 2000/53)
7. EU: PPW Directive (EC 94/62)
8. EU: POP Regulation (EU 2019/1021)
9. EU: ODS Regulation (EU 2024/590)
10. EU: Fluorinated Greenhouse Gases Regulation (EU 2024/573)
11. EU: ECHA's PBT, vPvB, PMT, and vPvMs substance list
12. France: Decree No. 2020-105 on the 'Fight Against Waste and the Circular Economy'
13. France: PE List Order
14. Japan: Chemical Substances Control Law (CSCL)

15. Switzerland: Chemical Risk Reduction Ordinance (ORRChem)
16. USA: Persistent, Bioaccumulative, and Toxic (PBT) Chemicals under TSCA Section 6(h)
17. Washington: List of chemicals of high concern to children (CHCC list)

5.2 Prohibited Substances

The intentional use of these substances and/or substances belonging to substance groups mentioned is prohibited. Nexperia does not allow the intentional use of prohibited substances under the conditions as set by our objectives and scope in any application. Nexperia accepts impurities of these substances in naturally occurring amounts and/or amounts generated via synthesis which cannot be avoided and where removal is not feasible.

Table A: List of prohibited substances and substance groups together with their TLVs. TLVs apply to all applications. Footnotes are given below.

Substance/Substance Group	TLV ppm (mg/kg)	Applies to
Asbestos	not used	ind
Biocides	0.01	ind
Cadmium (Cd) and its compounds	5[a)]	sum Cd
Chlorinated hydrocarbons (CHCs), aliphatic, < C_{10}	900	sum
Chlorinated paraffins (CPs), ≥ C_{10} including short-chain chlorinated paraffins (SCCPs, C_{10}—C_{13}), medium-chain chlorinated paraffins (MCCPs, C_{14}—C_{17}), and long-chain chlorinated paraffins (LCCPs, >C_{17})	100	sum
Chlorofluorocarbons (CFCs)	1	sum
Creosotes (tar oils)	5	sum
Chemical Substances Control Law (CSCL), Section I and II substances	5	ind
Endangered species of flora and fauna according to CITES	not used	ind
Expanded polystyrene (EPS)	not used	ind
Glycol ethers	1	sum
Halogenated benzenes	50	sum
Halogenated dibenzo-*p*-dioxins and dibenzofurans including polybrominated dibenzo-*p*-dioxins (PBDDs), polybrominated dibenzofurans (PBDFs), polychlorinated dibenzo-*p*-dioxins (PCDDs), and polychlorinated dibenzofurans (PCDFs)	0.005	sum
Halogenated diphenylmethanes, benzyltoluenes, and diarylalkanes	10	sum
Halons	1	sum
Hexavalent chromium (Cr^{6+}) compounds	100[a)]	sum Cr^{6+}
Hydrofluorocarbons (HFCs), hydrobromofluorocarbons (HBFCs), hydrochlorofluorocarbons (HCFCs), hydrofluoroethers (HFEs), and hydrofluoroolefins (HFOs)	1	ind
Isocyanates	100	sum
Mercury (Hg) and its compounds	2[a)]	sum Hg
Metal carbonyls	100	ind

Substance/Substance Group	TLV ppm (mg/kg)	Applies to
Monomers	5	sum
Nitro and nitroso compounds	100	sum
Nonylphenols (NPs), octylphenols (OPs), and their ethoxylates (NPEs, OPEs)	50	ind
Organotin compounds	5	sum
Ozone-Depleting Substances (ODS) as defined by Regulation 2024/590/EU, Annexes I and II	1	sum
Pentachlorophenol (PCP) and its salts and esters	5	ind
Perchloric acid and its salts (perchlorates)	0.006	ind
Per- and polyfluoroalkyl substances (PFAS) including fluorotelomers, perfluorocarboxylic acids (PFCAs) and perfluorosulfonic acids (PFSAs) with the following exceptions:	50	sum
- Perfluorocarbons (PFCs)	1	sum
- Perfluorooctanesulfonic acid (PFOS), its salts and related substances	0.025	sum
- Perfluorohexanoic acid (PFHxA) and its salts	0.025	sum
- Perfluorohexanesulfonic acid (PFHxS) and its salts	0.025	sum
- Perfluorooctanoic acid (PFOA) and its salts	0.025	sum
- PFHxA-related substances	1	sum
- PFHxS-related substances	1	sum
- PFOA-related substances	1	sum
- C_9–C_{21} PFCAs and their salts[1]	0.025	sum
- Substances related to C_9–C_{21} PFCAs	0.26	sum
PBT (persistent, bioaccumulative, and toxic), vPvB (very persistent and very bioaccumulative), vPvM (very persistent and very mobile), and PMT (persistent, mobile, and toxic) substances per ECHA	1000	ind
Persistent Organic Pollutants per EU 2019/1021	not used	ind
Phthalates, including their salts and esters	100	ind
Polybrominated biphenyls (PBBs)	10	sum
Polychlorinated biphenyls (PCBs)	0.2	sum
Polybrominated diphenyl ethers (PBDEs)	10	sum
Polychlorinated naphthalenes (PCNs)	5	sum
Polychlorinated terphenyls (PCTs)	5	sum
Radioactive elements	background radiation	sum
REACH Annex XIV substances (Authorization List)	not used	ind
Selenium (Se) and its compounds	100	sum Se

