

Hazardous Substances, List of Prohibited Substances, Avoidance List
Environmentally Compatible Products

Standards and Directives

HEIDENHAIN - Standards

1 Application and Objective

This standard is to be applied in the design and development of environmentally compatible products in all JH divisions as well as in the purchase of materials and parts for use in products and in the purchase of externally supplied products. The standard is intended to provide assistance in the environmentally and industrially safe handling of the products, components, materials, preparations, manufacturing supplies and packaging materials involved in the production, recycling and disposal of the intermediate and final products.

In addition, the standard is necessary to ensure compliance with the corresponding specifications of HEIDENHAIN customers.

The product properties achieved by an environmentally compatible product design are to be documented.

2 List of Prohibited Hazardous Substances

The list of prohibited hazardous substances (table 1) provides a simplified overview of the restrictions applicable in the EU and other countries to the electrical and electronics industries with regard to hazardous substances. It contains a selection of substances whose marketing in products of the electrical and electronics industries as well as in the associated operating materials is subject to the legal prohibitions indicated in the table. Exceptions exist for research and development purposes as well as for disposal. Legislation has permitted further exceptions to the prohibitions for specific substances ("Yes" in the table means that exceptions exist which are relevant to the electrical industry). The indicated legal regulations provide further details.

The list of prohibited substances is for information only; it is not a legally binding document. Full conformance to all substance regulations is strived for, but cannot be guaranteed.

Compliance with all relevant prohibitions is a legal obligation for placing products on the market. The supplier is expected to have implemented a system, which ensures compliance with these prohibitions. For the purposes of clarity, however, it may be required to point the prohibited substances out to suppliers and to provide them with the list of prohibited substances or the more comprehensive list for their information.

Where permissible exceptions to substance bans apply, the hazardous substances must be documented according to type and quantity and with reference to the component involved. In this case, the supplier must submit the corresponding declarations of the materials, subassemblies and components.

3 List of Products and Product Parts Possibly Affected by Substance Bans

This list (table 2) provides an overview of products and product parts which may be affected by restrictions on their marketing due to specific ingredients. It corresponds with the list of prohibited hazardous substances (table 1) in its contents, differing from it only in the representation.

4 List of Hazardous Substances to be Declared or Avoided

The declaration and avoidance list (table 3) indicates substances for which the placing on the market is not or not yet prohibited, but whose application should be avoided or at least reduced as far as possible, since these substances may cause risks in the manufacture, use and disposal of products. In many cases, the substances of the declaration and avoidance list cannot be avoided for technical reasons or due to reliability requirements. In these cases, the use must be documented and information must be made available to all those who may require it, such as the person disposing of the product.

Edited on: Standard sheet overworked



	Released		Version	Rev.	Sheet	Page
Name	Dr. Thommes	HN 373 132 - 00 - A - 02				1/
Date	02.09.2004	Document no.				10

The following criteria apply to including a substance in the declaration and avoidance list:

Hazardous to health

- Carcinogenic, mutagenic, toxic to reproduction (CMR substances, categories 1 and 2)
- Chronically toxic
- Acutely very toxic or toxic
- Easily forms CMR substances (cat. 1 and 2) Chronically or acutely toxic substances
- Radioactive

Hazardous to the environment

- Hazardous to aquatic environments
- Persistent + bioaccumulative
- Contributing to global warming
- Ozone depleting

No declaration is required below a concentration of 0.1% by weight (1000 ppm). The concentration value refers to the substance in its respective application, such as the arsenic pigment in the dried enamel.

The substances of the declaration and avoidance list, which have been released by the responsible product executive, must be documented according to type, quantity and distribution (e.g., in the technical product documentation).

For this purpose, the suppliers of materials, subassemblies and components should be required to declare the substances contained in the declaration and avoidance list. A substance to be declared must refer to the corresponding component (ID no., supplier, order no.) in an unambiguous way.

The declaration and avoidance list is not suitable for being submitted to suppliers as a binding requirement without further explanation. It should rather form the basis for joint development discussions and agreements.

Note the protection mark for ISO 16016!



