Kaschke Components Regulated Substances List (KCRSL)

Contents

1. Introduction

The “Kaschke Components Regulated Substances List” (KCRSL) applies to all products (parts, components, articles, mixtures, preparations, substances) that Kaschke Components purchases from its suppliers under any contract and that end up in a finished Kaschke product. Whether the regulations specified in the KCRSL also apply to packaging, will be indicated below the title of each relevant chapter.

The KCRSL specifies substances which are prohibited, restricted or declarable due to different legislations and policies as well as requirements of our customers.

The supplier must comply with the substance requirements presented by the KCRSL. In the event that a supplied product does not comply with those requirements, Kaschke Components must be informed immediately. Depending on the nonconformity, suitable corrective actions will then be agreed upon with the supplier.

The KCRSL represents the regulatory situation at a certain point in time (see revision history). However, due to the constantly changing requirements of the global material compliance legislations, the supplier must always be aware of the most recent version of each relevant legislation and refer to the newest amendments and substance lists that are available at the time of declaration, even if the current version of the KCRSL does not yet reflect the most recent substance lists and amendments.

Declarable substances are substances which must be disclosed or reported according to relevant laws, regulations or policies (e.g. REACH SVHCs). The presence of these substances must be reported when their concentration is above the maximum concentration limit as defined by the KCRSL. They are not prohibited from use.

Restricted substances are substances which are subject to specific limitations, conditions or controls under relevant laws, regulations or policies. The use of these substances is restricted to a maximum concentration limit as defined by the KCRSL. Unless otherwise mentioned, the maximum concentration limit of a restricted substance must be applied to the homogeneous material level (definition see below). Unless otherwise mentioned, the maximum concentration level also applies to substances that were not added intentionally but are naturally present in the material in question.

Prohibited substances are substances that must not be manufactured, placed on the market or used. In some cases there can be exemptions, e.g. for unintentional trace contaminants or for products already in use before the legislation in question entered into force.

Homogeneous materials are materials of uniform composition throughout, that cannot be mechanically separated into different materials by actions such as unscrewing, cutting, crushing, grinding, and abrasive processes.

2. RoHS Directive 2011/65/EU

does not apply to packaging

The RoHS substance restrictions are shown in Table 1. The maximum concentration limits refer to the homogeneous material level.

The maximum concentration limits for the compounds of Cd, Cr-VI, Pb and Hg refer to the metal weight, not the weight of the whole metal-containing compound.

The RoHS restrictions do not apply to the exempted applications as listed in Annex III and Annex IV of directive 2011/65/EU. Kaschke Components must be notified if an exemption is used, including the concentration of the relevant substance on the homogeneous material level.

The four phthalates in Table 1 are also restricted under REACH, see Table 3.

Table 1: RoHS Substance Restrictions (Cd: cadmium, Cr: chromium, Pb: lead, Hg: mercury)

Substance	**CAS No**	**maximum concentration limit in ppm (mg/kg)**	**Legislation**
Cd / Cd compounds	-	100	EU RoHS Directive 2011/65/EU
Cr-VI / Cr-VI compounds	-	1000	
Pb / Pb compounds	-	1000	
Hg / Hg Compounds	-	1000	
Polybrominated biphenyls (PBB)	-	1000	
Polybrominated diphenyl ethers (PBDE)	-	1000	
Bis(2-ethylhexyl) phthalate (DEHP)	117-81-7	1000	EU RoHS Directive 2011/65/EU as amended by Commission Delegated Directive (EU) 2015/863
Butyl benzyl phthalate (BBP)	85-68-7	1000	
Dibutyl phthalate (DBP)	84-74-2	1000	
Diisobutyl phthalate (DIBP)	84-69-5	1000	

3. REACH Regulation (EC) No 1907/2006

also applies to packaging

There are three lists of substances within REACH, that have to be considered, the "Candidate List of substances of very high concern (SVHC) for Authorisation", the "Authorisation List (Annex XIV)", and the "Substances restricted under REACH (Annex XVII)".

The Candidate List of substances of very high concern (SVHC) for Authorisation is regularly updated twice a year (December/January and June/July). Without a regular schedule, substances from the Candidate List are added to the Authorisation List (Annex XIV), however these substances also remain on the Candidate List. The list of Substances restricted under REACH (Annex XVII) is also updated without a regular schedule but more frequently than Annex XIV.

Table 2: Relevant lists of substances within REACH

Substances	**maximum concentration limit**	**Classification**	**Current lists can be found here**
Candidate List of substances of very high concern (SVHC) for Authorisation	0.1% by weight	declarable, according to Article 33 REACH	https://www.echa.europa.eu/candidate-list-table
Authorisation List (Annex XIV)	no intentionally added content	prohibited	https://www.echa.europa.eu/authorisation-list
Substances restricted under REACH (Annex XVII)	see Table 3	restricted	https://echa.europa.eu/substances-restricted-under-reach

Candidate List:

As stipulated by Article 33 REACH, suppliers of articles which consist of one or more constituent articles which contain a substance of very high concern (SVHC) in a concentration above 0.1% weight by weight have to inform Kaschke Components of the presence of that substance. In such a case the supplier must report the name, CAS number and concentration of the SVHC.