[1] The PCTSR sets restrictions on PFCAs of molecular formula $C_nF_{2n+1}COOH$ in which $8 \leq n \leq 20$. Within this document, these PFCAs are described as "C_9—C_{21} PFCAs", thus including the carboxylic acid carbon atom.

Substance/Substance Group	TLV ppm (mg/kg)	Applies to
Triorganophosphates	1000	sum
TSCA Section 6(h)-covered substances	not used	ind

5.3 Restricted Substances

The intentional use of these substances is restricted. Nexperia allows their intentional use only for specific applications under the conditions as set by our objectives and scope. Nexperia accepts impurities of substances in naturally occurring amounts and/or amounts generated via synthesis which cannot be avoided and where removal is not feasible.

5.3.1 General

Table B1: List of restricted substances and substance groups together with their restricted applications and TLVs. Footnotes are given below.

Substance/Substance Group	Restricted Application(s)	TLV ppm (mg/kg)	Applies to
Aldehydes	Wooden packaging materials	0.05	sum
Anilines (including benzidines and phenylenediamines) and their salts	Direct and prolonged skin contact	30	sum
Arsenic (As) and its compounds	Product-related materials, except as dopant in semiconductor dies	25	sum As
	Packaging	10	
Azo compounds and their salts	Direct and prolonged skin contact	30	ind
Beryllium (Be) and its compounds	All, except as dopant in gold wires	1000	sum Be
Brominated flame retardants (BFRs)	New materials and products	not used	ind
Carcinogenic, mutagenic, or toxic for reproduction (CMR) substances, cat. 1 A and 1 B according to REACH (Appendices 1 to 6)	All, except PAH impurities from carbon black pigment and lead in RoHS or ELV-exempted applications	1000	ind
Lead (Pb) and its compounds	All metals, except for applications exempted by RoHS or ELV	500[a)]	sum Pb
	All non-metals, except for applications exempted by RoHS or ELV	50[a)]	
Mineral and ceramic fibres	All, except in GRPs in PCBs and as crystalline silica in mould compounds and adhesives	10	sum
Mineral Oil Aromatic Hydrocarbons (MOAH), 1—2 aromatic rings	Inks	1000	sum
MOAH, 3—7 aromatic rings	Inks	1	sum
Mineral Oil Saturated Hydrocarbons (MOSH)	Inks	1000	sum
Natural rubber (latex)	Direct and prolonged skin contact	100	sum
Phenols, their salts, and related substances	Direct and prolonged skin contact	50	sum
Polycyclic aromatic hydrocarbons (PAHs)	Direct and prolonged skin contact	0.5	ind
		10	sum

Substance/Substance Group	Restricted Application(s)	TLV ppm (mg/kg)	Applies to
Polyvinylchloride (PVC) and PVC blends	All, except PVC tubes/rails for semiconductor packaging	5	sum
Skin sensitizers of category 1 per CLP – including, but not limited to: - Cobalt (Co) and its compounds - Nickel (Ni) and its compounds	Direct and prolonged skin contact and laminates of PCBs	1000[b)]	ind
REACH Annex XVII substances (Restriction List)	All, except i) As as dopant in semiconductor dies; ii) Ni in non-direct/prolonged skin contact applications; iii) azodyes in non-direct/prolonged skin contact applications; iv) Pb in applications exempted by RoHS or ELV;	1000	ind

5.3.2 Halogen/Antimony-Free Products Only

The requirements from Table B2 must be met for all homogeneous materials in Nexperia parts that are designated to meet Nexperia's Halogen-Free definition as per XPR-0213.

Table B2: List of restricted substances/substance groups for products designated to meet Nexperia's Halogen-Free definition. Footnotes are given below.