	Released		Version	Rev.	Sheet	Page
Name	Dr. Thommes	HN 373 132	- 00 - A - 02			2/
Date	02.09.2004	Document no.				10

Table 1. List of Prohibited Hazardous Substances (Informative)

Substance	CAS No.	Application	Limit in Weight % ¹⁾	Exception	Legal Regulations ²⁾	
					DE/EU/Other countries	
Aliphatic CHCs	See below ³⁾	General ban	0.1 (total)	Yes	DE	ChemVerbotsV EU 76/769/EEC
1,1,1-Trichloroethane Tetrachloromethane	71-55-6 56-23-5	General ban	n.g.		CH	StoV Anh. 3.4 StoV Anh. 4.14
Asbestos	1332-21-4 See below ⁴⁾	General ban	0.1 (total)	Yes	DE	ChemVerbotsV EU 76/769/EEC
			n.g.	Yes	CH	StoV Anh. 3.3
Synthetic mineral fibers that consist of randomly oriented vitreous (silicate) fibers containing more than 18 % (by weight) of the oxides of sodium, potassium, calcium, magnesium or barium.		Heat insulation and soundproofing in building construction, Technical insulation	0.1 (total)	Yes	DE	ChemVerbotsV
Lead and lead compounds	7439-92-1	Fixed batteries ⁷⁾	0.4	Yes	DE	BattV EU 91/157/EEC
			0.1	Yes	CH	StoV Anh. 4.10
		Electrical and electronic equipment (from July 1, 2006)	n.g.	Yes	EU	2002/95/EC (RoHS)
Cadmium and cadmium compounds	7440-43-9	Colored plastics	0.01	Yes	DE	ChemVerbotsV
		Stabilized vinyl chloride polymers and copolymers (e.g. PVC)	0.01	Yes	EU	76/769/EEC
		Metallic surface coatings	n.g.	Yes	CH	StoV Anh. 4.11, 4.12
		Fixed batteries ⁷⁾	0.025	Yes	DE	BattV EU 91/157/EEC
		Zinc carbon batteries	0.015		CH	StoV Anh. 4.10
		Zinc coatings	0.025	Yes	CH	StoV Anh. 4.12
		Electrical and electronic equipment (from July 1, 2006)	n.g.	Yes	EU	2002/95/EC (RoHS)
Polybrominated biphenyls (PBBs) Polybrominated diphenyl ethers (PBDEs)		Electrical and electronic equipment (from July 1, 2006)	n.g.		EU	2002/95/EC (RoHS)
Octabrominated diphenyl ethers (OBDEs)	32536-52-0	General ban	0.1		DE	ChemVerbotsV EU 76/769/EEC
Pentabrominated diphenyl ethers (PeBDEs)	32534-81-9					
Polychlorinated dioxins and furans Polybrominated dioxins and furans	See below ⁵⁾	General ban	(group limit values)	Yes	DE	ChemVerbotsV
			0.000 000 5	Yes		
CFCs and halons	See below ⁶⁾	Aerosols	1.0	Yes	DE	FCKW-Halon-VerbotsV
		Refrigerants	1.0	Yes	EU	2037/2000
		Foam materials	n.g.	Yes	US	Clean Air Act
		Cleaning agents and solvents	1.0	Yes	CH	StoV Anh. 3.4 StoV Anh. 4.9 StoV Anh. 4.14-15

Note the protection mark for ISO 16016!