Suppliers of substances and mixtures must also pass on information about the presence of SVHCs, stating its name, CAS number and concentration. This can be done by providing the safety data sheet which includes information on SVHCs and other hazardous components.

Definition of **article** according to REACH:

An article is an object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition. The threshold of 0.1 % is not calculated on basis of the whole article, but of each single constituent article the product consists of. A few examples for articles are: wire, adhesive tape, metal pipe, paper, packaging.

ECHA guidance on requirements for substances in articles:
https://echa.europa.eu/documents/10162/2324906/articles_en.pdf
BAUA guidance on articles:
https://www.baua.de/EN/Service/Publications/Guidance/REACH-Info-06e.html

Authorisation List (Annex XIV):

Substances that have been identified as SVHCs and included in the Authorisation List cannot be used or placed on the market for a use after a specified date, known as the sunset date, unless the use has been authorized or is exempt from authorization.

None of the substances on the Authorisation List shall be intentionally added to products that are sold to Kaschke Components (see Table 2).

Substances restricted under REACH (Annex XVII):

Most of the substances in Annex XVII are restricted under specific conditions and applications. However, many of the conditions do not apply to our areas of application and use. Therefore, we reduced the list to only those entries that are applicable to our products. The relevant substances as well as concentration limits can be found in Table 3. Unless otherwise stated, the maximum concentration limits apply to the homogeneous material level.

If more entries should be added to Annex XVII before the KCRSL is updated, suppliers must also review the new entries for their material compliance declaration.

The information in this list was assembled on 22-May-2023. There are currently 71 entries overall, the last one being no. 76.

Table 3: Relevant entries selected from the list of substances restricted under REACH (Annex XVII)

Substance	CAS No	maximum concentration limit / restriction condition	Entry No	Comment
Polychlorinated terphenyls (PCTs)	-	no intentionally added content	01	
Chloroethene	75-01-4	no intentionally added content	02	
Tris (2,3 dibromopropyl) phosphate (TDBPP)	126-72-7	not permitted in textile articles	04	
Benzene	71-43-2	5 ppm by weight	05	
Asbestos fibres	-	no intentionally added content	06	
Tris(aziridinyl)phosphinoxide	545-55-1	not permitted in textile articles	07	
Polybromobiphenyls, Polybrominatedbiphenyls (PBB)	-	not permitted in textile articles	08	
2-Naphthylamine and its salts	-	1000 ppm by weight	12	
Benzidine and its salts	-	1000 ppm by weight	13	
4-Nitrobiphenyl	92-93-3	1000 ppm by weight	14	
4-Aminobiphenyl xenylamine and its salts	-	1000 ppm by weight	15	
Mercury compounds	-	No content permitted in wood and wooden materials	18	
Arsenic compounds	-	No content permitted in wood and wooden materials	19	
Tri-substituted organostannic compounds	-	1000 ppm by weight of tin	20	
Dibutyltin (DBT) compounds	-	1000 ppm by weight of tin	20	
Dioctyltin (DOT) compounds	-	1000 ppm by weight of tin	20	
Di-µ-oxo-di-n-butylstanniohydroxyborane / Dibutyltin hydrogen borate $C_8H_{19}BO_3Sn$ (DBB)	75113-37-0	1000 ppm by weight	21	
Cadmium and its compounds	-	100 ppm by weight of cadmium	23	
Monomethyl — tetrachlorodiphenyl methane Trade name: Ugilec 141	76253-60-6	no intentionally added content	24	
Monomethyl-dichloro-diphenyl methane Trade name: Ugilec 121, Ugilec 21	-	no intentionally added content	25	
Monomethyl dibromodiphenyl methane (DBBT)	99688-47-8	no intentionally added content	26	

Table 3 continued: Relevant entries selected from the list of substances restricted under REACH (Annex XVII)