Substance/Substance Group	Restricted Application(s)	TLV ppm (mg/kg)	Applies to
Antimony oxides	Any product-related h.m. of a product to meet Nexperia's Halogen-Free definition	900	sum
Chlorine and bromine content	Any product-related h.m. of a product to meet Nexperia's Halogen-Free definition	900	sum

Footnotes to the tables:

a) Sum of cadmium, mercury, chromium(VI) and lead shall not exceed the limit of 100 ppm (0.01 %) in packaging material.

b) For nickel in surface preparations of products intended to come into direct and prolonged contact with the skin: Nickel ion release <0.5 µg/cm^2/week using test method EN1811:2011.

5.4 Declarable Substances

All prohibited (Table A) and restricted substances (Tables B1 and B2) are also considered declarable substances. The declarable concentration limit shall be the lower of either the respective TLV or 100 ppm. In addition, substances belonging to one or more of the following groups are declarable at the 100 ppm level:

Substance/Substance Group	TLV ppm (mg/kg)
Elements and their compounds	
Aluminum (Al) and its compounds[2]	100
Antimony (Sb) and its compounds**Error! Bookmark not defined.**	100
Barium (Ba) and its compounds**Error! Bookmark not defined.**	100
Bismuth (Bi) and its compounds**Error! Bookmark not defined.**	100
Boron (B) and its compounds**Error! Bookmark not defined.**	100
Copper (Cu) and its compounds**Error! Bookmark not defined.**	100
Chromium (Cr) and its compounds	100
Gallium (Ga) and its compounds**Error! Bookmark not defined.**	100
Germanium (Ge) and its compounds**Error! Bookmark not defined.**	100
Gold (Au) and its compounds	100
Hafnium (Hf) and its compounds**Error! Bookmark not defined.**	100
Indium (In) and its compounds	100
Lithium (Li) and its compounds**Error! Bookmark not defined.**	100
Magnesium (Mg) and its compounds**Error! Bookmark not defined.**	100
Manganese (Mn) and its compounds**Error! Bookmark not defined.**	100
Niobium (Nb) and its compounds**Error! Bookmark not defined.**	100
Phosphorus (P) and its compounds**Error! Bookmark not defined.**	100
Platinum group elements[3] and their compounds**Error! Bookmark not defined.**	100
Rare earth elements[4] and their compounds**Error! Bookmark not defined.**	100
Silver (Ag) and its compounds	100
Silicon (Si) and its compounds**Error! Bookmark not defined.**	100
Strontium (Sr) and its compounds**Error! Bookmark not defined.**	100
Tantalum (Ta) and its compounds**Error! Bookmark not defined.**	100
Tellurium (Te) and its compounds	100
Thallium (Tl) and its compounds	100
Tin (Sn) and its compounds	100
Titanium (Ti) and its compounds**Error! Bookmark not defined.**	100
Tungsten (W) and its compounds**Error! Bookmark not defined.**	100
Vanadium (V) and its compounds**Error! Bookmark not defined.**	100
Zinc (Zn) and its compounds	100

[2] Part of the fifth list 2023 of critical raw materials for the EU, either directly or indirectly.
[3] Platinum group elements are ruthenium, osmium, rhodium, iridium, palladium, and platinum.
[4] Rare earth elements include lanthanides (lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium), yttrium, and scandium

Declarable substances required by legislation	
California Proposition 65 substances	detectable
CSCL: Monitoring and Priority Assessment Chemical Substances (PACS)	100
Substances of Very High Concern (SVHCs) per REACH Article 59(10)	100
Washington list of chemicals of high concern to children (CHCC list)	intentional use
Declarable substances required by industry standards	
Global Automotive Declarable Substances List (GADSL) *including GADSL Critical Raw Materials (CRM) list*	100
IEC 62474 Declarable Substances List	100
Individual substance classes	
Chemical warfare agents	100
Cyanogenic compounds and inorganic cyanides	100
Epoxy compounds	100
Flame retardants	intentional use
Graphite**Error! Bookmark not defined.**	100
Halogenated organic compounds, salts with halogenated ions, and inorganic halides	100
Nanomaterials	100
Nitrites	100
Optical brighteners / fluorescent whitening agents (FWAs)	100
PFAS (nonpolymeric)	intentional use 0.025
PFAS (polymeric)	intentional use 50
Photoinitiators	100
Plasticizers	100
Polyamines	100
Polymeric resins	100
UV stabilizers	100

The declaration of substances is generally mandatory for all intentionally added and unintentionally present substances that exceed 100 ppm (0.01 %) of the homogeneous material. Nexperia recognizes that minor variations in chemical composition between production lots may occur. However, the declared concentrations are considered fixed values and must reflect typical substance levels, as ranges or deviations are not acceptable. This ensures consistent and reliable reporting of substance concentrations.