Substance	CAS No.	Application	Limit in Weight % ¹⁾	Exception	Legal Regulations ²⁾	
					DE/EU/Other countries	
HCFCs		Use in chilling, refrigerating and air conditioning equipment	n.g.	Yes	EU	2037/2000
FCs HFCs		Cooling, chilling, refrigerating and air conditioning equipment (HCFCs from January 1, 2008)	n.g.	Yes	AT	BGBI Nr.447/2002
HCFCs up to C ₃ inclusive HBFCs up to C ₃ inclusive Methyl bromide	74-83-9	General ban	n.g.	Yes	CH	StoV Anh. 3.4 StoV Anh. 4.9 StoV Anh. 4.14-15
Formaldehyde	50-00-0	Wood-based materials and furniture	0.1 ml/m ³ (special testing method)	Yes	DE AT SE	ChemVerbotsV BGBI. 194/1990 KIFS 1998:8 (Ch. 9, 20-27 §§)
Halogenated aromatic substances		Capacitors and transformers	0.05/0.005 (mono-/polyhalogenated)		CH	StoV Anh. 4.8
Pentachlorophenol (PCP) Pentachlorophenol sodium Other PCP salts and compounds	87-86-5 131-52-2	General ban	0.000 5 (total)	Yes	DE EU	ChemVerbotsV 76/769/EEC
Polychlorinated biphenyls (PCBs)	1336-36-3	General ban	0.005 (total)	Yes	DE EU	ChemVerbotsV 76/769/EEC
Polychlorinated terphenyls (PCTs)	61788-33-8		n.g.		CH	StoV Anh. 3.1
Monomethyl-tetrachlorodiphenyl methane (Ugilec 141)	76253-60-6					
Monomethyl-dichlorodiphenyl methane (Ugilec 121 or 21) Monomethyl-dibromodiphenyl methane (DBBT)	99688-47-8					
Polychlorinated biphenyls (PCBs)	1336-36-3	Not totally enclosed	0.05	Yes	US	TSCA (15 USC 2605) + 40 CFR 761
Halogenated biphenyls, terphenyls, naphthalenes		General ban	n.g.		CH	StoV Anh. 3.1
Mercury and mercury compounds	7439-97-6	Batteries	0.000 5	Yes	DE EU	BattV 98/101/EC
		Button cells and batteries composed of button cells	2		DE EU	BattV 98/101/EC
		Alkaline manganese batteries	0.025	Yes	CH	StoV Anh. 4.10
		Zinc carbon batteries	0.01		CH	StoV Anh. 4.10
		General ban	n.g.	Yes	CH NL SE	StoV Anh. 3.2 Decree 9 Sept. 1998 SFS 1998:944
		Electrical and electronic equipment (from July 1, 2006)	n.g.	Yes	EU	2002/95/EC (RoHS)
Mercury and cadmium	7439-97-6 7440-43-9	Fixed batteries ⁷⁾	0.001 (total)	Yes	CH	StoV Anh. 4.10
Hexavalent chromium (Cr ^{VI})		Electrical and electronic equipment (from July 1, 2006)	n.g.	Yes	EU	2002/95/EC (RoHS)
Heavy metals (lead, cadmium, hexavalent chromium, mercury)		Packaging and packaging components	0.01 (total)		DE EU	VerpackV 94/62/EC



Substance	CAS No.	Application	Limit in Weight % ¹⁾	Exception	Legal Regulations ²⁾	
					DE/EU/Other countries	
Sulfur hexafluoride (SF ₆)	2551-62-4	Insulating and quenching gas in electrotechnical systems and equipment up to 1 kV (over 1 kV: subject to reporting requirements)	n.g.	Yes	AT	BGBl. Nr. 447/2002 CH StoV Anh. 3.5
Tar oils	8001-58-9	Wood and wood-based materials	n.g.	Yes	DE	ChemVerbotsV EU 76/769/EEC
Carcinogenic and mutagenic substances and substances toxic to reproduction (categories 1 and 2)		Substances and preparations for private customers	Depending on the substance	Yes	DE	ChemVerbotsV EU 76/769/EEC
The regulations regarding the following residual monomers apply only to plastic materials and articles intended to be in contact with foodstuffs. They do not apply to the majority of the electrotechnical products!						
Acrylonitrile as residual monomer	107-13-1	ABS, SAN and other copolymers for food contact materials	0.000 002 (SML)		DE	BedarfsgegVV EU 90/128/EEC
Butadiene as residual monomer	106-99-0	ABS for food contact materials	0.000 002 (SML)		DE	BedarfsgegVV EU 90/128/EEC
Vinyl chloride as residual monomer	75-01-04	PVC and copolymers for food contact materials	0.000 1 0.000 001 (SML)		DE	BedarfsgegVV EU 90/128/EEC

Excerpt of the applicable legal prohibitions or restrictions on the marketing of hazardous substances in Germany, the European Union, Switzerland and several other countries (see Chapter 2 for an explanation).