Creosote and Creosote related substances	-	No content permitted in wood and wooden materials	31	
Diphenylether, octabromo derivative $C_{12}H_2Br_8O$	85446-17-9 32536-52-0	1000 ppm by weight	45	compare RoHS directive 2011/65/EU (Table 1)
Nonylphenol / Nonylphenol ethoxylates	-	1000 ppm by weight	46	
Trichlorobenzene	120-82-1	1000 ppm by weight	49	
Polycyclic aromatic hydrocarbons (PAH)	-	1 ppm by weight	50	the restricted PAHs can be found in Annex XVII, entry 50, column 1
Diisobutyl phthalate (DIBP) Dibutyl phthalate (DBP) Benzyl butyl phthalate (BBP) Bis(2-ethylhexyl) phthalate (DEHP)	84-69-5 84-74-2 85-68-7 117-81-7	1000 ppm by weight of platicised material, individual or in any combination	51	for the definition of "plasticised material" see Annex XVII, entry 51, column 2; compare RoHS directive 2011/65/EU (Table 1)
Diisononyl phthalate (DINP)	28553-12-0 68515-48-0	1000 ppm by weight of platicised material	52	for the definition of "plasticised material" see Annex XVII, entry 51, column 2
Diisodecyl phthalate (DIDP)	26761-40-0 68515-49-1	1000 ppm by weight of platicised material	52	for the definition of "plasticised material" see Annex XVII, entry 51, column 2
Di-n-octyl phthalate (DNOP)	117-84-0	1000 ppm by weight of platicised material	52	for the definition of "plasticised material" see Annex XVII, entry 51, column 2
Dimethyl fumarate (DMF)	624-49-7	0.1 ppm by weight	61	
Phenylmercury acetate	62-38-4	100 ppm by weight	62	
Phenylmercury propionate	103-27-5	100 ppm by weight	62	
Phenylmercury neodecanoate	26545-49-3	100 ppm by weight	62	
Phenylmercury 2-ethylhexanoate	13302-00-6	100 ppm by weight	62	
Phenylmercury octanoate	13864-38-5	100 ppm by weight	62	
Bisphenol A (BPA, 4,4'-isopropylidenediphenol)	80-05-7	200 ppm by weight in thermal paper	66	
C9-C14 PFCAs (perfluorocarboxylic acids) and their salts	-	25 ppb for the sum of C9-C14 PFCAs and their salts	68	for the definition of "C9-C14 PFCAs" see Annex XVII, entry 68, column 1
C9-C14 PFCA-related substances	-	260 ppb for the sum of C9-C14 PFCA-related substances	68	for the definition of "C9-C14 PFCA-related substances" see Annex XVII, entry 68, column 1
1-Methyl-2-pyrrolidone	872-50-4	0.3 %	71	

4. POP Regulation (EU) 2019/1021

also applies to packaging

The substances regulated by the EU POP regulation, annexes I and II (see Table 4), must be declared at the homogeneous material level.

Table 4: Annexes to the EU POP regulation listing prohibited and restricted substances

Substances	Conditions	maximum concentration limit	Comment
Annex I: Prohibited POPs	manufacturing, placing on the market, and use are prohibited	no content permitted	exemptions for unintentional trace contaminants can be found in Annex I
Annex II: Restricted POPs	manufacturing, placing on the market and use are restricted	no content permitted	exemptions for unintentional trace contaminants can be found in Annex II

5. U.S. EPA TSCA Section 6(h)

does not apply to packaging

The substances regulated by the U.S. EPA TSCA Section 6(h) (see Table 5) must be declared at the homogeneous material level.

Table 5: Substances regulated under section 6(h) of the U.S. EPA TSCA

Substance	CAS No	maximum concentration limit / restriction condition	Comment
Decabromodiphenyl ether (decaBDE)	1163-19-5	no intentionally added content	compare EU POP Regulation
Phenol, Isopropylated Phosphate (3:1) (PIP 3:1)	68937-41-7	declare concentration by weight	until October 31, 2024 declarable for all applications; after October 31, 2024 non-FDA-regulated products must adhere to "no permitted content", whereas FDA-regulated products remain declarable
2,4,6-tris(tert-butyl)phenol (2,4,6-TTBP)	732-26-3	0.3 % by weight	
Hexachlorobutadiene (HCBD)	87-68-3	no intentionally added content	compare EU POP Regulation
Pentachlorothiophenol (PCTP)	133-49-3	1 % by weight	

6. Low Halogen Content

does not apply to packaging

Though not mandated by official legislations, the electronics industry often requires products to comply with low halogen requirements. The halogens that need to be considered are chlorine and bromine in the form of brominated and chlorinated flame retardants as well as PVC. For more information please refer to the joint Jedec/ECA standard JS709C as well as the IEC standard 61249-2-21:2003.

The substances in Table 6 must be declared at the homogeneous material level.

Table 6: Requirements for the content of chlorinated and brominated flame retardants as well as PVC

Substance	**maximum concentration limit**	**Comment**
Brominated flame retardants	1000 ppm by weight of bromine	excluding Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) or Hexabromocyclododecane (HBCDD) (compare EU POP Regulation)
Chlorinated flame retardants	1000 ppm by weight of chlorine	
Polyvinyl chloride (PVC), PVC congeners, PVC block polymers, PVC copolymers, or polymer alloys containing PVC	1000 ppm by weight of chlorine	
Brominated flame retardants in printed wiring board laminates	900 ppm by weight of bromine	excluding Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) or Hexabromocyclododecane (HBCDD) (compare EU POP Regulation)
Chlorinated flame retardants in printed wiring board laminates	900 ppm by weight of chlorine	
Sum of chlorinated and brominated flame retardants in printed wiring board laminates	1500 ppm by weight of bromine + chlorine	excluding Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) or Hexabromocyclododecane (HBCDD) (compare EU POP Regulation)

7. Safe Drinking Water and Toxic Enforcement Act of 1986 – Proposition 65

does not apply to packaging

The list of substances regulated under the Proposition 65 can be found here:
https://oehha.ca.gov/proposition-65/proposition-65-list

All the substances regulated by Proposition 65, are declarable at the homogeneous material level if they are intentionally added to a product. Table 7 lists the substances of the Proposition 65 list that have a specific concentration limit. These substances are not otherwise listed in the KCRSL or are otherwise listed but with a different concentration limit. The other substances on the Proposition 65 list do not have a maximum concentration limit but they must also be declared if they are present in the product.

