

See Substance list for more details on substances - CAS number are provided as a reference, For more information on CAS Registry numbers often referred to as CAS numbers can be found at: <https://www.cas.org/>

Material / Substance Group	CAS number (examples)	Restriction in force (Note the details in References sheet)	Monitored Substances	Regulation
Antimony Trioxide, Sb2O3	1309-64-4		For all products: Expected to be reduced or gradually phased out from Adtran applications, subject to the availability of technically, environmentally and economically sound alternatives. Suppliers are strongly advised to investigate suitable alternative solutions.	
Arsenic and compounds	7440-38-2 See Substances in named group sheet for more examples of CAS numbers	For all products: Use of wooden packaging material that has been treated with Arsenic wood preservation treatment banned. Arsenic concentration in the preservation chemical shall be less 0.1% by weight of the chemical. NOTE: This restriction does not apply to the GaAs component manufacturing process.	For all products: Expected to be reduced or gradually phased out from Adtran applications, subject to the availability of technically, environmentally and economically sound alternatives. Suppliers are strongly advised to investigate suitable alternative solutions.	
Asbestos	1332-21-4 See Substances in named group sheet for more examples of CAS numbers	For all products: Banned in all applications. The concentration of possible impurities from natural raw materials and processes shall be less 0.01% in a substance/material, provided it is not intentionally introduced (1).		
Benzene	71-43-2	For all products: Total concentration of Benzene shall be less 0.1% by weight of a homogenous material(2).		
Beryllium and compounds (other than BeO)	7440-41-7 See Substances in named group sheet for more examples of CAS numbers		For all products: Expected to be reduced or gradually phased out from Adtran applications, subject to the availability of technically, environmentally and economically sound alternatives. Suppliers are strongly advised to investigate suitable alternative solutions.	
Beryllium Oxide	1304-56-9	For all products: Banned as intentionally introduced(1) in all applicatons.		
Bromine and compounds	PBBs & PBDEs; other brominated flame retardants and all other brominated compounds; See examples of the CAS numbers in the Substances in named group sheet	For all products: 1. PBBs and PBDEs banned in all applications. The concentration of PBBs and PBDEs shall be less 0.1% by weight of a homogeneous material (2).	For all products: Brominated flame retardants (other than PBBs and PBDEs) and all other brominated compounds expected to be reduced or gradually phased out in Adtran applications, subject to the availability of technically, environmentally and economically sound alternatives. Suppliers are strongly advised to investigate suitable alternative solutions.	RoHS II
Cadmium and compounds	7440-43-9 See Substances in named group sheet for more examples of CAS numbers	For all products: Banned in all applications.(3) The concentration of Cd or its compounds shall be less 0.01% by weight of a homogeneous material(2). Packaging: Cadmium is banned also in packaging(4) & packaging inks. Batteries: Different concentration limit is applied for batteries & accumulators: Concentration of Cd shall be less 0.002% by weight of a battery or accumulator.		RoHS II
Carcinogens, mutagens and reproductive toxins	See list of the CMR substances for examples, and definition of substances (5)	For all products: Banned in applications where user may be exposed (6) to the listed chemical during normal use of the product. NOTE: the concentration of azo dyes and pigments containing carcinogenic amino compounds shall be less 0.1% by weight of a chemical and the concentration of listed aromatic amines shall be less 0.03% by weight of a chemical.		REACH
Chlorine and compounds	1. Aliphatic CHCs ; Short chain chlorinated paraffins ; 2. Hexachlorobenzene Hexachlorobuta-1, 3-diene 3. Polychlorinated Naphthalenes 4. PCBs, PCTs 5. Pentachlorophenol (PCP), Pentachlorophenol sodium salt, other PCP salts and compounds; See examples of the CAS numbers in the Substances in named group sheet	For all products and internal processes: Banned in all applications. 1. Aliphatic CHCs and short chained chlorinated paraffins the concentration shall be less 0.1% by weight of a homogeneous material(2). Tetrachloromethane (CAS# 56-23-5) and 1,1,1-trichloroethane (CAS# 71-55-6) no measurable trace amounts are allowed in products. 2. Banned in all applications. 3. Polychlorinated Naphthalenes as intentionally introduced(1. 4. PCBs and PCTs concentration as impurities from natural raw materials and processes shall be less 0.005% by weight of a homogenous material (2). 5. Pentachlorophenol (PCP), Pentachlorophenol sodium salt, other PCP salts and compounds the concentration shall be less 0.1% by weight in a part/component.		REACH
	Polyvinyl Chloride (PVC); chlorine based flame retardants and polymers, and all other use of chlorine and its compounds. See examples of the CAS numbers in the Substances in named group sheet	Packaging: PVC banned in Packaging material	For all products: Expected to be reduced or gradually phased out in Adtran applications, subject to the availability of technically, environmentally and economically sound alternatives. Suppliers are strongly advised to investigate suitable alternative solutions.	RoHS II, Some PVC's contain Lead(Pb)