Table 2. Products and Product Parts Possibly Affected by Substance Bans (Informative)

Product / Product Part	Prohibited Substance	CAS No.	Limit in Weight % ¹⁾	Exception	Legal Regulations ²⁾	
					DE/EU/Other countries	
Electrical and electronic equipment						
Electrical and electronic equipment with the exception of medical equipment and monitoring and control equipment (from July 1, 2006)	Lead	7439-92-1	n.g.	Yes	EU	2002/95/EC (RoHS)
	Cadmium	7440-43-9				
	Mercury	7439-97-6				
	Hexavalent chromium (Cr ^{VI})					
	Polybrominated biphenyls (PBBs) Polybrominated diphenyl ethers (PBDEs)					
Electronic systems and equipment with up to 1 kV, using insulating and quenching gas	Sulfur hexafluoride (SF ₆)	2551-62-4	n.g.		AT	BGBl.Nr. 447/2002
Use in chilling, refrigerating and air conditioning equipment	HCFCs		n.g.	Yes	EU	2037/2000
Batteries						
Batteries and accumulators	Mercury	7439-97-6	0.000 5	Yes	DE	BattV EU 98/101/EC
Alkaline manganese batteries	Mercury	7439-97-6	0.025	Yes	CH	StoV Anh. 4.10
Button cells and batteries composed of button cells	Mercury	7439-97-6	2		DE	BattV EU 98/101/EC
Zinc carbon batteries	Cadmium	7440-43-9	0.015		CH	StoV Anh. 4.10
	Mercury	7439-97-6	0.01			



Product / Product Part	Prohibited Substance	CAS No.	Limit in Weight % ¹⁾	Exception	Legal Regulations ²⁾ DE/EU/Other countries
Fixed batteries ⁷⁾	Lead	7439-92-1	0.4	Yes	DE BattV EU 91/157/EEC
	Lead	7439-92-1	0.1		CH StoV Anh. 4.10
	Cadmium	7440-43-9	0.025		DE BattV EU 91/157/EEC
	Mercury and Cadmium	7439-97-6 7440-43-9	0.001 (total)		CH StoV Anh. 4.10
Electrical components (see also "General bans, ..." section)					
Capacitors and transformers	Halogenated aromatic substances		0.05/0.005 (mono-/ poly-halogenated)		CH StoV Anh. 4.8
Plastic materials (see also "General bans, ..." section)					
Colored plastics	Cadmium compounds		0.01	Yes	DE ChemVerbotsV EU 76/769/EEC CH StoV Anh. 4.11
Stabilized vinyl chloride polymers and copolymers (e.g. PVC)					
Flame-retardant plastic materials	Octabrominated diphenyl ethers (OBDEs) Pentabrominated diphenyl ethers (PeBDEs)	32536-52-0 32534-81-9	0.1		EU 76/769/EEC
ABS, SAN and other copolymers for food contact materials	Acrylonitrile	107-13-1	0.000 002 (SML)		DE BedarfsgegV EU 90/128/EEC
ABS for food contact materials	Butadiene	106-99-0	0.000 002 (SML)		DE BedarfsgegV EU 90/128/EEC
PVC and copolymers for food contact materials	Vinyl chloride	75-01-04	0.0001 0.000 001 (SML)		DE BedarfsgegV EU 90/128/EEC
Insulating materials (see also "General bans, ..." section)					
Foam materials	CFCs and halons	See below ⁶⁾	n.g.	Yes	DE FCKW-Halon VerbotsV EU 2037/2000 US Clean Air Act CH StoV Anh. 3.4
Metal coatings					
Metallic surface coatings	Cadmium	7440-43-9	n.g.	Yes	DE ChemVerbotsV EU 76/769/EEC CH StoV Anh. 4.12
Zinc coatings	Cadmium	7440-43-9	0.025	Yes	CH StoV Anh. 4.12
Other materials					
Wood and wood-based materials	Tar Oils	8001-58-9	n.g.	Yes	DE ChemVerbotsV EU 76/769/EEC
	Pentachlorophenol (PCP) Pentachlorophenol sodium Other PCP salts and compounds	87-86-5 131-52-2	0.000 5 (total)	Yes	DE ChemVerbotsV EU 76/769/EEC
Wood-based materials and furniture	Formaldehyde	50-00-0	0.1 ml/m ³ (special testing procedure)	Yes	DE ChemVerbotsV AT BGBI. 194/1990 SE KIFS 1998:8 (Ch. 9.20-27 §§)
Packaging					
Packaging and packaging components	Heavy metals (lead, cadmium, hexavalent chromium, mercury)		0.01 (total)		DE VerpackV EU 94/62/EC