Table 7: Selected substances from the Proposition 65 List, that have a specific concentration limit

Substance	**CAS No**	**maximum concentration limit**
Tetrahydrofuran (THF)	109-99-9	1000 ppm by weight
Methyl acrylate	96-33-3	1000 ppm by weight
Indium tin oxide	50926-11-9	1000 ppm by weight
Lead and Lead compounds	-	90 ppm by weight
Bisphenol A (BPA, 4,4'-isopropylidenediphenol)	80-05-7	3 ppm by weight
Diisononyl phthalate (DINP)	28553-12-0 68515-48-0	no intentionally added content
Diisodecyl phthalate (DIDP)	26761-40-0 68515-49-1	no intentionally added content
Di-n-hexyl phthalate (DHEXP, DNHP)	84-75-3	no intentionally added content
Tris (1,3-dichloro-2-propyl) phosphate (TDCPP/TDCP)	13674-87-8	25 ppm by weight
Tris (2-chlorethyl) phosphate (TCEP)	115-96-8	25 ppm by weight
Tris (2,3-dibromopropyl) phosphate (TDBPP)	126-72-7	25 ppm by weight
Molybdenum trioxide	1313-27-5	1000 ppm by weight
Antimony trioxide	1309-64-4	1000 ppm by weight
Tetrabromobisphenol A (TBBPA)	79-94-7	1000 ppm by weight
2,2-Bis(bromomethyl)-1,3-propanediol (BMP)	3296-90-0	1000 ppm by weight
Benzophenone	119-61-9	1000 ppm by weight
Benzidine-based Dyes (see Table 11)	-	1000 ppm by weight
3,3'-Dimethoxybenzidine-based (DMOB) dyes metabolized to 3,3'-dimethoxybenzidine (see Table 12)	-	1000 ppm by weight
3,3'-Dimethylbenzidine-based (DMB) dyes metabolized to 3,3'-dimethylbenzidine (see Table 13)	-	1000 ppm by weight
D&C Orange No. 17	3468-63-1	1000 ppm by weight
1-Amino-2,4-dibromoanthraquinone (ADBAQ)	81-49-2	1000 ppm by weight
1-Amino-2-methylanthraquinone	82-28-0	1000 ppm by weight
Direct Blue 6 (Technical Grade)	2602-46-2	1000 ppm by weight
Direct Brown 95 (Technical Grade)	16071-86-6	1000 ppm by weight
Disperse Blue 1	2475-45-8	1000 ppm by weight
Naphthalene	91-20-3	1 ppm by weight

8. Further Legislations

also applies to packaging

Unless otherwise stated, the substances in Table 8 must be declared at the homogeneous material level.

Table 8: Substances regulated by various legislations

Substance	**CAS No**	**maximum concentration limit**	**Legislations**
Biocides	-	no intentionally added content	Regulation (EU) No 528/2012
Radioactive substances	-	no intentionally added content	Directive 2013/59/EURATOM; Japan Law Concerning Prevention from Radiation Hazards
Ozone depleting substances	-	no intentionally added content	Regulation (EU) No 1005/2009
Fluorinated Greenhouse gases	-	no content permitted	Regulation (EU) No 517/2014
Perfluorohexane-1-sulphonic acid (PFHxS) and its salts	-	25 ppb by weight	Swiss Chemical Risk Reduction Ordinance, ORRChem, RS 814.81
Perfluorohexane-1-sulphonic acid (PFHxS)-related substances	-	1 ppm for the sum of PFHxS-related substances	definition of "PFHxS-related sub-stances": substances including polymers with a linear or branched perfluorohexyl group with the formula C_6F_{13} in direct connection with a sulphur atom as structural element, which are degraded to PFHxS. Swiss Chemical Risk Reduction Ordinance, ORRChem, RS 814.81
Bisphenol S (4,4'-Sulfonyldiphenol, BPS)	80-09-1	200 ppm by weight in thermal paper	Swiss Chemical Risk Reduction Ordinance, ORRChem, RS 814.81
Formaldehyde	50-00-0	no intentionally added content in composite wood products or components (plywood, particle board and MDF) and textiles	California CARB ATCM to reduce formaldehyde emissions from composite wood products; US EPA TSCA Title VI; Germany Gefahrstoffverordnung (GefStoffV, Hazardous Substances Ordinance) Annex III, No. 9, 26.10.1993
Polychlorinated and polybrominated dioxins and furans	-	no intentionally added content	Germany Chemikalienverbotsverordnung (ChemVerbotsV, Order concerning bans and restrictions in terms of placement on the market and on the supply of dangerous substances, mixtures and articles in accor-dance with the Chemicals Act), Annex I; EU POP Regulation (EU) 2019/1021
Mineral oil aromatic hydrocarbons (MOAH) consisting of 1-7 aromatic cycles	-	1000 ppm in ink	Article 112 of decree no.2020-105 (France)
Mineral oil saturated hydrocarbons (MOSH) consisting of 16-35 carbon atoms	-	1000 ppm in ink	Article 112 of decree no.2020-105 (France)

Table 8 continued: Substances regulated by various legislations

Latex	9006-04-6	declare concentration by weight	US FDA labelling regulation Title 21 of the Code of Federal Regulations (21 CFR 801.437)
Flame retardant chemicals	-	declare concentration by weight	flame retardant chemicals include, but are not limited to, halogenated, phosphorous-based, nitrogen-based, and nanoscale flame retardants
Substances listed in Appendix C of EU Toys Directive 2009/48/EC	-	no content permitted	EU Toys Directive 2009/48/EC, Appendix C
Di-n-pentyl phthalate (DPENP)	131-18-0	1000 ppm	US Consumer Product Safety Improvement Act (CPSIA)
Di-n-hexyl phthalate (DHEXP, DNHP)	84-75-3	1000 ppm	US Consumer Product Safety Improvement Act (CPSIA)
Dicyclohexyl phthalate (DCHP)	84-61-7	1000 ppm	US Consumer Product Safety Improvement Act (CPSIA)
Diisononyl phthalate (DINP)	28553-12-0 68515-48-0	1000 ppm	US Consumer Product Safety Improvement Act (CPSIA)
Tris(2-chlorethyl) phosphate (TCEP)	115-96-8	no content permitted	EU Toys Directive 2009/48/EC, Appendix C; Canada Consumer Product Safety Act
Tris(2-chloro-1-methylethyl) phosphate (TCPP)	13674-84-5	no content permitted	EU Toys Directive 2009/48/EC, Appendix C
Tris (1,3-dichloro-2-propyl) phosphate (TDCPP/TDCP)	13674-87-8	no content permitted	EU Toys Directive 2009/48/EC, Appendix C
Lead and lead compounds	-	90 ppm in surface coating materials	Canada Consumer Product Safety Act: Surface Coating Materials Regulations, SOR/2016-193
Mercury	-	10 ppm in surface coating materials	Canada Consumer Product Safety Act: Surface Coating Materials Regulations, SOR/2016-193 amended by SOR/2022-122

9. Industry Restrictions

also applies to packaging

Unless otherwise stated, the substances in Table 9 must be declared at the homogeneous material level.

Table 9: Substances regulated due to customer requirements

Substance	**maximum concentration limit**	**Conditions**	**Comment**
Beryllium and Beryllium compounds	1000 ppm	declarable, by weight of any material	
Antimony trioxide CAS No: 1309-64-4	1000 ppm	declarable in plastic materials	
Rare Earth minerals (scandium, yttrium, lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium)	1 mg per part, for the sum of the rare earth minerals	declarable if intentionally added; concentration has to be declared in mg/part if necessary please define the meaning of a part (e.g. the length of a wire)	France AGEC law, article 13, Decree No. 2022-748 of April 29, 2022
Precious metals (gold, silver, platinum, palladium)	1 mg per part, for the sum of the precious metals	declarable if intentionally added concentration has to be declared in mg/part if necessary please define the meaning of a unit (e.g. the length of a wire)	France AGEC law, article 13, Decree No. 2022-748 of April 29, 2022
Per- and Polyfluoroalkyl substances (PFAS)	no intentionally added content	declarable if intentionally added a list of PFAS can be found on the US EPA homepage: https://comptox.epa.gov/dashboard/chemical-lists/pfasmaster	PFAS definition: Any substance that contains at least one fully fluorinated methyl (CF3-) or methylene (-CF2-) carbon atom (without any H/Cl/Br/I attached to it).
Alkylphenols and alkylphenol ethoxylates	100 ppm	restricted in textiles and leather	

10. Additional Provisions for Packaging

only applies to packaging

Unless otherwise stated, the substances in Table 10 must be declared at the homogeneous material level.

Table 10: Substance regulations that specifically apply to packaging

Substance	**maximum concentration limit**	
Sum of Heavy metals (Cadmium, Mercury, Hexavalent Chromium and Lead)	100 ppm	Packaging & Packaging Waste Directive 94/62/EC
Oxo-degradable plastics	no content permitted	EU Single-use Plastics Directive (EU) 2019/904
PVC and PVC copolymers	1000 ppm by weight	declarable

11. Abbreviations

CAS	Chemical Abstracts Service
EPA	Environmental Protection Agency
KCRSL	Kaschke Components Regulated Substance List
MOAH	Mineral oil aromatic hydrocarbons
PAH	Polycyclic aromatic hydrocarbons
PFAS	Per- and Polyfluoroalkyl substances
POP	Persistent Organic Pollutants
ppb	Parts Per Billion, 1 ppb = 0.0000001%
ppm	Parts Per Million, 1 ppm = 0.0001%
PVC	Polyvinyl chloride
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RoHS	Restriction of Hazardous Substances
SVHC	Substance of Very High Concern
TSCA	Toxic Substances Control Act

12. Non-exhaustive list of Benzidine-based dyes

Table 11: Non-exhaustive list of Benzidine-based dyes (referred to in Table 7)