The use of wildcards such as "trade secret" is strongly discouraged, since in this case a continuous alignment with Nexperia's changing requirements on declarable substances in step with legal and customer requirements is necessary. In any case, the concentration of wildcard substances must not exceed 10 % of the respective homogeneous material.

5.5 Interpretation Guidelines

5.5.1 Prohibited Substances

Substance/Substance Group	TLV ppm (mg/kg)	Applies to
Triorganophosphates	1000	sum
TSCA Section 6(h)-covered substances	not used	ind

For triorganophosphates:

Application	*Intentional* addition allowed?	Concentration limit for **incidental**/unavoidable traces
Product-related materials	No	≤ 1000 ppm (0.10 %)
Packaging	No	≤ 1000 ppm (0.10 %)

For "TSCA Section 6(h)-covered substances":

Application	*Intentional* addition allowed?	Concentration limit for **incidental**/unavoidable traces
Product-related materials	No	None *any detectable amount is non-compliant*
Packaging	No	None *any detectable amount is non-compliant*

5.5.2 Restricted Substances

Substance/Substance Group	Restricted Application(s)	TLV ppm (mg/kg)	Applies to
Arsenic (As) and its compounds	Product-related materials, except as dopant in semiconductor dies	25	sum As
	Packaging	10	

Application	Is *intentional* addition of As allowed?	Concentration limit for **incidental**/unavoidable traces
Product-related materials except when As is used as a dopant in the silicon die	**No.** Any deliberate addition is forbidden unless the substance is functioning as a dopant inside the semiconductor die.	≤ 25 ppm (0.0025 %) total As in the material
Semiconductor die dopant	**Yes.** Deliberate doping is permitted. No numerical limit, doping concentrations are set by device performance.	
Packaging (carrier tape, trays, reels, labels, boxes, pallets)	**No.** Intentional addition is forbidden.	≤ 10 ppm (0.001 %) total As in the material

5.6 Non-Conformance

Nexperia requires suppliers to address any non-conformance towards the requirements mentioned herein. The Nexperia Sourcing Manager and ECO-Products (eco-products@nexperia.com) must be informed immediately when a non-conformance is either suspected or confirmed. The existence of any non-conformity shall be verified via appropriate verification methods. After root cause analysis and recognition of the extent of the non-conformity, a corrective action plan must be shared with Nexperia. After the non-conformance has been remedied, suitable evidence is required to confirm that the non-conformance has been successfully eliminated.

In case Nexperia's customer reports a possible non-conformance towards agreed-on requirements, the procedure as outlined in XPR-0036, Customer Complaint Handling Procedure, shall be followed.

6 RECORDS

Compliance to this procedure should be checked with help of the full material declaration process (XPR-0318), with the relevant form being XTE-0008 for incoming materials and products. In addition, compliance should be verified by third-party analytical test reports as evidence with respect to Nexperia's test requirements (XPR-0009), with XPR-0282 being the respective process description. Documents submitted by suppliers should be attached to the material level in Enovia for traceability purposes.

7 DOCUMENT INFORMATION

7.1 References

Item	Description
XTE-0008	Nexperia Material Declaration Form *(public)*
XPR-0009	Test Requirements for Hazardous Substances in Products and Packaging (*public*)
XPR-0036	Customer Complaint Handling Procedure *(company internal)*
XPR-0213	RHF-2006 Classification for Semiconductor Products *(company internal)*
XPR-0282	Obtaining Valid Certificates of Analysis (CoAs) *(company internal)*
XPR-0318	Environmental Material Compliance Assurance Procedure *(company internal)*
XPR-0534	List of Controlled Substances in Products and Packaging *(public)*
CA Prop 65	Safe Drinking Water & Toxic Enforcement Act of 1986 (Proposition 65), CAL. HEALTH & SAFETY CODE §§ 25249.5–25249.14
CHCC List	Wash. Admin. Code (WAC) § 173-334-130 The reporting list of chemicals of high concern to children
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLP	Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006
CSCL	Chemical Substances Control Law, Law No. 117 of 1973
ELV	Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of-life vehicles
EU 2024/573	Regulation (EU) 2024/573 of the European Parliament and of the Council of 7 February 2024 on fluorinated greenhouse gases, amending Directive (EU) 2019/1937 and repealing Regulation (EU) No 517/2014
French Decree No. 2020-105	LAW no. 2020-105 of 10 February 2020 on the fight against waste and the circular economy
GADSL	Global Automotive Declarable Substances List
IEC 62474	Declarable Substances List (DSL) including Reference Substance List (RSL) per "IEC 62474 - Material Declaration for Products of and for the Electrotechnical Industry"
ODS	Regulation (EU) 2024/590 of the European Parliament and of the Council of 7 February 2024 on substances that deplete the ozone layer
ORRChem	Chemikalien-Risikoreduktions-Verordnung

Item	Description
	Ordinance on the Reduction of Risks relating to the Use of Certain Particularly Dangerous Substances, Preparations and Articles, SR 814.81
PBT/vPvB	The ECHA publishes a PBT assessment list.
PCTSR	Proposed Prohibition of Certain Toxic Substances Regulations, 2022, 156 Can. Gaz. I 20 (2022-05-14)
PE List Order	Ministerial Order on endocrine-disrupting substances (NOR TREP2323345A JORF, 2023-10-12)
POP	Regulation (EU) 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants
PPW	European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste
REACH	Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
RoHS	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
TSCA 6(h)	Toxic Substances Control Act § 6(h), 15 U.S.C. § 2605(h)

7.2 Terms, Acronyms, and Definitions

Acronym / Term	Definition
Background radiation	Nexperia defines background radiation as 0.2 µSv/h and/or 50 Bq/g maximum at 10 cm distance.
BFR	Brominated flame retardant
CFC	Chlorofluorocarbons
CHC	Chlorinated hydrocarbon
CHCC List	List of chemicals of high concern to children
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora (see section 7.1)
CLP	Classification, labelling and packaging of substances and mixtures (see section 7.1)
CMR	Carcinogenic, mutagenic, or reproductive toxicant
CP	Chlorinated paraffin
CSCL	Chemical Substances Control Law (see section 7.1)
ECHA	European Chemicals Agency
ELV	End-of-life vehicles (see section 7.1)

Acronym / Term	Definition
EPS	Expanded polystyrene
FWA	Fluorescent whitening agent
GRP	Glass-reinforced plastics
h.m.	Homogeneous material. A material of uniform composition throughout or a material, consisting of a combination of materials that cannot be disjointed or separated into varied materials by mechanical actions such as unscrewing, cutting, crushing, grinding, and abrasive processes.
HBFC	Hydrobromofluorocarbon
HCFC	Hydrochlorofluorocarbon
HFC	Hydrofluorocarbon
HFE	Hydrofluoroether
HFO	Hydrofluoroolefin
Impurity	An impurity is a trace amount of a substance that is present in raw materials and is not removed during the production process. These substances can include contaminants found in recycled materials or naturally occurring elements in raw materials, such as ore. Additionally, impurities encompass residual substances that remain in a homogeneous material after processing by the supplier. These residuals can include unreacted constituent substances (e.g., monomers, pre-polymers, base materials, antioxidants, and catalysts), solvents, reaction byproducts formed during production, and decomposition products.
Intentionally added	A substance that is deliberately incorporated into a material or product to perform a specific function or purpose in the final product.
LCCP	Long-chain chlorinated paraffin. An unbranched chloroparaffin with a carbon chain length of more than 17 atoms.
MCCP	Medium-chain chlorinated paraffin. An unbranched chloroparaffin $C_xH_{2x-y+2}Cl_y$, where x = 14—17 and y = 1—17.
MOAH	Mineral oil aromatic hydrocarbon
MOSH	Mineral oil saturated hydrocarbon
n.d.	Not detectable. Nexperia considers amounts of substances below the natural occurrence levels and/or below the detection limit of currently accepted quantitative analytical methods as "not detectable (n.d.)", "not present", "not contained" or "0 ppm".
Nanomaterial	following Commission recommendation 2011/696/EU, a nanomaterial shall be defined as "*a natural, incidental or manufactured material containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for 50 % or more of the particles in the*

Acronym / Term	Definition
	number size distribution, one or more external dimensions is in the size range 1 nm–100 nm."
Not used	A substance that is not intentionally added during the manufacturing or processing of a material or product.
NPE	Nonylphenol ethoxylate (= ethoxylated nonylphenol)
NP	Nonylphenol
ODS	Ozone-depleting substance
OPE	Octylphenol ethoxylate (= ethoxylated octylphenol)
OP	Octylphenol
Packaging (material)	Please refer to the legal definition set out in PPW Directive: *"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."* As such, the definition also covers tertiary shipment materials such as pallets to facilitate handling and transport of a number of sales units or grouped packagings.
Packing (material)	Materials in direct (primary) or indirect (secondary) contact with the product, such as reel, tape, tube, tray, bag, box, cushion, bag, plug, humidity indicator card, label, ...
PAH	Polycyclic aromatic hydrocarbon
PACS	Priority Assessment Chemical Substances (*see CSCL*)
PBB	Polybrominated biphenyl
PBDD	Polybrominated dibenzodioxin
PBDE	Polybrominated diphenyl ether
PBDF	Polybrominated dibenzofuran
PBT	Persistent, bioaccumulative, and toxic
PCB	Printed circuit board *or* polychlorinated biphenyl
PCDD	Polychlorinated dibenzodioxin
PCDF	Polychlorinated dibenzofuran
PCN	Polychlorinated naphthalene
PCP	Pentachlorophenol
PCT	Polychlorinated terphenyl
PCTSR	Prohibition of Certain Toxic Substances Regulations

Acronym / Term	Definition
PFAS	Per- and polyfluoroalkyl substances. Any substance that contains at least one fully fluorinated methyl ($-CF_3$) or methylene ($-CF_2-$) carbon atom (without any H/Cl/Br/I attached to it). A substance that only contains the structural element CF_3–X or X–CF2–X', where X = –OR or -NRR' and X' = methyl ($-CH_3$), methylene ($-CH_2-$), an aromatic group, a carbonyl group (–C(O)–), –OR'', -SR'' or –NR''R''', and where R/R'/R''/R''' is a hydrogen (–H), methyl ($-CH_3$), methylene ($-CH_2-$), an aromatic group or a carbonyl group (–C(O)–), is excluded from the scope. PFAS are sometimes referred to as per- and polyfluorinated chemicals, abbreviated as "PFCs". This should not be confused with the use of the abbreviation PFC in this document.
PFC	Perfluorocarbon
PFCA	Perfluorocarboxylic acid
PFHxA	Perfluorohexanoic acid
PFHxS	Perfluorohexanesulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PFSA	Perfluorosulfonic acid
Photoinitiator	Light-absorbing molecules that, when irradiated with 250–450 nm UV/visible light, release radicals or cationic acids that polymerize specialty acrylate, epoxy, or vinyl resins.
Plasticizer	Molecules (e.g., phthalate, adipate, or citrate esters) blended into polymers to lower the glass-transition temperature, making otherwise rigid plastics softer and less brittle.
PMT	Persistent, mobile, and toxic
POP	Persistent organic pollutant (see section 7.1)
PPW	Packaging and packaging waste (see section 7.1)
PVC	Polyvinyl chloride
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals (see section 7.1)
Related substance of…	A related substance of a given substance is a substance (including polymers) that can release the target substance and thereby act as its precursor. For example, compounds containing the structural element $C_8F_{17}SO_2-$, $C_8F_{17}SO_3-$, or $C_8F_{17}SO_2N-$ are suspected to release perfluorooctane sulfonate (PFOS) and are related substances of PFOS.

Acronym / Term	Definition
RoHS	Restriction on Hazardous Substances (see section 7.1)
RHF	RoHS and Halogen/Antimony-Free
SCCP	Short-chain chlorinated paraffin. An unbranched chloroparaffin $C_xH_{2x-y+2}Cl_y$, where x = 10—13 and y = 1—13.
Skin contact, prolonged	Contact with the skin for more than 10 minutes on three or more occasions within two weeks, or for 30 minutes on one or more occasions within two weeks.
SVHC	Substance of very high concern
TLV	Threshold Limit Value
TSCA	Toxic Substances Control Act (see section 7.1)
UV stabilizer	Additives—such as benzophenone or benzotriazole UV absorbers and HALS free-radical scavengers—blended into plastics, rubbers, and coatings to absorb or deactivate ultraviolet light–induced energy and radicals, thereby preventing embrittlement, discoloration, and loss of mechanical strength and significantly extending service life in sunlight.
vPvB	Very persistent and very bioaccumulative
vPvM	Very persistent and very mobile

7.3 History of Changes

Date	Description of change	Changed by (name)
2017-02-06	Transfer from NX3-00119 to Nexperia	Rainer Paschold
2018-04-18	Update of terms and tables	Annette Bunk
2019-12-04	Review and re-validation, correction of typos. Changed owning organization from Quality to EHS.	Annette Bunk
2022-04-22	*Interim revision: changed document owner from Marc Bollmann to Timo Stein*	*NMS Admin*
2022-10-11	• Periodic review • Definitions for prohibited, restricted, declarable substances were moved from chapter 7 to chapter 5 • "Azo compounds (azocolourants and azodyes)" moved from prohibited to restricted • "Persistent, Bioaccumalative and Inherently Toxic Substances (PBiTs)" renamed to PBTs and moved from restricted to prohibited • Typographic fixes • Removed footnote f) about benzene impurities • Info on Tab. C1 and C2 removed as it applies to XTE-0008/XTE-0055 • Rework of chapter 7.1 and 7.2	Annette Bunk