Product / Product Part	Prohibited Substance	CAS No.	Limit in Weight % ¹⁾	Exception	Legal Regulations ²⁾ DE/EU/Other countries
Cleaning agents, solvents and refrigerants					
Cleaning agents and solvents	CFCs and halons	See below ⁶⁾	1.0	Yes	DE FCKW-Halon-VerbotsV EU 2037/2000 US Clean Air Act CH StoV Anh.3.4 StoV Anh.4.14
	CFCs, HCFCs and HBFCs up to C ₃ inclusive Methyl bromide	74-83-9	n.g.	Yes	CH StoV Anh. 3.4 StoV Anh. 4.14
	Aliphatic CHCs	See below ³⁾	0.1 (total)	Yes	DE ChemVerbotsV EU 76/769/EEC
	1.1.1-Trichloroethane Tetrachloromethane	71-55-6 56-23-5	n.g.		CH StoV Anh. 3.4 StoV Anh. 4.14
Refrigerants	CFCs and halons	See below ⁶⁾	1.0	Yes	DE FCKW-Halon-VerbotsV EU 2037/2000 US Clean Air Act CH StoV Anh. 3.4 StoV Anh. 4.15
	FCs HCFCs (from January 1, 2008)		n.g.	Yes	AT BGBl. Nr. 447/2002
	HCFCs and HBFCs up to C ₃ inclusive Methyl bromide	74-83-9	n.g.	Yes	CH StoV Anh. 3.4 StoV Anh. 4.15
Aerosols					
Aerosols	CFCs and halons	See below ⁶⁾	1.0	Yes	DE FCKW-Halon-VerbotsV EU 2037/2000 US Clean Air Act CH StoV Anh. 3.4 StoV Anh. 4.9
	FCs HFCs		n.g.	Yes	AT BGBl. Nr. 447/2002
	HCFCs and HBFCs up to C ₃ inclusive Methyl bromide	74-83-9	n.g.	Yes	CH StoV Anh. 3.4 StoV Anh. 4.9
	Vinyl chloride	75-01-4	n.g.		DE ChemVerbotsV EU 76/769/EEC
General bans, exemplarily allocated to affected products and product parts					
Insulating materials	Asbestos	1332-21-4	0.1 (total)	Yes	DE ChemVerbotsV EU 76/769/EEC
Gaskets		See below ⁴⁾	n.g.	Yes	CH StoV Anh. 3.3
Heat insulation and soundproofing (building construction) Technical insulation	Synthetic mineral fibers that consist of randomly oriented vitreous (silicate) fibers containing more than 18 % (by weight) of the oxides of sodium, potassium, calcium, magnesium or barium.		0.1 (total)	Yes	DE ChemVerbotsV
Plastic materials Cast resins	Polychlorinated dioxins and furans Polybrominated dioxins and furans	See below ⁵⁾	Group limit values 0.000 000 5	Yes Yes	DE ChemVerbotsV



Product / Product Part	Prohibited Substance	CAS No.	Limit in Weight % ¹⁾	Exception	Legal Regulations ²⁾	
					DE	EU/Other countries
Transformers Power capacitors	Polychlorinated biphenyls (PCBs)	1336-36-3	0.005 (total)	Yes	DE	ChemVerbotsV 76/769/EEC
	Polychlorinated terphenyls (PCTs)	61788-33-8	n.g.		CH	StoV Anh. 3.1
	Monomethyl-tetrachloro-diphenyl methane (Ugilec 141)	76253-60-6				
	Monomethyl-dichloro-diphenyl methane (Ugilec 121 or 21) Monomethyl-dibromo-diphenyl methane (DBBT)	99688-47-8				
	Halogenated biphenyls, terphenyls, naphthalenes		n.g.		CH	StoV Anh. 3.1
Substances and preparations in operating materials for private customers	Carcinogenic and mutagenic substances and substances toxic to reproduction (categories 1 and 2)		Depending on the substance	ja	DE EU	ChemVerbotsV 76/769/EWG

Excerpt of the applicable legal prohibitions or restrictions on the marketing of hazardous substances in Germany, the European Union, Switzerland and several other countries (see Chapter 3 for an explanation).

Notes on the Lists

1) "n.g." means that no limit is stated in the legal regulation. In these cases, the limits stipulated by chemical regulations for taking substances into account must be complied with.
SML = Specific Migration Limit (maximum permissible concentration of diffused substance in food product)

2) Country codes according to ISO 3166

BattV (= Batterieverordnung) = German battery ordinance
 BedGgstV (= Bedarfsgegenständeverordnung) = German commodity goods ordinance
 ChemVerbotsV (= Chemikalienverbotverordnung) = German chemicals prohibition ordinance
 CAA = Clean Air Act
 FCKWHalonVerbotsV (= FCKW-Halon-Verbotsverordnung) = German CFC and halons prohibition ordinance
 KIFS (= Kemikalieinspektionens föreskrifter) = Regulations of National Swedish Chemicals Inspectorate
 RoHS = Directives of the European Parliament and Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment (Directive 2002/95/EC)
 SFS (= Svensk författningssamling) = Swedish Code of Statutes
 StoV (= Verordnung über umweltgefährdende Stoffe) = Swiss ordinance on environmentally hazardous substances (Swiss ordinance on substances = Schweizer Stoffverordnung)
 TSCA = Toxic Substances Control Act
 VerpackV (= Verpackungsverordnung) = German packaging ordinance

3) Aliphatic CHCs

CAS No.

Tetrachloromethane	56-23-5
1.1.2.2-Tetrachloroethane	79-34-5
1.1.1.2-Tetrachloroethane	630-20-6
Pentachloroethane	76-01-7
Trichloromethane (Chloroform)	67-66-3
1.1.2-Trichloroethane	79-00-5
1.1-Dichloroethylene	75-35-4
1.1.1-Trichloroethane	71-55-6



	Released	Version	Rev.	Sheet	Page
Name	Dr. Thommes	HN 373 132 - 00 - A - 02			8/
Date	02.09.2004	Document no.			10

4) Asbestos	CAS No.
Actinolite	77536-66-4
Amosite	12172-73-5
Anthophyllite	77536-67-5
Chrysotile	12001-29-5
Crocidolite	12001-28-4
Tremolite	77536-68-6
5) Halogenated dioxins and furans	CAS No.
2.3.7.8-Tetra-CDD	1746-01-6
1.2.3.7.8-Penta-CDD	40321-76-4
2.3.7.8-Tetra-CDF	51207-31-9
2.3.4.7.8-Penta-CDF	57117-31-4
1.2.3.4.7.8-Hexa-CDD	39227-28-6
1.2.3.7.8.9-Hexa-CDD	19408-74-3
1.2.3.6.7.8-Hexa-CDD	57653-85-7
1.2.3.7.8-Penta-CDF	57117-41-6
1.2.3.4.7.8-Hexa-CDF	70648-26-9
1.2.3.7.8.9-Hexa-CDF	72918-21-9
1.2.3.6.7.8-Hexa-CDF	57117-44-9
2.3.4.6.7.8-Hexa-CDF	60851-34-5
1.2.3.4.6.7.8-Hepta-CDD	35822-46-9
1.2.3.4.6.7.8.9-Octa-CDD	3268-87-9
1.2.3.4.6.7.8-Hepta-CDF	67562-39-4
1.2.3.4.7.8.9-Hepta-CDF	55673-89-7
1.2.3.4.6.7.8.9-Octa-CDF	39001-02-0
2.3.7.8-Tetra-BDD	50585-81-6
1.2.3.7.8-Penta-BDD	109333-34-8
2.3.7.8-Tetra-BDF	67733-57-7
2.3.4.7.8-Penta-BDF	131166-92-2
1.2.3.4.7.8-Hexa-BDD	110999-44-5
1.2.3.7.8.9-Hexa-BDD	110999-46-7
1.2.3.6.7.8-Hexa-BDD	110999-45-6
1.2.3.7.8-Penta-BDF	109333-34-8
6) CFCs/Halons	CAS No.
Trichlorofluoromethane (R11)	75-69-4
Dichlorodifluoromethane (R12)	75-71-8
Chlorotrifluoromethane (R13)	75-72-9
Tetrachlorodifluoroethane (R112)	76-11-9
Trichlorotrifluoroethane (R113)	76-13-1
Dichlorotetrafluoroethane (R114)	76-14-2
Chloropentafluoroethane (R115)	76-12-0
Bromochlorodifluoromethane (Halon 1211)	353-59-3
Bromotrifluoromethane (Halon 1301)	75-63-8
Dibromotetrafluoroethane (Halon 2402)	124-73-2
Tetrachloromethane	56-23-5
1.1.1-Trichloroethane	71-55-6
Chlorodifluoromethane (R22)	75-45-6
7) Fixed batteries are batteries that cannot be removed without effort from a device. They are soldered, welded or in some other way permanently connected to the contacts.	