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Chromium VI (Cr6+)	18540-29-9 See Substances in named group sheet for more examples of CAS numbers	For all products: Banned in all applications.(4). The concentration of Cr shall be less 0.1% by weight of a homogeneous material (2). NOTE: Hexavalent chromium is also banned in packaging & packaging inks.		RoHS II
Conflict Minerals	see CAS numbers for metals refined from these minerals in the Substances in the named group sheet	The supplier will guarantee in writing that no coltan from the Congo has been processed in its devices/components	The trade of metals used in parts and components for ADTRAN products must follow lawful and socially and environmentally responsible practices defined eg by OECD and industry guidance such as GESI/EICC. All metals must come from legal sources and not to be fueling military conflict, related human rights violations and environmental degradation. Tantalum: Suppliers need to track their tantalum supply chain and assure the origin of the metal is independently audited at the smelter level 15). The proof must be provided to ADTRAN upon request.	Frank-Dodd Act Title XV
Ethylene Glycol Monomethyl Ether and its acetate, Ethylene Glycol Monoethyl Ether and its acetate	See the CAS numbers for examples in the Substances in named group sheet	For all products: Banned in all applications. The concentration of the compounds shall be .0.0001% by weight of a homogeneous material(2 .		REACH
Fluorinated greenhouse gases (PFC, SF6, HFC)	See list of CAS number Annex I to EU Reg. No. 842/2006	For all products: Banned in all products as intentionally added.		Regulation (EC) No. 842/2006
Formaldehyde	50-00-0	For all products: Banned in wood and wooden material, e.g. packaging. Limit of 0.1 ml/m3 (special testing procedure(7).		
Isocyanates	71000-82-3 See Substances in named group sheet for more examples of CAS numbers		For all products: Expected to be reduced or gradually phased out from Adtran applications(8 , subject to the availability of technically, environmentally and economically sound alternatives. Suppliers are strongly advised to investigate suitable alternative solutions.	
Lead and compounds	7439-92-1 See Substances in named group sheet for more examples of CAS numbers	For all products: Lead is banned also in solder of all NEW products. Banned in all applications(3,4,9). The concentration of Pb and its compounds shall be less 0.1% by weight of a homogeneous materials(2). Packaging: Lead is banned also in packaging & packaging inks.		RoHS II
Mercury and compounds	7439-97-6 See Substances in named groups sheet for more examples of CAS numbers	For all products: Banned in all applications(4,10). The concentration of Hg and compounds shall be less 0.1% by weight of a homogeneous material(2). Packaging: Mercury is banned also in packaging & packaging inks. Batteries: Different concentration limit for mercury are applied for batteries and accumulators. Concentration of Hg shall be less 2 % by weight in button cell batteries and less 0.0005% by weight in other batteries and accumulators. "		RoHS II
Methyl bromide	74-83-9	For all products: Banned in all products		
N,N'-ditolyl-p-phenylenediamine	27417-40-9	For all products: Banned in all products		
Nonyl Phenols and Nonylphenol Ethoxylates	104-40-5 See Substances in named group sheet for more examples of CAS numbers	For all products: Banned in textile, leather, metal, pulp and paper parts. No measurable trace amounts are allowed in parts made of these materials(11).	For all products: Expected to be reduced or gradually phased out from Adtran applications, subject to the availability of technically, environmentally and economically sound alternatives. Suppliers are strongly advised to investigate suitable alternative solutions.	Directive 2003/53/EC

