



## Nokia Substance List 2020

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## 1 Purpose and scope

Nokia recognizes the need to identify and control the materials and substances used in its products and sales packaging. For this purpose, Nokia has compiled the Nokia Substance List. The list specifies the substances Nokia has restricted, targeted for reduction or required to be reported. The basic principle for the Nokia Substance List is that the use of substances in Nokia products shall be safe for humans and the environment. Nokia applies these mandatory requirements worldwide. This list and timetables are subject to change in light of further scientific evidence, legislation or other facts, at the sole discretion of Nokia.

The scope of the restrictions is generally defined (unless specifically restricted for processing in the restriction table) as materials and substances present in the final product. The requirements apply for applications in Nokia products including components, materials (solders, pastes, etc.), parts, assemblies, accessories and packaging materials.

Compliance with this list does not exempt manufacturer/seller/supplier from any legal requirements, and it is the responsibility of manufacturer/seller/supplier to follow the latest legislative developments related to materials and substances. Further, if the manufacturer/seller/supplier has reason to believe that any substance, listed or otherwise, may create risk of harm to persons, the environment or products, the manufacturer/seller/supplier shall alert Nokia to the potential harm.

## 2 Definitions

**Accessory** – A non-electronic device that is not essential in itself, but adding to the convenience, or effectiveness of a product.

**Article** – An object, which during production is given a special shape, surface or design, and which determines its function to a greater degree than does its chemical composition. This definition is aligned with the EU REACH Regulation.

<https://echa.europa.eu/en/regulations/reach/candidate-list-substances-in-articles>

**Assembly** – A (semi) finished combination of parts.

**Battery** – or accumulator is any source of electrical energy generated by direct conversion of chemical energy and consisting of one or more non-rechargeable cells or one or more rechargeable cells. This definition is aligned with the EU Battery Directive.

**CAS number** – Chemical Abstract Service number, which is a unique numerical identifier assigned to the substance. The same substance may have several different names, all having the same CAS number (e.g. acetone is also named 2-propanone, but only one CAS number: 67-64-1).

**Conversion between units: ppm (parts per million), ppb (parts per billion) and percent (%)** –

Conversion instructions:

- To convert percent (%) to ppm multiply by 10 000, e.g. 0.1% = 0.1 \* 10 000 = 1000 ppm
- To convert ppm to percent (%), divide by 10 000, e.g. 900 ppm = 900 / 10 000 = 0.09 %
- To convert ppm to ppb multiply by 1000, e.g. 0.025 ppm = 0.025 \* 1000 = 25 ppb
- To convert ppb to ppm, divide by 1000, e.g. 100 ppb = 100 / 1000 = 0.1 ppm

**Exemptions** – Applications where the use of a restricted substance is permitted, such as RoHS exemptions and Nokia Substance List exemptions.

**Homogeneous material** – A material of uniform composition throughout or a material, consisting of a combination of materials, that cannot be disjointed or separated into different materials by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes. Examples are individual types of plastics, ceramics, glass, metals, alloys, resins and coatings. For example, a stainless steel screw is an "homogeneous material", but a semiconductor package contains many homogeneous materials, which include plastic molding material, tin-plating on the lead-frame, the lead-frame alloy and bonding wires. This definition is from RoHS.

**Impurity** - A substance contained in a natural material but which is not completely removed in the refining process (i.e. natural impurities), or which is generated in a reaction process but is not completely removed.

**Intentionally introduced** - For the purposes of this document: "Intentionally introduced" shall mean "deliberately utilized in the formulation of a material or component where its continued presence is desired in the final product to provide a specific characteristic, appearance or quality". The use of recycled materials as feedstock for the manufacture of new products, where some portion of the recycled materials may contain amounts of regulated substances, is not to be considered as intentionally introduced.

**Material** - A material is made of one or more substances. Examples of materials are plastics, metals, coatings, alloys, paints and adhesives. For example, copper alloy is a material made up of several substances, e.g. copper, nickel and zinc. Also, preparations (e.g. solder pastes, fluxes, cleaners and lubricants), compounds (e.g. water and sodium chloride) and elements (e.g. hydrogen, helium, gold) are materials.

**Mobile & Wearable** - Products that belong to mobile and wearable categories and parts used in such products – Mobile category includes devices such as mobile phones, smart phones and tablets. Wearable category includes devices that are intended to be worn by the user or maintained in close proximity to the user. Both categories also include accessories (such as USB cables, chargers or headsets) intended for use with products that belong to these categories.

**Nanomaterial** - Definition of nanomaterial in Nokia is based on the European Commission Recommendation on the definition of nanomaterials (2011/696/EU):

‘Nanomaterial’ means 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 number size distribution, one or more external dimensions is in the size range 1 nm-100 nm. In specific cases and where warranted by concerns for the environment, health, safety or competitiveness, the number size distribution threshold of 50% may be replaced by a threshold between 1 and 50%.

**Network & Others** – All network products and other products as well as parts used in such products not covered by Mobile & Wearables.

**Packaging** – Restrictions for materials/substances used in packaging refer to sales (outbound) packaging. Packaging in Nokia refers to packaging including printed user guide and other printed materials and its transport packaging that is used for transportation to end customers.

**Parts** – Any item that is supplied to and/or designed on behalf of Nokia excluding packaging.

**Processing** – Any operation used to produce finished products or intermediate materials from raw materials or other resources.

**Product** - A final manufactured good that is delivered to Nokia customers.

**Prolonged skin contact** - Prolonged contact with the skin is defined as contact with the skin of potentially more than 10 minutes on three or more occasions within two weeks, or 30 minutes on one or more occasions within two weeks. Definition is taken from the ECHA proposal for minimum contact time for “prolonged contact with the skin” in relation to the Nickel restriction: [https://echa.europa.eu/documents/10162/13641/nickel\\_restriction\\_prolonged\\_contact\\_skin\\_en.pdf](https://echa.europa.eu/documents/10162/13641/nickel_restriction_prolonged_contact_skin_en.pdf)

**Radioactive substance** - Substance whose radioactivity exceeds the natural background value.

**REACH** - Acronym for the EU Regulation (EC) 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals.

**Reportable** - Substances that are to be monitored regarding their use/presence in Nokia products and packaging and any usage/amounts present reported to Nokia.

**Restriction / threshold value** - Defines the limitation, requirement and/or regulation

**Restricted** - Substances that are prohibited from use as specified in the restriction / threshold level column in table 1 and/or 2.

For all other uses these substances are considered “To be Avoided”.

**RoHS** - An acronym for the EU Directive 2011/65/EU on the Restriction of the use of certain Hazardous Substances in electrical and electronic equipment.

**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. This definition is from REACH.

**To be Avoided** - Substances which Nokia tracks and expects suppliers to reduce and phase out from products and packaging as technically and environmentally acceptable alternatives become available. Suppliers are strongly advised to work on a phase-out plan based on potential future regulatory or Nokia implementation dates, as applicable.

## 3 Requirements for materials and substances

The Substance List defines all materials and substances which are restricted, to be avoided or defined as reportable. If a substance belongs to several material/substance groups, the stricter concentration limit is always applied.

### 3.1 Substance list

All materials and substances for which a requirement of any type applies are listed in Table 1. or Table 2. Examples of legal and regulatory references are listed for each material / substance group, but this list is not exhaustive. Even though some regulatory references are country specific, Nokia applies these mandatory requirements worldwide.

The letter "R" in any of the columns under Scope indicates that the substance is Restricted for that scope. The letter "A" in any of these columns means that the substance is to be Avoided. See also Figure 1 below.

Material	Scope <sup>1</sup>	Scope					Restriction / threshold level	References (non-exhaustive list)
		Mobile & Wearables	Networks & Others	Batteries	Packaging	Pressing		
REACH: Res		R	R	R	R	R	As specified in Annex XVII of REACH	EU REACH Regulation (EC)1907/2006 as amended
REACH: Aut		A	A	A	A	R	As specified in Annex XIV of REACH	EU REACH Regulation (EC)1907/2006 as amended
REACH: Car		A	A	A	A		Reportable <sup>2</sup> if > 0.1% by weight of an article	EU REACH Regulation (EC)1907/2006 as amended
RoHS: (Pb, Hg, Cd, Cr6+, PBBs, PBDEs)	<a href="#">2011/65/EU</a>	R	R				As specified in Annex II - allowing for exemptions from Annex III and, for medical devices, Annex IV	EU RoHS Directive
RoHS: (DEHP, BBP, DBP, DIBP)	<a href="#">2015/863/EU</a>	R	R					Nokia (additional substances per July 2019 under EU RoHS Directive 2011/65/EU as amended)
Persistent organic pollutants (POP)	<a href="#">(EC)850/2004</a>	R	R	R	R	R	Intentionally introduced, and not exceeding limits set in 850/2004/EC	EU Regulation (EC)850/2004 on persistent organic pollutants
Radioactive substances	-	R	R	R	R	R	Intentionally introduced	<a href="#">EU-D.96/29/Euratom</a>
Ozone depleting substances (ODS)	<a href="#">(EC)1005/2009</a>	R	R	R	R	R	Intentionally introduced	EU Regulation (EC)1005/2009 on substances that deplete the ozone layer
Fluorinated greenhouse gases	<a href="#">(EC)517/2014</a>	R	R	R	R	R	As specified in Annex I of 517/2014	EU Regulation (EC)517/2014 on fluorinated greenhouse gases
Proposition 65 listed substances	<a href="#">PROP 65</a>	A	A	A	A	A	Any application where a warning is required	California Proposition 65
Substances that may cause skin sensitization							Banned for all applications that may come into contact with the skin <sup>3</sup>	Restriction applies to substances classified as Skin Sensitizer under CLP Regulation (CE)1272/2008
EU Battery Directive							however, for Cd this is not the case of battery	EU Battery Directive 2006/66/EC as amended
EU Packaging Directive							Article 11	EU Directive 94/62/EC on Packaging and Packaging waste as amended
Nanomaterials	-		Reportable					Various National registers (e.g. Belgium, France, Denmark)