Substance name	CAS No	Colour Index name or acronym
Disodium 4-amino-3-[[4'-[(2,4-diaminophenyl)azo][1,1'-biphenyl]-4-yl]azo] -5-hydroxy-6-(phenylazo)naphthalene-2,7-disulphonate	1937-37-7	Direct Black 38
Disodium 3-[[2,2'-dimethyl-4'-[[4-[[(p-tolyl)sulphonyl]oxy]phenyl]azo][1,1'-biphenyl]-4-yl]azo]-4-hydroxynaphthalene-2,7-disulphonate	6358-57-2	Acid Red 111
2,7-Naphthalenedisulfonic acid, 4-hydroxy-3-[[4′-[(2-hydroxy-1-naphthalenyl)azo]-2,2′-dimethyl[1,1′-biphenyl]-4-yl]azo], disodium salt	3701-40-4	Acid Red 99
1,3-Naphthalenedisulfonic acid, 8-[[3,3′-dimethyl-4′-[[4-[[(4-methylphenyl)sulfonyl]oxy]phenyl]azo][1,1′-biphenyl]-4-yl]azo]-7-hydroxy-, disodium salt	6459-94-5	Acid Red 114
[1,1′-Biphenyl]-2,2′-disulfonic acid, 4-[(4,5-dihydro-3-methyl-5-oxo-1-phenyl-1*H* -pyrazol-4-yl)azo]-4′-[(2-hydroxy-1-naphthalenyl)azo]-, disodium salt	6470-20-8	Acid Orange 56
1,3-Naphthalenedisulfonic acid, 8-[[3,3′-dimethoxy-4′-[[4-[[(4-methylphenyl)sulfonyl]oxy]phenyl]azo][1,1′-biphenyl]-4-yl]azo]-7-hydroxy-, disodium salt	6548-30-7	Acid Red 128
2,7-Naphthalenedisulfonic acid, 4-amino-3-[[4′-[(2,4-dihydroxyphenyl)azo]-3,3′-dimethyl[1,1′-biphenyl]-4-yl]azo]-5-hydroxy-6-[(4-sulfophenyl)azo]-, trisodium salt	68318-35-4	Acid Black 209
2,7-Naphthalenedisulfonic acid, 4-amino-5-hydroxy-6-[[4′-[(4-hydroxyphenyl)azo]-3,3′-dimethyl[1,1′-biphenyl]-4-yl]azo]-3-[(4-nitrophenyl)azo]-, disodium salt	68400-36-2	NAAHD
2,7-Naphthalenedisulfonic acid, 4-amino-3-[[4′-[(2,4-diaminophenyl)azo]-2,2′-disulfo[1,1′-biphenyl]-4-yl]azo]-5-hydroxy-6-(phenylazo)-, sodium salt	83221-63-0	NAADD
Benzenesulfonic acid, 3,3′-[(2,2′-dimethyl[1,1′-biphenyl]-4,4′-diyl)bis[azo(4,5-dihydro-3-methyl-5-oxo-1 *H*-pyrazole-4,1-diyl)]]bis[4-chloro-, disodium salt	89923-60-4	BADB
[1,1′-Biphenyl]-2,2′-disulfonic acid, 4,4′-bis[(2-hydroxy-1-naphthalenyl)azo]-, disodium salt	10169-02-5	Acid Red 97
2,7-Naphthalenedisulfonic acid, 3,3′-[(3,3′-dimethyl[1,1′-biphenyl]-4,4′-diyl)bis(azo)]bis[5-amino-4-hydroxy-, tetrasodium salt	72-57-1	Direct Blue 14
1-Naphthalenesulfonic acid, 3,3′-[[1,1′-biphenyl]-4,4′-diylbis(azo)]bis[4-amino-, disodium salt	573-58-0	Direct Red 28
1-Naphthalenesulfonic acid, 3,3′-[(3,3′-dimethyl[1,1′-biphenyl]-4,4′-diyl)bis(azo)]bis[4-amino-, disodium salt	992-59-6	Direct Red 2
2,7-Naphthalenedisulfonic acid, 3,3′-[(3,3′-dimethyl[1,1′-biphenyl]-4,4′-diyl)bis(azo)]bis[4,5-dihydroxy-, tetrasodium salt	2150-54-1	Direct Blue 25
1-Naphthalenesulfonic acid, 3,3′-[(3,3′-dimethoxy[1,1′-biphenyl]-4,4′-diyl)bis(azo)]bis[4-hydroxy-, disodium salt	2429-71-2	Direct Blue 8
2,7-Naphthalenedisulfonic acid, 3,3′-[(3,3′-dimethoxy[1,1′-biphenyl]-4,4′-diyl)bis(azo)]bis[5-amino-4-hydroxy-, tetrasodium salt	2429-74-5	Direct Blue 15
1-Naphthalenesulfonic acid, 4-hydroxy-3-[[4′-[(1-hydroxy-5-sulfo-2-naphthalenyl)azo]-3,3′-dimethyl[1,1′-biphenyl]-4-yl]azo]-, disodium salt	6420-06-0	Direct Violet 28
2,7-Naphthalenedisulfonic acid, 5-amino-3-[[4′-[(6-amino-1-hydroxy-3-sulfo-2-naphthalenyl)azo]-3,3′-dimethyl[1,1′-biphenyl]-4-yl]azo]-4-hydroxy-, trisodium salt	6420-22-0	Direct Blue 295
1-Naphthalenesulfonic acid, 3-[[4′-[(6-amino-1-hydroxy-3-sulfo-2-naphthalenyl)azo]-3,3′-dimethoxy[1,1′-biphenyl]-4-yl]azo]-4-hydroxy-, disodium salt	6449-35-0	Direct Blue 151