Table 3. List of Hazardous Substances to be Declared or Avoided (Normative)

No.	Group of Substances	Reason	Application examples
100	Antimony trioxide	Possibly carcinogenic (category 3), aggravated classification possible.	Plastics with halogenated flame retardants.
200	Arsenic and its compounds	Toxic, arsenic trioxide as well as arsenic acid and its salts are also carcinogenic.	Pb and Cu alloys, metal adhesives, soft solders, color pigments.
300	Azo compounds with carcinogenic amine components	Release carcinogenic substances.	Colored plastics.
400	Lead and its compounds	Toxic to reproduction. Ban in the EU from July 1, 2006.	Solders, hybrid circuits, stabilizers in plastics.
500	Polybrominated biphenyls (PBB) and diphenylethers (PBDE) Remark: Decabromo diphenyl ethers and octabromo diphenyl ethers are the ones most frequently used.	Easily form very toxic polybrominated dioxins (→ list of prohibited substances), thereby making the material non-recyclable special waste. Ban in the EU from July 1, 2006, octa- and pentaBDE from August 15, 2004.	Flame retardants in printed circuit boards and plastic parts.
600	Cadmium and its compounds	Toxic, some compounds (cadmium chloride, cadmium oxide and cadmium sulfate) are carcinogenic. Ban in the EU from July 1, 2006.	Accumulators, batteries, contacts, hard and soft solders.
700	Chlorinated hydrocarbons	Hazardous to aquatic environments, non-degradable, accumulate in organisms.	Solvents, cleaning and degreasing agents.
800	Chlorinated paraffins	Hazardous to aquatic environments, non-degradable, accumulate in organisms; short-chain chlorinated paraffins are possibly carcinogenic.	Additives in cooling lubricants, flame-retardant plasticizers in plastics, flame retardants in rubbers.
900	Chromium (VI) compounds	Carcinogenic in inhalable form. Ban in the EU from July 1, 2006.	Coatings, coloring agents in plastics, industrial tubes.
1000	Dibutylphthalate (DBP)	Toxic to reproduction, hazardous to aquatic environments.	Plasticizers, particularly in PVC.
1100	Bis(2-ethylhexyl)phthalate (diethylhexylphthalate, DEHP)	Toxic to reproduction.	Common plasticizers, particularly in PVC.
1200	Dimethyl formamide (DMF)	Toxic to reproduction.	Electrolytic capacitors.
1300	HCFCs (CFC substitutes)	Contributing to global warming, ozone depleting.	Refrigerants and cleaning agents.
1400	Synthetic mineral fibers classified as carcinogenic.	Carcinogenic on inhalation. Ban in Germany.	Thermal insulating materials.
1500	Mercury and its compounds	Acutely and chronically (very) toxic, accumulate in organisms. Ban in the EU from July 1, 2006.	Batteries, discharge lamps, relays, barometers, thermometers.
1600	Radioactive substances	Radioactive.	Measuring instruments, surge arresters, thorium in welding electrodes.
1700	Selenium and its compounds	Acutely and chronically toxic.	Plastics, photoelectric coatings, diodes, rectifiers, color pigments.
The following group of substances poses a risk only if inhalable dust or smoke is produced during processing or machining, e.g. grinding or welding. In their compact form, as part of a manufactured product, they do not pose any hazards, which would require their avoidance.			
1800	Beryllium and its compounds	Very toxic and carcinogenic in inhalable form (dust or smoke).	Contact and spring materials, beryllium oxide ceramics, high-temperature materials.
The following substance is not regarded as hazardous to the environment, provided it is safely enclosed in the product (> 10 years, leakage rate < 0.5%/a) and recycled in a safe way. Its use, e.g. in switchgears, rather leads to a reduction of energy loss, and thus emissions. Any application that may cause this substance to be released (e.g. in a shredder) must be avoided. In all other cases, it must be declared.			
1900	Sulfur hexafluoride (SF ₆)	Contributes to global warming.	Electronic components.

This list contains a regularly reviewed selection of relevant hazardous substances (explanation in Chapter 4).

Note the protection mark for ISO 16016!



	Released		Version	Rev.	Sheet	Page
Name	Dr. Thommes	HN 373 132	- 00	- A	- 02	10/
Date	02.09.2004	Document no.				10