Date	Description of change	Changed by (name)
	• Removed Master List attachment as it is distributed along with XTE-0008/XTE-0055	
2023-02-07	Reworked: (3.2) Risks Updated: - (5.1) Prohibited Substances: PFAS limits adapted to new requirements; polychlorinated phosphate esters added; TSCA 6(h) substances added; specified group column "Applications" removed - (5.2) Restricted Substances: Addition of MOAH/MOSH Added: - (5.4) Non-Conformance; - (8) MasterList as an Excel appendix	Annette Bunk
2023-06-15	• MasterList: (a) Added requirements on declarable substances according to EU Critical raw materials (CRMs) 2023 draft. (b) SVHC-235 update. • (5.1) Specified PFAS requirements, added PFHxA • (5.2.1) Application for "natural rubber (latex)" was changed from "All, except in photo diodes" to "direct and prolonged skin contact". Application for Arsenic was changed from "All, except ICs (as dopant or GaAs-based dies)" to "All, except semiconductor chips". • (5.2.2) Specified Cl+Br requirement for Halogen-Free; removed footnote j; • (5.3) Rework. Explicit reference to the declarability of substances according to MasterList and wildcard substances.	Annette Bunk
2023-11-29	*Interim rev. removed "Nexperia" from document title*	*Timo Stein*
2024-08-27	Renamed the document from "Nexperia List of Hazardous Substances in Products and Packaging" to "Hazardous Substances Control Standard for Products and Packaging" • Reworked "1 Objectives / Purpose", the responsibility assignment matrix below "3 Responsibilities and Risks", and "5 Procedure". • Added "5.1 Legal and Regulatory Background". • Prohibited substances. Removed "(excl. hexachlorobenzene)" from halogenated benzenes; Added definitions of SCCPs, MCCPs, and LCCPs to CPs. Specified "endangered species of flora and fauna" by adding "according to CITES". Changed "greenhouse gases" to cover HFCs, HBFCs, and HCFCs. Moved aldehydes to restricted substances. Renamed "pesticides, herbicides, insecticides" to "biocides", lowered TLV from 1000 ppm to 0.01 ppm. Removed UV-320, is covered by REACH Annex XIV. Removed dimethylfumarate, is covered by REACH Annex XVII. Merged "ethyl/methyl glycols and their	Annette Bunk

Date	Description of change	Changed by (name)
	acetates" (P1) and "toxic glycol ethers, excluding ethyl/methyl glycols and their acetates" (P1000) to one row "glycol ethers" (P1). Removed fluorotelomers, is covered by PFAS. Added isocyanates at 100 ppm. Lowered metal carbonyls to 100 ppm. Merged nitro compounds and nitrosamines to "nitro and nitroso compounds", lowered TLV from 1000 ppm to 100 ppm. Removed HBCDD, is covered by REACH Annex XIV. Removed hexachlorobenzene, is covered by biocides. Added OPs and OPEs to NPs and NPEs. Moved organotin compounds from restricted to prohibited. Added info on origin of ODS (1005/2009/EC). Added PFCs, HFCs, HFEs, HFOs below PFAS at 1 ppm. Redefined PBTs and vPvBs to extend to ECHA-specified substances. Merged "phthalates, specified group" (P100) and "phthalates, excl. specified group" (R100) as "phthalates, including their salts and esters" (P100). PCBs, PBBs, PCDEs, PBDEs, PCTs, PBTs, PCNs, PBNs now all at P5. Renamed "polychlorinated phosphate esters, specified group" to "triorganophosphates". Removed PACs and thioxanthenes. Moved PAHs to restricted substances. Added REACH Annex XIV as "not used". Removed triclosan, is covered by biocides. Added "creosotes (tar oils)" at 5 ppm. • Restricted substances: Added "aromatic brominated flame retardants" (not used). Moved aldehydes from prohibited to restricted, apply only to wooden packaging materials. Added "anilines (including benzidines and phenylenediamines) and their salts" at 30 ppm. Expanded "azo compounds" to also cover their salts. Removed "ceramic headers" from beryllium application. Changed CMR application to "all, except PAH impurities from carbon black as a pigment in product-related and packaging materials and lead in RoHS or ELV-exempted applications". Raised TLV for lead in metals to 500 ppm. Changed application for mineral and ceramic fibres to cover adhesives as well. Lowered MOAH and MOSH limits to 1000 ppm. Added MOAH w. 3-7 aromatic rings at 1 ppm. Moved "organotin compounds" to prohibited substances. Changed "phenols excl. PCPs, NPs, NPEs, and UV-320" to "phenols, their derivatives and salts", changed application to "direct and prolonged skin contact". Moved PAHs from prohibited to restricted substances. Removed phthalates, now covered under prohibited substances. Specified that skin sensitizers apply to substances as classified by CLP. Added REACH Annex XVII at R1000. Removed TRIS and TEPA, are covered by REACH Annex XVII.	