Table 11 continued: Non-exhaustive list of Benzidine-based dyes (referred to in Table 7)

2,7-Naphthalenedisulfonic acid, 4,4′-[(3,3′-dichloro[1,1′-biphenyl]-4,4′-diyl)bis(azo)]bis[3-amino-, tetrasodium salt	6548-29-4	Direct Red 46
Acetic acid, 2,2′-[[4,4′-bis[[1-hydroxy-6-[(4-methoxyphenyl)amino]-3-sulfo-2-naphthalenyl]azo][1,1′-biphenyl]-3,3′-diyl]bis(oxy)]bis-, tetrasodium salt	6655-95-4	Direct Blue 158
Cuprate(2−), [5-[[4′-[[2,6-dihydroxy-3-[(2-hydroxy-5-sulfophenyl)azo]phenyl]azo][1,1′-biphenyl]-4-yl]azo]-2-hydroxybenzoato(4-)]-, disodium	16071-86-6	Direct Brown 95
2,7-Naphthalenedisulfonic acid, 5-amino-4-hydroxy-3-[[4′-[(1-hydroxy-4-sulfo-2-naphthalenyl)azo]-3,3′-dimethoxy[1,1′-biphenyl]-4-yl]azo]-, trilithium salt	67923-89-1	NAAH·3Li
Benzoic acid, 5-[[4′-[[6-amino-5-(1*H* -benzotriazol-5-ylazo)-1-hydroxy-3-sulfo-2-naphthalenyl]azo]-3,3′-dimethoxy[1,1′-biphenyl]-4-yl]azo]-2-hydroxy-4-methyl-, disodium salt	70210-28-5	BABHS
Benzoic acid, 5-[[4′-[(2-amino-8-hydroxy-6-sulfo-1-naphthalenyl)azo]-2,2′-dichloro[1,1′-biphenyl]-4-yl]azo]-2-hydroxy-, disodium salt	71215-83-3	BAHSD
2,7-Naphthalenedisulfonic acid, 3,3′-[(3,3′-dimethoxy[1,1′-biphenyl]-4,4′-diyl)bis(azo)]bis[5-amino-4-hydroxy-, tetralithium salt	71550-22-6	NADB·4Li
[1,1′-Biphenyl]-3,3′-dicarboxylic acid, 4-[[5-[[5-(aminosulfonyl)-2-hydroxyphenyl]azo]-1-hydroxy-6-(phenylamino)-3-sulfo-2-naphthalenyl]azo]-4′-[[1-[[(3-carboxy-4-hydroxyphenyl)amino]carbonyl]-2-oxopropyl]azo]-, tetrasodium salt	72252-59-6	BDAAH
2,7-Naphthalenedisulfonic acid, 3,3′-[(3,3′-dimethoxy[1,1′-biphenyl]-4,4′-diyl)bis(azo)]bis[5-amino-4-hydroxy-, monolithium trisodium salt	75659-72-2	NADB·Li·3Na
2,7-Naphthalenedisulfonic acid, 3,3′-[(3,3′-dimethoxy[1,1′-biphenyl]-4,4′-diyl)bis(azo)]bis[5-amino-4-hydroxy-, dilithium disodium salt	75659-73-3	NADB·2Li·2Na
2,7-Naphthalenedisulfonic acid, 5-amino-4-hydroxy-3-[[4′-[(1-hydroxy-4-sulfo-2-naphthalenyl)azo]-3,3′-dimethoxy[1,1′-biphenyl]-4-yl]azo]-, monolithium disodium salt	75673-18-6	NAAH·Li·2Na
2,7-Naphthalenedisulfonic acid, 5-amino-4-hydroxy-3-[[4′-[(1-hydroxy-4-sulfo-2-naphthalenyl)azo]-3,3′-dimethoxy[1,1′-biphenyl]-4-yl]azo]-, dilithium monosodium salt	75673-19-7	NAAH·2Li·Na
1-Naphthalenesulfonic acid, 3,3′-[(3,3′-dimethoxy[1,1′-biphenyl]-4,4′-diyl)bis(azo)]bis[4-hydroxy-, dilithium salt	75673-34-6	NADB·2Li
1-Naphthalenesulfonic acid, 3,3′-[(3,3′′-dimethoxy[1,1′-biphenyl]-4,4′-diyl)bis(azo)]bis[4-hydroxy-, monolithium monosodium salt	75673-35-7	NADB·Li·Na
2,7-Naphthalenedisulfonic acid, 3,3′-[(3,3′-dimethoxy[1,1′-biphenyl]-4,4′-diyl)bis(azo)]bis[5-amino-4-hydroxy-, trilithium monosodium salt	75752-17-9	NADB·3Li·Na
2*H*-Tetrazolium, 3,3′-(3,3′-dimethoxy[1,1′-biphenyl]-4,4′-diyl)bis[2-(4-nitrophenyl)-5-phenyl-, dichloride	298-83-9	TDBPD
2*H*-Tetrazolium, 3,3′-(3,3′-dimethoxy[1,1′-biphenyl]-4,4′-diyl)bis[2,5-diphenyl-, dichloride	1871-22-3	TDBD
2-Naphthalenecarboxamide, *N*,*N* ′-(3,3′-dimethoxy[1,1′-biphenyl]-4,4′-diyl)bis[3-hydroxy-	91-92-9	Naphthol AS-BR
1-Triazene-1-carbonitrile, 3,3′-(3,3′-dimethoxy[1,1′-biphenyl]-4,4′-diyl)bis-	93940-21-7	TCDB
1,1′-Biphenyl, 4,4′-diisocyanato-3,3′-dimethyl-	91-97-4	TODI
[1,1′-Biphenyl]-4,4′-diamine, 3,3′-dimethoxy-	119-90-4	3,3′-DMOB
[1,1′-Biphenyl]-4,4′-diamine, 3,3′-dimethyl-	119-93-7	3,3′-DMB
[1,1′-Biphenyl]-4,4′-diamine, *N*,*N*,*N*′, *N*′-tetramethyl-	366-29-0	4N-TMB
1,1′-Biphenyl]-4,4′-diamine, 3,3′-dimethyl-, dihydrochloride	612-82-8	3,3′-DMB·2HCl

13. Non-exhaustive list of DMOB-based dyes

Table 12: Non-exhaustive list of DMOB-based based dyes (referred to in Table 7)

Substance name	CAS No	Colour Index name or acronym
3,3’-Dimethoxybenzidine dihydrochloride	20325-40-0	Fast Blue B
6,6'-[(3,3'-dimethoxy[1,1'-biphenyl]-4,4'-diyl)bis(azo)]bis[4-amino-5-hydroxynaphthalene-1,3-disulphonic] acid	3841-14-3	Direct Blue 1
1-naphthalenesulfonicacid,3,3’-[(3,3’-dimethoxy[1,1’-biphenyl]-4,4’-diyl)bis(	2429-71-2	Direct Blue 8
Tetrasodium 3,3'-[(3,3'-dimethoxy[1,1'-biphenyl]-4,4'-diyl)bis(azo)]bis[4,5-dihydroxynaphthalene-2,7-disulphonate]	4198-19-0	Direct Blue 10
3,3’-[(3,3’-Dimethoxy[1,1’-biphenyl]-4,4’-diyl)bis(azo)]bis[5-amino-4-hydroxy-2,7-naphthalenedisulfonic acid tetrasodium salt	2429-74-5	Direct Blue 15
4-amino-3-((4'-((1-hydroxy-4-sulfo-2-naphthalenyl)azo)-3,3'-dimethoxy(1,1'-biphenyl)-4-yl)azo)-1-naphthalenesulfonic acid disodium salt	6428-94-0	Direct Violet 32
Direct Black 114	61703-05-7	Direct Black 114

14. Non-exhaustive list of DMB-based dyes

Table 13: Non-exhaustive list of DMB-based based dyes (referred to in Table 7)

Substance name	CAS No	Colour Index name or acronym
3,3'-Diimethyl-[1,1'-biphenyl]-4,4' diamine dihydrochloride	612-82-8	o-Tolidine dihydrochloride
8-((3,3'-dimethyl-4'-((4-(((4-methylphenyl)sulfonyl)oxy)phenyl)azo)(1,1'-biphenyl)-4-yl)azo)-7-hydroxy-1,3-naphthalenedisulfonic acid disodium salt	6459-94-5	Acid Red 114
Benzopurpurine 4B	992-59-6	Direct Red 2
3,3'-Dimethyl-4,4'-bis(5-amino-4-hydroxy-2,7-disulfonaphthyl-3-azo)-[1,1'-biphenyl] tetrasodium salt	72-57-1	Trypan blue
Evan’s blue	314-13-6	Direct Blue 53
Tetrasodium 3,3'-[(3,3'-dimethyl[1,1'-biphenyl]-4,4'-diyl)bis(azo)]bis[4,5-dihydroxynaphthalene-2,7-disulphonate]	2150-54-1	Direct Blue 25
1, 8-[[4'-[(4-ethoxyphenyl)azo]-3,3'-dimethyl[1,1'-biphenyl]-4-yl]azo]-7-hydroxy-, disodium salt	6358-29-8	Direct Red 39
Benzoic acid, 5-[2-[4'-[2-(2,6-diamino-3-methyl-5-sulfophenyl)diazenyl]-3,3'-dimethyl[1,1'-biphenyl]-4-yl]diazenyl]-2-hydroxy-, sodium salt (1:2)	6637-88-3	Direct Orange 6, disodium salt

15. Revision History

Version	Release date	Revisions
1.0	20-Apr-2023	Initial version