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Nickel and compounds	7440-02-0 See Substances in named group sheet for more examples of CAS numbers		For all products: Expected to be reduced or gradually phased out from Adtran applications, subject to the availability of technically, environmentally and economically sound alternatives. Suppliers are strongly advised to investigate suitable alternative solutions.	
Organic tin compounds (Di- and triorganic tins)	See the CAS numbers for examples in the Substances in named group sheet	For all products: Tributyltin (TBT), Tributyltin Oxide (TBTO) and Triphenyl Tin (TPT) compounds are banned as intentionally introduced in all applications. Dibutyltin (DBT) compounds, dioctyltin (DOT) compounds and triorganic tin compounds are banned in all applications, The concentration of tin in above mentioned compounds shall be less 0.1%		
Ozone depleting substances	See the CAS numbers in Annex I to EU 1005/2009	For all products: Banned in all products as intentionally added.		Regulation (EC) No. 1005/2009 (EU)
Perfluorooctane sulfonates (PFOSs)	See the CAS numbers for examples in the Substances in named group sheet	For all products: Banned in all applications(12). The concentration of PFOS's shall be less 0.005% by weight of homogenous material(2).		REACH
Phenol,2-(2H-benzotriazol-2-yl)-4,6-bis(1,1-dimethylethyl)-	3846-71-7	For all products: Banned in all products		Proposed REACH SVHC (Germany)
Phthalates	See the CAS numbers for examples in the Substances in named group sheet		For all products: Expected to be reduced or gradually phased out from Adtran applications, subject to the availability of technically, environmentally and economically sound alternatives. Suppliers are strongly advised to investigate suitable alternative solutions.	
Polystyrene expanded	9003-53-6		Packaging material: Not allowed in new designs	
Polyurethan	68400-67-9		Packaging material: Not allowed in new designs	
Radioactive substances		For all products: Banned in all applications(13)		
REACH Substances of Very High Concern (SVHC)	See ECHA pages SVHC(14)		For all products and processes: Expected to be reduced or gradually phased out from Adtran applications, subject to the availability of technically, environmentally and economically sound alternatives. Suppliers are strongly advised to investigate suitable alternative solutions. Suppliers have duty to confirm the obligations, e.g. information duties, in case a SVCH is > 0.1 weight-% in article.	REACH
REACH authorised substances included in Annex XIV		For all products and processes: Suppliers have a duty to follow up the substances under authorization process and decisions about the possible obligations.		REACH

(1) Definition of "Intentionally introduced" for the purpose of the ADTRAN substance List:

- "Intentionally introduced" shall mean "deliberately utilised 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.

(2) "Homogeneous Material" means a material that can not be mechanically disjointed into different materials.

- The term "homogeneous" is understood as "of uniform composition throughout". Examples of "homogeneous materials" are individual types of plastics, ceramics, glass, metals, alloys, paper, board, resins and coatings. For example a stainless steel screw is a "homogeneous material", but a semi-conductor package contains many homogeneous materials which include plastic moulding material, tin-platings on the lead-frame, the lead-frame alloy and gold-bonding wires.

- The term "mechanically disjointed" means that the material can be, in principle separated by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes.

(3) Exemptions for the ban of using cadmium

- Cadmium and lead in filter glasses and glasses used for reflectance standards

- Cadmium in colour converting II-IV LEDs (< 10 µg per mm<sup>2</sup> of light-emitting area) for use in solid state illumination or display systems(*Expires on 1 July 2014*)

- Cadmium and its compounds in electrical contacts

(4) Details of the ban of cadmium, hexavalent chromium, lead and mercury in packaging:

- The sum of concentration levels of cadmium, hexavalent chromium, lead and mercury in packaging or packaging components shall not exceed 0.01% by weight.