Date	Description of change	Changed by (name)
	• Reworked Tab. B2 to list antimony requirements for glass diodes and other products. • Reworked "5.4 Declarable Substances", now mentioning all declarable substance groups. • Reworked "7.2 Terms, Acronyms, and Definitions". • Removed Appendix, replaced by XPR-0534. • Removed references to XTE-0055 (Product Declaration Form), now all handled within XTE-0008.	
2024-09-05	• Changed "Pb in applications non-exempted by RoHS or ELV" to "Pb in applications exempted by RoHS or ELV" for REACH Annex XVII substances (Table B1). • Fixed two wrong references to XPR-0534 (was: XPR-0543) and the link to the document.	Annette Bunk
2025-01-16	• Changed document author to Timo Stein • 5.1: Added Regulation 2024/573/EU and French Decree No. 2020-105 • 5.2: Moved HFEs and HFOs from PFAS sub-groups to the group of HFCs, HBFCs, and HCFCs; Added PFOS and its salts/derivatives to the PFAS category with TLV of 1 ppm; Included LC-PFCAs up to C_{21} (was: C_{19}); Added 2019/1021/EU POPs as "not used"; Lowered TLV for PCBs/PBBs, PCDEs/PBDEs, PCTs/PBTs, PCNs/PBNs from 5 ppm to 0.1 ppm: • 5.3.1: Phenols and their salts now also include "related substances" • 5.3.2: The restriction on the concentration of antimony oxide in glass diodes has been lifted and the general requirements for halogen-free products now apply • 5.5: Added reference to XPR-0036 as the leading process to handle non-conformities reported by customers • 7.1: Added XPR-0036, 2024/573/EU, French Decree No. 2020-105, GADSL, IEC 62474	Timo Stein
2025-07-02	• Replaced 1005/2009/EG by 2024/590/EU • 5.1: Added French Ministerial Order on endocrine-disrupting substances and Japanese Chemical Substances Control Law (CSCL) • 5.2+5.3: Added a column "applies to" to tables to indicate whether the respective TLV applies to the sum of substances or individual substances • 5.2: Changed asbestos TLV from 10 ppm to "not used"; lowered PFOS, its salts, and related substances from 1 ppm to 0.025 ppm; split of "PFHxA, PFHxS, PFOA, and their salts" into individual rows; split of "related substances of PFHxA, PFHxS, and PFOA" into individual rows; added PMT and vPvM to PBT+vPvB row; added CSCL Section I+II	Timo Stein

Date	Description of change	Changed by (name)
	(P5); split PBDEs/PCDEs/PBBs/PCBs/PBTs/PCTs/PBNs/PCNs (formerly P0.01) into separate rows PBDEs (P10), PCBs (P0.2), PBBs (P10), PCTs (P5), PCNs (P5) and dropped PCDEs/PBTs/PBNs due to low economic significance; • 5.3.1: Changed "aromatic brominated flame retardants (BFRs)" to "brominated flame retardants (BFRs)"; changed TLV for PAHs from 1 ppm to 0.5 ppm individually and 10 ppm for the sum of PAHs; changed restricted application for PAHs from "all, except naturally occurring amounts and/or amounts generated via synthesis which cannot be avoided and where removal is not feasible" to "direct and prolonged skin contact"; • 5.4: Introduced different declaration thresholds; added GADSL CRM list; changed TLV for California Proposition 65 substances from 100 ppm to "detectable"; added "Washington list of chemicals of high concern to children (CHCC list)" using TLV "intentional use"; added "flame retardants" (intentional use), plasticizers (100 ppm), UV stabilizers (100 ppm), photoinitiators (100 ppm), non-polymeric PFAS (intentional use and 0.025 ppm), polymeric PFAS (intentional use and 50 ppm), and optical brighteners / fluorescent whitening agents (FWAs); added CSCL Monitoring and Priority Assessment Chemical Substances; • 6: Changed "certificates of analysis (CoA)" to "analytical test reports" • 7.1+7.2: Addition of references and abbreviations	
2025-07-15	5.3.1: Added missing "sum" to "MOAH, 3—7 arom. rings". Raised TLV for lead in non-metals from 20 ppm to 50 ppm.	Timo Stein

7.4 Document Release

Function	Name	Organisation and Role
Approver	Timo Stein	Manager ECO-Products
Author	Timo Stein	Manager ECO-Products
Co-Author	-	
Reviewer	-	