<sup>1</sup> In the columns under Scope "R" means Restricted, "A" means to be Avoided. For further explanation see chapter 2 Definitions.

<sup>2</sup> For further explanation see chapter 2 Definitions and section 3.2.

<sup>3</sup> For reacted materials that are not in themselves sensitizing, this covers possible remains of sensitizing reactant(s).

<sup>4</sup> Restricted from use unless explicitly amended or waived in writing by Nokia.

Figure 1: How to read Table 1 and Table 2



Table 1 Legislative requirements for groups of materials and substances (applicable worldwide)

Material / Substance Group	Listing	Scope <sup>1</sup>						Restriction / threshold level	References (non-exhaustive list)
		Mobile & Wearables	Network & Others	Batteries	Packaging	Processing			
REACH: Restricted substances	<a href="#">Annex XVII</a>	R	R	R	R	R	As specified in Annex XVII of REACH	EU REACH Regulation (EC)1907/2006 as amended	
REACH: Authorised substances	<a href="#">Annex XIV</a>	A	A	A	A	R	As specified in Annex XIV of REACH	EU REACH Regulation (EC)1907/2006 as amended	
REACH: Candidate list for authorisation	<a href="#">cSVHC</a>	A	A	A	A		Reportable <sup>2</sup> if > 0.1% by weight of an article	EU REACH Regulation (EC)1907/2006 as amended	
RoHS: (Pb, Hg, Cd, Cr6+, PBBs, PBDEs, DEHP, BBP, DBP, DIBP)	<a href="#">2011/65/EU</a>	R	R				As specified in Annex II - allowing for exemptions from Annex III and, for medical devices, Annex IV	EU RoHS Directive 2011/65/EU as amended (including with <a href="#">2015/863/EU</a> )	
Persistent organic pollutants (POP)	<a href="#">(EU) 2019/1021</a>	R	R	R	R	R	Intentionally introduced, and not exceeding limits set in (EU) 2019/1021	EU Regulation (EU) 2019/1021 on persistent organic pollutants	
Radioactive substances	-	R	R	R	R	R	Intentionally introduced	<a href="#">EU-D 96/29/Euratom</a>	
Ozone depleting substances (ODS)	<a href="#">(EC)1005/2009</a>	R	R	R	R	R	Intentionally introduced	Montreal Protocol; (EC)1005/2009 on Ozone Depleting Substances; US Clean Air Act	
Fluorinated greenhouse gases	<a href="#">(EC)517/2014</a>	R	R	R	R		As specified in Article 11	EU Regulation (EC)517/2014 on fluorinated greenhouse gases	
Proposition 65 listed substances	<a href="#">PROP 65</a>	R	A	A	A		Any application where risk of user exposure requiring a warning is to be expected	US California Safe Drinking Water and Toxic Enforcement Act of 1986 (Prop 65)	
Substances that may cause skin sensitization	<a href="#">(EC)1272/2008</a>	R	R				Banned for all applications that may come into prolonged contact with the skin <sup>3</sup>	Restriction applies to substances classified as Skin Sensitizer under CLP Regulation (CE)1272/2008	
EU Battery Directive	<a href="#">2006/66/EC</a>			R <sup>4</sup>			As specified in Article 4, however, for Cd this applies to any type of battery	EU Battery Directive 2006/66/EC as amended	
EU Packaging Directive	<a href="#">94/62/EC</a>				R		As specified in Article 11	EU Directive 94/62/EC on Packaging and Packaging waste as amended	
Nanomaterials	-	Reportable						Various National registers (e.g. Belgium, France, Denmark)	

<sup>1</sup> In the columns under Scope “R” means Restricted, “A” means to be Avoided. For further explanation see chapter 2 Definitions.

<sup>2</sup> For further explanation see chapter 2 Definitions and section 3.2.

<sup>3</sup> For reacted materials that are not in themselves sensitizing, this covers possible remains of sensitizing reactant(s).

<sup>4</sup> Restricted from use unless explicitly amended or waived in writing by Nokia.

Table 2 Requirements for individual materials and substances (applicable worldwide)

Material / Substance Group	Listing	Scope <sup>1</sup>					Restriction / threshold level	Reference(s) (non-exhaustive list)
		Mobile & Wearables	Network & Others	Batteries	Packaging	Processing		
Antimony trioxide	-	R	A	A	A		0.09% of homogeneous material in polymeric materials	Nokia (prop65)
Beryllium oxide	-	R <sup>4</sup>	R <sup>4</sup>				Intentionally introduced	Nokia (prop 65, subject to reporting of information to WEEE recyclers)
Beryllium and compounds (other than BeO)	-	R	R <sup>4</sup>				0.1% of homogeneous material	Nokia (prop 65, subject to reporting of information to WEEE recyclers)
Bromine and compounds	-	R <sup>5</sup>	A				0.09% of homogeneous material	Nokia Policy (Halogen free)
Chlorine and compounds	-	R <sup>6</sup>	A				0.09% of homogeneous material	Nokia Policy (Halogen free)
Formaldehyde	-	A	A	A	R		Intentionally introduced	Nokia (prop65)
Nickel	-	R <sup>7</sup>	R <sup>7</sup>				Banned for all applications that may come into prolonged contact with the skin	Nokia Policy (Skin Sensitizer)
Perfluorooctanoic acids (PFOA)	-	R	R <sup>3</sup>	R	R	A	25 ppb of homogeneous material; cannot be waived beyond 1 January 2020	Norway Product regulation (FOR 2004-06-01 Nr. 922, § 2-32); Regulation (EU)2017/1000 restriction of PFOA
Polyethylene (PE) foam	-				R		Only chemically cross-linked PE foam	Nokia Policy (End of Life concerns)
Polystyrene expanded	-				R		Intentionally introduced	Nokia Policy (End of Life concerns)
Polyurethane	-				R <sup>4</sup>		Intentionally introduced	Nokia Policy (End of Life concerns)
Polyvinyl chloride (PVC)	-	R	A		R		Intentionally introduced	Nokia Policy (Halogen free)

<sup>5</sup> Bromine used as an activator in solder (excluding solders used in product assembly) and use as pigments in optical applications is exempted.

<sup>6</sup> Chlorine used as adhesion promotor, colorant as well as process residuals are exempted.

<sup>7</sup> Nickel used in amorphous metals and ceramics and the use of nickel in stainless steels (excluding stainless steel with sulphur content over 0.03% due to its potential for nickel release) are exempt.

## 3.2 Reporting of substances

All substances classified as to be Avoided are reportable. Substances classified as Restricted shall not be used for any applications covered by the scope of the restriction, all other uses are “To be Avoided” and are reportable.

## 3.3 RoHS exemptions

Exemptions set by the RoHS directive apply to RoHS substances. The actual list of exemptions can be found in the consolidated version of the EU RoHS Directive (see EUR-Lex website under consolidated legislation: [http://ec.europa.eu/environment/waste/rohs\\_eee/legis\\_en.htm](http://ec.europa.eu/environment/waste/rohs_eee/legis_en.htm))

It is the supplier’s responsibility to check the validity of the exemption in question.

## 3.4 REACH and nanomaterials

Suppliers are advised to follow the development of nanomaterials policy such as the review of the EU definition and inclusion in REACH: <https://echa.europa.eu/regulations/nanomaterials> as well as various mandatory National registers.

## 3.5 Examples of substances and their CAS numbers

Examples of substances and their CAS numbers in each material/substance group can be found in the IEC 62474 - Material Declaration for Products of and for the Electrotechnical Industry: <http://std.iec.ch/iec62474>.

Please note that this list is not exhaustive and suppliers need to identify if substances they are using in their products belong to additional restricted material/substance groups.

## 4 Contact and Updates

### 4.1 Contact

[sustainability.global@nokia.com](mailto:sustainability.global@nokia.com)

### 4.2 Communication of Updates

Once a new version of the Nokia Substance List is made available on the Nokia.com website all suppliers will be notified.

### 4.3 Changes since last issue

Section	Change	Comment
3	Update of various links and references to legislation	Annual review, no material changes in tables 1 or 2
3	Update of wording on EU RoHS	Additional RoHS substances per July 2019