(5) CMR substances (carcinogens, mutagens, and reproductive toxins) :

See Dangerous Substances Directive 67/548/EEC: Annex I of Directive 67/548/EEC contains a list of harmonised classifications and labellings for substances or groups of substances, which are legally binding within the EU. CMR substances include substances on that list which are classified Carcinogenic, Mutagenic, Toxic for Reproduction and meeting the criteria for classification as carcinogenic category 1 or 2, mutagenic category 1 or 2, or toxic for reproduction category 1 or 2.

Annex I of Directive 67/548/EEC is deleted by the entering into force of Regulation (EC) 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP) on 20 January 2009. Annex I is replaced by Table 3.2 in Annex VI to CLP.

(6) Exposures considered significant for CMR are the following:

- Where significant levels of the substance may come into contact with the skin as a result of leaching from the solid product surface.

- Where a volatile substance is still present within the solid product following purchase.

- The substance is considered to be at significant levels when it is present in the product at levels at or above 0.1% unless an alternate maximum concentration level is provided in the "Maximum Concentration Limit in surface materials" column of the "Substances in Named Groups" worksheet.

(7) Formaldehyde special testing procedure:

- The formaldehyde release of wood and wooden material for use as packaging material shall be determined to the test standar

- BS EN 717-2 - Wood-based panels - Determination of formaldehyde release - Formaldehyde release by the gas analysis metho

(8) Applications in question are in particular the following:

- Not to be used in packaging materials. Not to be used without prior ADTRAN consent in PWB varnishes or other applications where it may be heated to decomposition temperatures in use or in repair of products

**(9) Exemptions to the ban of lead in electrical and electronic equipment**

- Lead as an alloying element in steel for machining purposes and in galvanized steel containing up to 0,35 % lead by weight
- Lead as an alloying element in aluminium containing up to 0,4 % lead by weight
- Copper alloy containing up to 4 % lead by weight
- Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead)
- Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound
- Lead in dielectric ceramic in capacitors for a rated voltage of 125 V AC or 250 V DC or higher
- Lead in dielectric ceramic in capacitors for a rated voltage of less than 125 V AC or 250 V DC (*Expires on 1 January 2013*)
- Lead used in C-press compliant pin connector systems (May be used in spare parts for EEE placed on the market before 24 September 2010)
- Lead used in other than C-press compliant pin connector systems(*Expires on 1 January 2013*)
- Lead in white glasses used for optical applications
- Cadmium and lead in filter glasses and glasses used for reflectance standards
- Lead in solders consisting of more than two elements for the connection between the pins and the package of microprocessors with a lead content of more than 80 % and less than 85 % by weight (May be used in spare parts for EEE placed on the market before 1 January 2011)
- Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit Flip Chip packages
- Lead in solders for the soldering of thin copper wires of 100 µm diameter and less in power transformers
- Lead in the plating layer of high voltage diodes on the basis of a zinc borate glass body

**(10) Exemptions to the ban of mercury in electrical and electronic equipment**

- See the list of exemptions in the RoHS directive behind this link <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:251:0028:0034:EN:PDF> and corrigendum <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:254:0048:0048:EN:PDF> as well as <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:174:0088:0110:EN:PDF>

**(11) Exemptions for the ban of using Nonylphenols and Nonylphenol ethoxylates:**

Trace amounts allowed when originating from the following processes:

- controlled closed dry cleaning systems where the washing liquid is recycled or incinerated, cleaning systems with special treatment where the washing liquid is recycled or incinerated;
- textiles and leather processing with no release into waste water and systems with special treatment where the process water is pretreated to remove the organic fraction completely prior to biological waste water treatment;
- metal working uses in controlled closed systems where the washing liquid is recycled or incinerated

**(12) Exemptions to the ban of perfluorooctane sulfonates:**

- Use allowed as photoresists or anti-reflective coatings for photolithography processes, mist suppressants for non-decorative hard chromium (VI) plating and wetting agents for use in controlled electroplating systems where the amount of PFOS released into the environment is minimized

**(13) Exemptions to the ban of Radioactive substances:**

- Smoke Detectors

**(14) SVHC in REACH-regulation:**

See current list of SVHC on web-pages of European Chemicals Agency (ECHA): [http://echa.europa.eu/chem\\_data/authorisation\\_process/candidate\\_list\\_table\\_en.asp](http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp)