Designation: F2931 – 19

Standard Guide for Analytical Testing of Substances of Very High Concern in Materials and Products[1]

This standard is issued under the fixed designation F2931; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide contains a list of potential test methods for the analysis of Substances of Very High Concern (SVHC) as designated by ECHA, the European Chemicals Agency. Information on the test methods cited is publicly available and is drawn from a variety of sources. The guide is intended to assist in the selection of test methods that are applicable for the SVHCs identified.

1.2 The specific SVHCs covered within this guide are compiled from the ECHA Candidate List of Substances of Very High Concern. This list is also referred to as the REACH Candidate List.

1.3 This guide specifically addresses methods for the analysis of SVHCs in products. It is not intended to cover the many and varied analysis challenges associated in the manufacturing environment.

1.4 *Limitations:*

1.4.1 This guide is intended to provide a compilation of available test methods for the SVHCs listed on the ECHA Candidate list and is not intended to be exhaustive. The test methods within this guide are not the only ones available for any specific substances and this guide does not recommend any specific test method.

1.4.2 Test methods for specific substances at the detection limits required for REACH reporting are not always available. In some cases, it is necessary to deduce the quantity of substance present through the analysis and quantification of its elements. Although this approach is routinely used some degree of uncertainty exists in the final result due to the reduced specificity of the test method.

1.4.3 Although this guide is intended to be updated on a periodic basis to capture new developments in the field, there is no assurance that the information provided is the most current.

1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1257 Specification for High-Gravity Glycerin

D1385 Test Method for Hydrazine in Water

D1971 Practices for Digestion of Water Samples for Determination of Metals by Flame Atomic Absorption, Graphite Furnace Atomic Absorption, Plasma Emission Spectroscopy, or Plasma Mass Spectrometry

D3335 Test Method for Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy

D3545 Test Method for Alcohol Content and Purity of Acetate Esters by Gas Chromatography

D4309 Practice for Sample Digestion Using Closed Vessel Microwave Heating Technique for the Determination of Total Metals in Water

D5292 Test Method for Aromatic Carbon Contents of Hydrocarbon Oils by High ResolutionNuclear Magnetic Resonance Spectroscopy (Withdrawn 2018)[3]

D5831 Practice for Screening Fuels in Soils

[1] This guide is under the jurisdiction of ASTM Committee F40 on Declarable Substances in Materials and is the direct responsibility of Subcommittee F40.02 on Management Practices and Guides.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] The last approved version of this historical standard is referenced on www.astm.org.

D7065 Test Method for Determination of Nonylphenol, Bisphenol A, *p-tert*-Octylphenol, Nonylphenol Monoethoxylate and Nonylphenol Diethoxylate in Environmental Waters by Gas Chromatography Mass Spectrometry
D7485 Test Method for Determination of Nonylphenol, *p-tert*-Octylphenol, Nonylphenol Monoethoxylate and Nonylphenol Diethoxylate in Environmental Waters by Liquid Chromatography/Tandem Mass Spectrometry
D7823 Test Method for Determination of Low Level Phthalates in Poly (Vinyl Chloride) Plastics by Thermal Desorption—Gas Chromatography/Mass Spectrometry
D7968 Test Method for Determination of Polyfluorinated Compounds in Soil by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)
E1621 Guide for Elemental Analysis by Wavelength Dispersive X-Ray Fluorescence Spectrometry
F2576 Terminology Relating to Declarable Substances in Materials
F2853 Test Method for Determination of Lead in Paint Layers and Similar Coatings or in Substrates and Homogenous Materials by Energy Dispersive X-Ray Fluorescence Spectrometry Using Multiple Monochromatic Excitation Beams

2.2 *European Commission:*[4]
Article 57 of the European Union Regulation #1907/2006

2.3 *International Electrotechnical Commission TC111:*[5]
IEC 62321 Electrotechnical Products – Determination of Levels of Six Regulated Substances (Lead, Mercury, Cadmium, Hexavalent Chromium, Polybrominated Biphenyls, Polybrominated Diphenyl Ethers)

2.4 *Joint Industry Guide (JIG):*[6]
JIG-101 Material Composition Declaration for Electrotechnical Products. Ed 4.0, 2011

3. Terminology

3.1 *Definitions:*

3.1.1 Terms and definitions related to declarable substances in materials may be found in Terminology F2576.

3.1.2 Terms and definitions in the guide not found in Terminology F2576 are found in a common dictionary or other reference documents such as the ASTM Dictionary of Engineering Science & Technology.[7]

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *article*—"an object which during production is given a special shape, surface or design which determines its function to a greater degree than its chemical composition" as defined in Article 3(3) of the REACH Regulation.

3.2.2 *brominated flame retardant*—a group of brominated organic compounds that are used to inhibit initiation of a fire.

3.2.3 *Joint Industry Guide*—An industry standard of the Electric Industries Alliance that "*establishes the relevant substances as well as reporting thresholds that the industry agrees should govern material content disclosures*."[6]

3.2.4 *phthalates—also known as phthalate esters*, are esters of phthalic acid primarily used as a plasticizer for polyvinyl chloride or as solvents for many different types of consumer products.

3.2.5 *plasticizer*—any of a group of substances used in plastics and other materials to control viscosity, flexibility or softness of the finished product.

3.2.6 *Substances of Very High Concern (SVHC)*—substances that have hazards of serious consequences and meet the criteria for carcinogenic, mutagenic and reproductive toxic substances of category 1 and 2.

3.2.6.1 *Discussion*—SVHC can be persistent, bioaccumulative and toxic (PBT) substances or very persistent and very bioaccumulative (VPvB) substances. Other substances giving rise to an equivalent level of concern as potential SVHC include endocrine disruptors.

3.3 *Acronyms:*

3.3.1 *AAS*—Atomic Absorption Spectrometry

3.3.2 *AED*—Atomic Emission Detection

3.3.3 *AES*—Atomic Emission Spectrometry

3.3.4 *AFS*—Atomic Fluorescence Spectometry

3.3.5 *BFR*—Brominated Flame Retardant

3.3.6 *CAS*—Chemical Abstract Services

3.3.7 *CMR*—Carcinogenic, Mutagenic and Toxic to Reproduction

3.3.8 *CPSC*—United States Consumer Product Safety Commission

3.3.9 *DMF*—Dimethylformamide

3.3.10 *ECD*—Electron Capture Detection

3.3.11 *ECHA*—European Chemicals Agency

3.3.12 *ECNI*—Electron Capture Negative Ion

3.3.13 *EDXRF*—Energy Dispersive X-ray Fluorescence

3.3.14 *EEE*—Electrical and Electronic Equipment

3.3.15 *EIA*—Electronic Industries Alliance

3.3.16 *EPA*—United States Environmental Protection Agency

3.3.17 *EU*—European Union

3.3.18 *FID*—Flame Ionization Detection

3.3.19 *FLAA*—Flame Atomic Absorption Spectroscopy

3.3.20 *FPD*—Flame Photometric Detection

3.3.21 *GC-MS*—Gas Chromatography-Mass Spectrometry

3.3.22 *GFAA*—Graphite Furnace Atomic Absorption Spectrometry

3.3.23 *HAFID*—Hydrogen Atmosphere Flame Ionization Detection

3.3.24 *HFAA*—Heptaflurobutyric acid anhydride

3.3.25 *HIPS*—High Impact Polystyrene

[4] Europese Commissie, B-1049, Brussels, Belgium, http://ec.europa.eu/index_en.htm.

[5] Available from International Electrotechnical Commission (IEC), 3, rue de Varembé, P.O. Box 131, CH-1211 Geneva 20, Switzerland, http://www.iec.ch.

[6] Available from the Consumer Electronics Association, 1919 S. Eads St. Arlington, VA 22202, http://www.ce.org

[7] ASTM Dictionary of Engineering Science & Technology, 10th Edition. Available from www.astm.org.

3.3.26 *HPLC*—High Performance (or Pressure) Liquid Chromatography

3.3.27 *ICP-MS*—Inductively Coupled Plasma – Mass Spectrometry

3.3.28 *ICP-OES*—Inductively Coupled Plasma – Optical Emission Spectrometry

3.3.29 *IR*—Infrared Spectrometry

3.3.30 *LC-MS-MS*—Liquid Chromatography-Tandem

3.3.31 *MSP*—Microspectrophotometer

3.3.32 *NIOSH*—United States National Institute for Occupational Health and Safety

3.3.33 *PAH*—Polycyclic Aromatic Hydrocarbon

3.3.34 *PTFE*—Polytetrafluoroethylene (Teflon)

3.3.35 *PVC*—Polyvinyl Chloride

3.3.36 *REACH*—Registration, Evaluation and Authorization of Chemicals

3.3.37 *RoHS*—Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment

3.3.38 *UV-VIS*—UltraViolet-Visible Spectrometry

3.3.39 *XRF*—X-ray Fluorescence Spectrometry

4. Summary of Guide

4.1 This guide provides a list of test methods for the determination of the Substances of Very High Concern as identified in the REACH Candidate list. Screening methods are discussed in Appendix X2.

4.2 This guide provides identifiers for each substance such as chemical name, synonyms, chemical formulas, CAS and EU numbers.

4.3 Common uses for each of the substances are identified.

5. Significance and Use

5.1 The REACH Candidate list classifies substances as SVHCs thus making them subject to possible authorization. Compliance to the REACH regulation requires that any identified SVHC be present at a concentration of less than 0.1 % (w/w) of the total article weight to avoid triggering a reporting obligation. This guide is intended to assist in the identification of available test methods for quantitative analysis of the substance(s) of interest.

5.2 When possible, industry accepted standard test methods are cited. However, industry vetted test methods are not available for all of the substances contained in the REACH Candidate List. Thus, some caution and due diligence must be exercised when applying some of the methods listed in this guide.

5.3 In some cases, test methods for the identification and quantification of a specific substance are not available. An example would include $CoCl_2$. Methods currently in practice involve the individual determination of Co and Cl concentrations and use other sources of information or chemical judgment to assign the expected $CoCl_2$ concentration. This approach obviously has its limitations and pitfalls and must be used judiciously.

5.4 Under the REACH regulation, EU manufacturers, importers or distributors of articles containing more than 0.1 % (w/w) of a substance that the Agency has listed as being an SVHC shall provide their customers with the name of the substance and information allowing the safe use of the article. Producers and distributors of articles containing SVHC shall also supply the same information to consumers, upon request. In situations where this information is not readily available from the supply chain it is incumbent upon the supplier to collect this information through actual chemical analysis or other means. This guide is intended to assist in the selection of appropriate test methods in the event that chemical analysis is required.

6. Substance List and Uses

6.1 The substances listed[8] in Table 1 were derived from the ECHA SVHC Candidate List published from October 2008 to June 2018. Any substances that have been subsequently added after June 2018 are not included.

6.2 The CAS or EU numbers are unique identifiers for the substance. It is possible for a particular substance to have one or more commonly used names.

6.3 Common uses of the substance help to identify in which products or materials these substance is likely to be found. Note that the list of common uses is not exhaustive.

7. SVHC Test Methods

7.1 This guide is not intended to be exhaustive in the identification of available test methods. The intent is to provide guidance and some examples of available test methods relevant to the required analysis. Some of the SVHCs do not have industry standard test methods associated with them. Literature citations of these non-standard methods are meant to be for information only.

7.2 Standard test methods do not exist for all of the SVHCs listed. Therefore, the test methods cited for those substances must be validated for analytical accuracy before use in regulatory compliance demonstration. Moreover, when a method is applied outside of its intended scope, validation of the altered method is required. Considerations such as sample matrix, analytical requirements, etc. for the intended analysis will determine its applicability. All deviations from the published method must be clearly noted.

NOTE 1—If a standardized method is used beyond the stated scope, that addition must be validated. All deviations from published methods must be documented.

7.3 In many cases, test methods that are specific for a particular substance have not been developed. Therefore, the approach to quantitative analysis is not straightforward. A combination of test methods and the use of logical assumptions are required. These assumptions shall be clearly articulated because they will determine the limitations of the approach.

7.4 Screening methods can be utilized to determine whether a detectable amount of a substance is present. In many

[8] ECHA, European chemical agency, Candidate List of substances of very high concern for Authorisation, https://echa.europa.eu/candidate-list-table.

TABLE 1 SVHC Substances and Their Common Uses

Substance Name	Synonym	CAS Number	EU Number	Chemical Formula	Common Uses
4,4'-Diaminodiphenylmethane	4,4'-Methylene-dianiline, MDA	101-77-9	202-974-4	$C_{13}H_{14}N_2$	Converted to methylenedipheny diisocyanate (MDI). MDI used for polyurethane production. Other uses include: (1) hardener for epoxy resins and adhesives, (2) basic ingredient of colorant, and (3) intermediate for high-performance polymer.
5-tert-Butyl-2.4.6-Trinitro-m-Xylene	Musk Xylene (2,4,6-Trinitro-1,3-dimethyl-5-t-butylbenzene)	81-15-2	201-329-4	$C_{12}H_{15}N_3O_6$	Used as a fragrant particularly for consumer cosmetic products.
Alkanes, C10-13, chloro	Short Chain Chlorinated Paraffins (SCCP)	85535-84-8	287-476-5	$C_xH_{(2X-y+2)}Cl_y$ where $x=10^{-13}$ and $y=1^{-13}$	May act as a secondary plasticizer or flame retardant in PVC. Other uses include: (1) metal working lubricant, (2) rubber parts, (3) paints, (4) sealant, (5) leather work, and (6) fiber.
Anthracene	Paranaphthalene	120-12-7	204-371-1	$C_{14}H_{10}$	An intermediate in the production of dyes; used in the manufacturer of pyrotechnic products.
Benzyl butyl phthalate	Phthalic acid, benzyl butyl ester	85-68-7	201-622-7	$C_{19}H_{20}O_4$	Plasticizer in flooring material such as PVC foam. Other uses are as a plasticizer in traffic cones, food conveyor belts, artificial leather, etc.
Bis(2-ethylhexyl)phthalate	Dioctylphthalate	117-81-7	204-211-0	$C_{24}H_{38}O_4$	Commonly used as a platicizer in manufacturing of articles made of PVC, resins, rubbers, packaging materials, some paper products, and various medical devices, including the blood bags. It can also be found in some hydraulic fluids or dielectric fluids in capacitors. It is often found in coatings, pigments, textiles, or used as a solvent in light sticks.
Bis (tributyltin) oxide	Distannoxane, hexabutyl-	56-35-9	200-268-0	$C_{24}H_{54}OSn_2$	Primarily used as a biocide for boats, mildew proofing for leather work.
Cobalt dichloride	Cobaltous Chloride	7646-79-9	231-589-4	$CoCl_2$	This substance can be used for (1) humidity indicator, (2) absorbent of ammonia gas, (3) gas mask, (4) production for vitamin $B_1$2, (5) trace amount of nutrient factor for food, (6) trace amount of element for nitric-acid pesticides, (7) solvent in purifying magnesium. Additionally, it may be used for packaging.
Diarsenic pentaoxide	Diarsenic Pentoxide	1303-28-2	215-116-9	As_2O_5	This substance can be used for (1) colorants, (2) metal refining, (3) special glass production, and (4) antiseptic agent for wood.
Diarsenic trioxide	Arsenic Trioxide	1327-53-3	215-481-4	As_2O_3	This substance can be used for (1) decolorants for glasses and enamel, (2) purifying and oxidizing agent in production of special glasses and lead crystal, (3) antiseptic agent for wood, and (4) medicine for leukemia.
Dibutyl phthalate	1,2-Benzenedicarboxylic acid di-n-butyl ester	84-74-2	201-557-4	$C_{16}H_{22}O_4$	Common plasticizer used in various polymers to keep crystals from forming. It is also used in paints, pigments, or printing inks as an adhesive agent. It is soluble in various organic solvents. This property allows it to be used as fixatives in perfumes or as an ectoparasiticide.
Hexabromocyclododecane	Cyclododecane, hexabromo-isomers	25637-99-4	247-148-4	$C_{12}H_{18}Br_6$	Used as a brominated flame retardant for polystyrene materials, for example,, HIPS case material and packaging.
Lead hydrogen arsenate	Lead Acid Arsenate	7784-40-9	232-064-2	$(AsO_4H)Pb$	Insecticide or pesticide
Sodium dichromate dihydrate	Sodium Bichromate	7789-12-0	234-190-3	$Na_2Cr_2O_7.2H_2O$	Used for: (1) production of other chromium compounds, (2) production of inorganic chromate pigments, (3) preservative supplement, finishing of metal plating, (4) production of vitamin K.
Triethyl arsenate	Arsenic acid Triethyl Ester	15606-95-8	427-700-2	$(C_2H_5O)_3AsO$	Used for integrated circuit manufacturing as an intermediate for n-type doping of semiconductors.
2,4-Dinitrotoluene	1-methyl-2,4-dinitrobenzene	121-14-2	204-450-0	$C_7H_6N_2O_4$	2,4-dinitrotoluene is used in the production of toluene diisocyanate, which is used for the manufacture of flexible polyurethane foams. The substance is also used as gelatinizing-plasticizing agent for the manufacture of explosive mixtures (for example, for airbags in cars).
Aluminosilicate Refractory Ceramic Fibres	VITREOUS	142844-00-6			Refractory ceramic fibres are used for high-temperature insulation, almost exclusively in industrial applications (insulation of industrial furnaces and equipment, equipment for the automotive and aircraft/aerospace industry) and in fire protection (buildings and industrial process equipment).

TABLE 1 *Continued*

Substance Name	Synonym	CAS Number	EU Number	Chemical Formula	Common Uses
Anthracene oil	Anthracene Phenanthrene Carbazole	90640-80-5	292-602-7	$C_{14}H_{10}$ $C_{12}H_9N$	The substances are mainly used in the manufacture of other substances such as anthracene and carbon black. They may also be used as reducing agents in blast furnances, as components in bunker fuel, for impregnating, sealing and corrosion protection.
Anthracene oil, anthracene paste	Anthracene Phenanthrene Carbazole	90640-81-6	292-603-2	$C_{14}H_{10}$ $C_{12}H_9N$	The substances are mainly used in the manufacture of other substances such as anthracene and carbon black. They may also be used as reducing agents in blast furnances, as components in bunker fuel, for impregnating, sealing and corrosion protection.
Anthracene oil, anthracene paste, anthracene fraction	Anthracene Phenanthrene Carbazole	91995-15-2	295-275-9	$C_{14}H_{10}$ $C_{12}H_9N$	The substances are mainly used in the manufacture of other substances such as anthracene and carbon black. They may also be used as reducing agents in blast furnances, as components in bunker fuel, for impregnating, sealing and corrosion protection.
Anthracene oil, anthracene paste, distn. lights	Anthracene Phenanthrene Carbazole	91995-17-4	295-278-5	$C_{14}H_{10}$ $C_{12}H_9N$	The substances are mainly used in the manufacture of other substances such as anthracene and carbon black. They may also be used as reducing agents in blast furnances, as components in bunker fuel, for impregnating, sealing and corrosion protection.
Anthracene oil, anthracene-low	Anthracene Phenanthrene Carbazole	90640-82-7	292-604-8	$C_{14}H_{10}$ $C_{12}H_9N$	The substances are mainly used in the manufacture of other substances such as anthracene and carbon black. They may also be used as reducing agents in blast furnances, as components in bunker fuel, for impregnating, sealing and corrosion protection.
Diisobutyl phthalate	Bis(2-methylpropyl) benzene-1,2-dicarboxylate	84-69-5	201-553-2	$C_{16}H_{22}O_4$	Diisobutyl phthalate is used as plasticiser for nitrocellulose, cellulose ether, polyacrylate and polyacetate dispersions, and as a gelling aid in combination with other plasticisers, which are widely used for plastics, lacquers, adhesives, explosive material and nail polish.
Lead chromate	Lead(2+) chromate	7758-97-6	231-846-0	$CrH_2O_4.Pb$	Lead chromate is used for manufacturing pigments and dyes, as a pigment or coating agent in industrial and maritime paint products or for embalming/restoring of art products. Further potential uses include as detergents and bleaches, photosensitive materials and for the manufacture of pyrotechnic powder.
Lead chromate molybdate sulphate red (C.I. Pigment Red 104)	Lead(2+) chromate lead(2+) sulfate lead(2+) molybdate	12656-85-8	235-759-9	$CrH_2O_4.Pb$ $H_2O_4S.Pb$ $PbMoO_4$	Lead chromate molybdate sulphate red (C.I. Pigment Red 104) is used as a colouring, painting and coating agent in sectors such as the rubber, plastic and paints, coatings and varnishes industries. Applications comprise the production of agricultural equipment, vehicles and aircraft as well as road and airstrip painting.
Lead sulfochromate yellow (C.I. Pigment Yellow 34)	Lead(2+) chromate lead(2+) sulfate	1344-37-2	215-693-7	$CrH_2O_4.Pb$ $H_2O_4S.Pb$	Lead sulfochromate yellow (C.I. Pigment Yellow 34) is used as a colouring, painting and coating agent in sectors such as the rubber, plastic and paints, coatings and varnishes industries. Applications comprise the production of agricultural equipment, vehicles and aircraft as well as road and airstrip painting. The substance is further used for camouflage or ammunition marking in the defence area.
Pitch, coal tar, high temperature	anode pitch, binder pitch, clay pigeon binder, electrode pitch, hard pitch, impregnating pitch, soft pitch, vacuum pitch	65996-93-2	266-028-2	not applicable	Pitch, coal tar, high temperature is mainly used in the production of electrodes for industrial applications. Smaller volumes are dedicated to specific uses such as heavy duty corrosion protection, special purpose paving, manufacture of other substances and the production of clay targets.
Tris(2-chloroethyl)phosphate		115-96-8	204-118-5	$C_6H_{12}Cl_3O_4P$	Tris(2-chloroethyl)phosphate is mainly used as an additive plasticiser and viscosity regulator with flame-retarding properties for acrylic resins, polyurethane, polyvinyl chloride and other polymers. Other fields of application are adhesives, coatings, flame-resistant paints and varnishes. The main industrial branches to use TCEP are the furniture, the textile and the building industry.
Zirconia Aluminosilicate Refractory Ceramic Fibres					Refractory ceramic fibres are used for high-temperature insulation, almost exclusively in industrial applications (insulation of industrial furnaces and equipment, equipment for the automotive and aircraft/ aerospace industry) and in fire protection (buildings and industrial process equipment).

TABLE 1 *Continued*

Substance Name	Synonym	CAS Number	EU Number	Chemical Formula	Common Uses
Acrylamide	Prop-2-enamide	79-06-1	201-173-7	C_3H_5NO	Acrylamide is almost exclusively used for the synthesis of polyacrylamides, which are used in various applications, in particular in waste water treatment and paper processing. Minor uses of acrylamide comprise the preparation of polyacrylamide gels for research purposes and as grouting agents in civil engineering.
Ammonium dichromate	Diammonium dichromate, Ammonium bichromate, ammonium chromate, chromic acid [$H_2Cr_2O_7$] diammonium salt, diammonium dichromate, dichromic acid diammonium salt	7789-09-5	232-143-1	$Cr_2H_2O_7.2H_3N$	Ammonium dichromate is mainly used as an oxidising agent. Other known uses are in the manufacture of photosensitive screens and as mordant in the manufacture of textiles. Minor uses seem to comprise metal treatment and laboratory analytical agent.
Boric acid		10043-35-3 11113-50-1	233-139-2 234-343-4	BH_3O_3	Boric acid is widely used on account of its consistency-influencing, flame-retarding, antiseptic and preservative properties. It is a component of detergents and cleaners, adhesives, toys, industrial fluids, brake fluids, glass, ceramics, flame retardants, paints, disinfectants, cosmetics, food additives, fertilisers, insecticides and other products.
Disodium tetraborate, anhydrous	Disodium tetraborate decahydrate, Disodium tetraborate anhydrous, Disodium tetraborate pentahydrate, borax decahydrate, boric acid, disodium salt, borax pentahydrate	1303-96-4 1330-43-4 12179-04-3	215-540-4	$Na_2B_4O_7{\cdot}10H_2O$ $Na_2B_4O_7$ $Na_2B_4O_7{\cdot}5H_2O$	Disodium tetraborate and tetraboron disodium heptaoxide form the same compounds in aqueous solutions. Uses include a multitude of applications, for example, in detergents and cleaners, in glass and glass fibres, ceramics, industrial fluids, metallurgy, adhesives, flame retardants, personal care products, biocides, fertilisers.
Potassium chromate	Dipotassium chromate, Bipotassium chromate, Dipotassium monochromate, Bipotassium monochromate, Neutral potassium chromate, Potassium chromate (VI), Chromate of potash (potass), Chromic acid dipotassium salt	7789-00-6	232-140-5	K_2CrO_4	Potassium chromate is used as a corrosion inhibitor for treatment and coating of metals, for manufacture of reagents, chemicals and textiles, as a colouring agent in ceramics, in the manufacture of pigments/inks and in the laboratory as analytical agent.
Potassium dichromate	Chromic acid [$H_2Cr_2O_7$] dipotassium salt, dichromic acid dipotassium salt, dipotassium bichromate, dipotassium dichromate, Lopezite, potassium bichromate, potassium dichromate[VI], dipotassium dichromium hepta-oxide	7778-50-9	231-906-6	$K_2Cr_2O_7$	Potassium dichromate is used for chrome metal manufacturing and as corrosion inhibitor for treatment and coating of metals. It is further used as textile mordant, as laboratory analytical agent, for cleaning of laboratory glassware, in the manufacture of other reagents and as oxidising agent in photolithography.
Sodium chromate	Disodium chromate, Sodium monochromate, Disodium chromium tetraoxide	7775-11-3	231-889-5	Na_2CrO_4	Sodium chromate is mainly used as an intermediate in the manufacture of other chromium compounds as well as a laboratory analytical agent, but this use is limited. Other potential uses are mentioned in the literature but whether they occur in the EU is not clear.
Tetraboron disodium heptaoxide, hydrate		12267-73-1	235-541-3	$B_4Na_2O_7.x$ H_2O	Disodium tetraborate and tetraboron disodium heptaoxide form the same compounds in aqueous solutions. Uses include a multitude of applications, for example, in detergents and cleaners, in glass and glass fibres, ceramics, industrial fluids, metallurgy, adhesives, flame retardants, personal care products, biocides, fertilisers.
Trichloroethylene	Acetylene trichloride, Ethinyl trichloride, Trichloroethene, TRI, TRIC, 1-Chloro-2,2-dichloroethylene, 1,1,2-Trichloroethylene, Trilene, Triklone® , Trimar. Industrial abbreviations include trichloroethylene, trichlor, Trike, Tricky and trichloroethylene.	79-01-6	201-167-4	C_2 H Cl_3	Trichlororethylene is mainly used as intermediate in the manufacture of chlorinated and fluorinated organic compounds. Other uses are for cleaning and degreasing of metal parts or as solvent in adhesives.
Chromium trioxide	Trioxochromium	1333-82-0	215-607-8	CrO_3	Formulation of mixtures containing chromium trioxide, which are mainly used for for example, metal finishing/surface treatment or in much smaller amounts as catalysts containing chromium trioxide.
Acids generated from chromium trioxide and their oligomers	Dichromic acid ($H_2Cr_2O_7$), hydroxy-(hydroxy(dioxo)chromio)oxy-dioxochromium, Chromic acid (H_2CrO_4), dihydroxy(dioxo)chromium	13530-68-2 7738-94-5	236-881-5 231-801-5	$Cr_2H_2O_7$ CrH_2O_4	Chromic acid, dichromic acid and oligomers of chromic and dichromic acid are spontaneously generated products of the reaction of chromic trioxide with water. Refer to the uses for chromium trioxide.

TABLE 1 *Continued*

Substance Name	Synonym	CAS Number	EU Number	Chemical Formula	Common Uses
Cobalt (II) sulphate	Sulfuric acid, cobalt(2+) salt (1:1),	10124-43-3	233-334-2	CoH_2O_4S	Mainly used in the production of other chemicals. Further applications may include manufacture of catalysts and driers, surface treatments (such as electroplating), corrosion prevention, production of pigments, decolourising (in glass, pottery), batteries, animal food supplement, soil fertilizer, and others.
Cobalt (II) dinitrate		10141-05-6	233-402-1	CoN_2O_6	Mainly used in the production of other chemicals and the manufacture of catalysts. Further applications may include surface treatment and batteries.
Cobalt (II) carbonate		513-79-1	208-169-4	$CoCO_3$	Mainly used in the manufacture of catalysts. Minor uses may include feed additive, production of other chemicals, production of pigments, and adhesion (in ground coat frit).
Cobalt (II) diacetate	Cobalt di(acetate)	71-48-7	200-755-8	$C_4H_6CoO_4$	Mainly used in the manufacture of catalysts. Minor uses may include production of other chemicals, surface treatment, alloys, production of pigments, dyes, rubber adhesion, and feed additive.
2-Methoxyethanol	ethylene glycol monomethyl ether; EGME, Ethanol, 2-methoxy-	109-86-4	203-713-7	$C_3H_8O_2$	Mainly used as solvent, chemical intermediate and additive for fuels.
2-Ethoxyethanol	ethylene glycol monoethyl ether; EGEE, Ethanol, 2-ethoxy-	110-80-5	203-804-1	$C_4H_{10}O_2$	Mainly used as solvent and chemical intermediate.
2-ethoxyethyl acetate	Ethanol, 2-ethoxy-, acetate, Ethylglycol acetate; ethylene glycol mono ethyl ether acetate; 2-EEA; acetic acid, 2-ethoxyethyl ester; ethoxyethanol acetate	111-15-9	203-839-2	$C_6H_{12}O_3$	As solvent in coatings and in the chemical industry, intermediate in the manufacture of cyanoacrylate adhesives.
Strontium chromate	Chromic acid (H_2CrO_4), strontium salt (1:1), Chromium diolatodioxo-strontium salt (1:1), C.I. Pigment Yellow 32, Deep Lemon Yellow, Strontium chromate (VI), Strontium Yellow	7789-06-2	232-142-6	$SrCrO_4$	As corrosion inhibitor in coating mixtures used in the aeronautic / aerospace sector, in the coil coating sector of steel and aluminium and in the vehicle coating sector.
1,2-Benzenedicarboxylic acid, di-C7-11 branched and linear alkyl esters	Di-C_7-11-(linear and branched)-alkyl phthalate, Dialkyl phthalate (C_7-11) branched and linear phthalate ester; 711P; D711P; Di-711-phthalate; Dialkyl(C_7-11-branched and linear) phthalate (DHNUP); Di(heptyl, nonyl, undecyl) phthalate (mixed isomers); Phthalic acid, dialkyl (C_7-$C_1$1) ester; Santicizer 711	68515-42-4	271-084-6	$C_{22}H_{34}O_4$–$C_{30}H_{50}O_4$	As plasticiser in PVC, foam, adhesives and coatings.
Hydrazine	$H_7$0; $H_7$0 (fuel); Levoxine; Nitrogen hydride(N_2H_4);Oxytreat 35	7803-57-8 302-01-2 10217-52-4	206-114-9	H_4N_2	As intermediate in the manufacture of hydrazine derivatives, as a monomer in polymerisations, as a corrosion inhibitor in water treatment and for metal reduction and refining of chemicals. It is also used as a propellant for aerospace vehicles and as fuel in military (emergency) power units.

TABLE 1 *Continued*

Substance Name	Synonym	CAS Number	EU Number	Chemical Formula	Common Uses
1-methyl-2-pyrrolidone	2-Pyrrolidinone, 1-methyl-, 1-Methylpyrrolidin-2-one, 1-Methyl-2-pyrrolidinone 1-Methyl-5-pyrrolidinone 1-Methylazacyclopentan-2-one 1-Methylpyrrolidone AgsolEx 1 M-Pyrol Microposit 2001 N 0131 N-Methyl-α-pyrrolidinone N-Methyl-α-pyrrolidone N-Methyl-γ-butyrolactam N-Methyl-2-ketopyrrolidine N-Methyl-2-pyrrolidinone N-Methyl-2-pyrrolidone N-Methylbutyrolactam N-Methylpyrrolidone NMP NSC 4594 Pharmasolve Pyrol M SL 1332	872-50-4	212-828-1	C_5H_9NO	As solvent in coatings, cleaning products, for electronic equipment manufacture, as well as in semiconductor industry, petrochemical processing, pharmaceuticals and agrochemicals.
1,2,3-trichloropropane	Propane, 1,2,3-trichloro-, Allyl trichloride; Glycerol trichlorohydrin; Glyceryl trichlorohydrin; NSC 35403; Trichlorohydrin;	96-18-4	202-486-1	$C_3\ H_5\ Cl_3$	Intermediate in the manufacture of chlorinated solvents and agricultural products. It is also used as monomer. In the past, it was used as solvent, paint and varnish remover and as degreasing agent.
1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich	C_6-8-(branched)-Alkyl benzene-1,2-dicarboxylate, C_6-8-(branched)-Alkyl phthalate, Diisoheptyl phthalate, DIHP	71888-89-6	276-158-1		As plasticiser in PVC and in sealants, coatings and potentially printing inks.
Dichromium tris(chromate)	Chromic acid (H_2CrO_4), chromium(3+) salt (3:2), Dichromium(3+) trichromate, Chromic chromate, Chromium (III) chromate, Dichromium Trischromate, Accomet C; other trade names are confidential	24613-89-6	246-356-2	Cr_5O_{12} $CrH_2O_4.2/3Cr$	In mixtures for metal surface treatment in the aeronautic/aerospace, steel, and aluminium coating industries.
Potassium hydroxyoctaoxodizincatedi-chromate		11103-86-9	234-329-8		Aeronautic/ aerospace coating, steel and aluminium coil coating, and vehicle coating.
Pentazinc chromate octahydroxide	Zinc chromate hydroxide (Zn5(CrO_4)(OH)8), Zinc tetraoxychromate, Zinc tetroxy chromate, Zinc chromate, hydroxide, Basic zinc chromate, Zinc chromate, Trizinc, dioxido(dioxo)chromium dihydroxide	49663-84-5	256-418-0	$CrH_8O_{12}Zn_5$	Vehicle coating and aeronautic / aerospace coating.
Formaldehyde, oligomeric reaction products with aniline (technical MDA)	Formaldehyde, polymer with benzenamine, polymeric MDA3, PMDA, MDA, technical grade, crude MDA	25214-70-4	500-036-1	$(C_6H_7N.CH_2O)x$	Manufacture of other substances. Minor uses are as ion exchange resins in nuclear power plants, as hardener for epoxy resins.
Bis(2-methoxyethyl) phthalate	1,2-Benzenedicarboxylic acid, 1,2-bis(2methoxyethyl) ester, Di(methoxyethyl) phthalate, Bis(methylglycol) phthalate	117-82-8	204-212-6	$C_{14}H_{18}O_6$	Plasticiser in polymeric materials and paints, lacquers and varnishes, including printing inks.
2-Methoxyaniline; o-Anisidine	Benzenamine, 2-methoxy-, 2-methoxybenzenamine	90-04-0	201-963-1	C_7H_9NO	Manufacture of dyes for tattooing and coloration of paper, polymers and aluminium foil.
4-(1,1,3,3-Tetramethylbutyl)phenol, (4-tert-Octylphenol)	4-(2,4,4-trimethylpentan-2-yl)phenol, Phenol, 4-(1,1,3,3-tetramethylbutyl)-	140-66-9	205-426-2	$C_{14}H_{22}O$	Manufacture of polymer preparations and of ethoxylate surfactants. Also used as a component in adhesives, coatings, inks and rubber articles.

TABLE 1 *Continued*

Substance Name	Synonym	CAS Number	EU Number	Chemical Formula	Common Uses
1,2-Dichloroethane	Ethane, 1,2-dichloro-, Ethylene dichloride, dichloroethylene, 1,2-DCE,, 1,2-EDC	107-06-2	203-458-1	$C_2 H_4 Cl_2$	Manufacture of other substances. Minor uses as solvent in chemical and pharmaceutical industries.
Bis(2-methoxyethyl) ether	Ethane, 1,1'-oxybis[2-methoxy-, 1-methoxy-2-(2-methoxyethoxy)ethane, Diglyme, DEGDME, Diethylenglycoldimethylether, Dimethyldiglycol, 2-(2-Methoxyethoxy)-1-methoxyethane, 2,5,8-Trioxanonane, Di(2, Methoxyethyl) ether, Dimethyl carbitol, Ether, bis(2-methoxyethyl), 1,1'-Oxybis[2-methoxyethane], Methyldiglyme, (CAS registry numbers still in use: 70-992-86-8, 54631-70-8, 142939-39-7 although deleted in CAS, registry)	111-96-6	203-924-4	$C_6H_{14}O_3$	Used primarily as a reaction solvent or process chemical in a wide variety of applications. Also used as solvent for battery electrolytes, and possibly in sealants, adhesives, fuels and automotive care products.
Arsenic acid	Arsenic acid (H_3AsO_4), arsenic acid, trihydroxidooxidoarsenic (IUPAC 2005), Orthoarsenic acid	7778-39-4	231-901-9	AsH_3O_4	Mainly used to remove gas bubbles from ceramic glass melt (fining agent) and in production of laminated printed circuit boards. Also used in the manufacture of semiconductors and as laboratory agent.
Calcium arsenate	Arsenic acid (H_3AsO_4), calcium salt (2:3), Tricalcium(2+) diarsenate, Arsenic acid calcium salt; calcium orthoarsenate; tricalcium arsenate	7778-44-1	231-904-5	$As_2Ca_3O_8$	Present in complex raw materials that are used mainly for copper and lead refining. Also used to precipitate nickel from the molten metal and to manufacture diarsenic trioxide.
Trilead diarsenate	Arsenic acid (H_3AsO_4), lead salt (2:3), Trilead (2+) diarsenate, Lead (II) arsenate, lead arsenate	3687-31-8	222-979-5	$As_2O_8Pb_3$	Present in complex raw materials for manufacture of copper, lead and a range of precious metals.
N,N-dimethylacetamide (DMAC)	Acetamide, N,N-dimethyl-, Acetdimethylamide, DMA, DMAA, DMAc, Dimethylamide acetate, N,N-Dimethylethanamide	127-19-5	204-826-4	$C_4 H_9 N O$	Used as solvent, mainly in the manufacture of various substances and in the production of fibres for clothing. Also used as reagent, and in products such as industrial coatings, insulation paper, polyimide films, paint strippers and ink removers.
2,2'-Dichloro-4,4'-methylene-dianiline (MOCA)	4,4'-methylenebis[2-chloroaniline], Benzenamine, 4,4'-methylenebis[2-chloro-, Bisamine A, 2,2'-Dichloro-4,4'-methylenedianiline, 3,3'-Dichloro-4,4'-diaminodiphenylmethane, Bis(4-amino-3-chlorophenyl)methane	101-14-4	202-918-9	$C_{13}H_{12}Cl_2 N_2$	Mainly used as curing agent in resins and in the production of polymer articles and also for manufacture of other substances.
Phenolphthalein	1(3H)-Isobenzofuranone, 3,3-bis(4-hydroxyphenyl)-; 3,3-Bis(4-hydroxyphenyl)-2-benzofuran-1(3H)-one; 3,3-Bis(p-hydroxyphenyl)phthalide; 3,3-Bis(4-hydroxyphenyl)phthalide; 3,3-Bis(4-hydroxyphenyl)-1(3H)-isobenzofuranone	77-09-8	201-004-7	$C_{20}H_{14}O_4$	Mainly used as laboratory agent (pH indicator solutions). Minor uses are in pharmaceutical preparations and in some special applications.
Lead azide Lead diazide	Lead azide ($Pb(N_3)2$); Lead(2+) diazide	13424-46-9	236-542-1	$N_6 Pb$	Mainly used as initiator or booster in detonators for both civilian and military uses and as initiator in pyrotechnic devices.
Lead styphnate	lead 2,4,6-trinitro-m-phenylene dioxide; 1,3-Benzenediol, 2,4,6-trinitro-, lead(2+) salt (1:1); Lead(2+) 2,4,6-trinitrobenzene-1,3-diolate; 2,4-Dioxa-3-plumbabicyclo[3.3.1]nona-1(9),5,7-triene; 3,3didehydro-6,8,9-trinitro-; Lead, [styphnato(2-)]-; Resorcinol, 2,4,6-trinitro-, lead(2+) salt (1:1); Lead styphnate; Lead tricinate; Lead trinitroresorcinate; Tricinat	15245-44-0	239-290-0	$C_6 H N_3 O_8 Pb$	Mainly used as a primer for small calibre and rifle ammunition. Other common uses are in ammunition pyrotechnics, powder actuated devices and detonators for civilian use.

TABLE 1 *Continued*

Substance Name	Synonym	CAS Number	EU Number	Chemical Formula	Common Uses
Lead dipicrate	Phenol, 2,4,6-trinitro-, lead(2+) salt (2:1); Lead(2+) bis(2,4,6-trinitrophenolate); Lead, bis(picryloxy)-; Phenol, 2,4,6-trinitro-, lead(2+) salt; Picric acid, lead(2+) salt; Lead(II) picrate	6477-64-1	229-335-2	$C_{12}H_4\ N_6\ O_{14}Pb$	The substance is an explosive like lead diazide and lead styphnate.
1,2-bis(2-Methoxyethoxy)ethane (TEGDME; triglyme)	2,5,8,11-tetraoxadodecane; Triglyme; TEGDME Triethylene glycol dimethyl ether; Ansul Ether 161; DMTG; Ethane, 1,2-bis(2-methoxyethoxy)-; Glyme 4; Hisolve MTM; Methyltriglyme; NSC 66400	112-49-2	203-977-3	$C_8H_{18}O_4$	Triglyme is used as an inert solvent for grignard-, reduction- and alkylation-reactions. Reactions involving alkali metals can be carried out in triglyme and alkali metal dispersions in triglyme are used for etching of Teflon and Fluoropolymers. Triglyme is also used as an inert solvent for reduction reactions using Sodium borohydride and used as a solvent to carry out methylation reactions using dimethyl carbonate (and other dialkyl carbonates). Triglyme is also used as part of absorbing liquids in the industrial cleaning of gases. Triglyme has been reported to be used in Brake fluids.
1,2-Dimethoxyethane; ethylene glycol dimethyl ether (EGDME)	Ethane, 1,2-dimethoxy-; EGDME; Ethylene glycol dimethyl ether; 1,2-Dimethoxyethane; 1,2-Ethanediol, dimethyl ether; 2,5-Dioxahexane;DME; DME (glycol ether); Dimethyl Cellosolve; Ethylene dimethyl ether; Glycol dimethyl ether; Glyme;Hisolve MMM; Monoethylene glycol dimethyl ether; Monoglyme; NSC 60542; α,β-Dimethoxyethane.	110-71-4	203-794-9	$C_4H_{10}O_2$	EGDME is used as a solvent or processing aid in the manufacture or formulation of industrial chemicals. The large majority of the EGDME sold by the producer is used as a site limited processing aid for industrial chemical manufacture.
Ammoniumpentadecafluoro otanoate (APFO)	APFO	3825-26-1	223-320-4	$C_8H_4NF_{15}NO_2$	PFOA is used as a group name for PFOA and its salts, and PFOA is mainly produced and used as its ammonium salt, ammoniumpentadecafluorootanoate (APFO, CAS Number: 3825-26-1). However, the perfluorooctanoate anion is the molecule of primary interest. APFO and PFOA are sometimes used interchangeably as both PFO-anion and PFOA (neutral species) exist in solution.

TABLE 1 *Continued*

Substance Name	Synonym	CAS Number	EU Number	Chemical Formula	Common Uses
C.I. Basic Blue 26 ([4-[[4-anilino-1-naphthyl][4-(dimethylamino) phenyl]methylene]cyclohexa -2,5-dien-1-ylidene] dimethylammonium chloride)	Methanaminium, N-[4-[[4-(dimethylamino)phenyl][4-(phenylamino)-1-naphthalenyl]methylene]-2,5-cyclohexadien-1-ylidene]-N-methyl-, chloride (1:1); 4-[[4-(Dimethylamino)phenyl][4-(phenylamino)naphthalen-1-yl]methylidene}-N,N-dimethylcyclohexa-2,5-dien-1-iminium Chloride; C.I. Basic Blue 26; Methanaminium, N-[4-[[4-(dimethylamino)phenyl][4-(phenylamino)-1-naphthalenyl]methylene]-2,5-cyclohexadien-1-ylidene]-N-methyl-; chloride; Victoria Blue B; ADC Victoria Blue B; Aizen Victoria Blue BH; BTK Victoria Blue; Basazol C Blue 57; Basic Blue; 26; Basic Blue B; Basic Victoria Blue B; Basonyl Blue 640; Basonyl Blue 644; Basovict Victoria Blue; C-WR Blue 8; C.I. 44045; Calcozine Blue B; Conbasic Blue AK; Dycosbasic Victoria Blue B; Flexo Blue 630; Flexo Blue 640; Hecto Blue B; Hidaco Victoria Blue B; Libbase Victoria Blue LB; Lowacryl Blue 26; Mitsui Victoria Blue B; Ravi Victoria Blue ;Tertrophene Blue; Victoria Blue; Victoria Blue 2B; Victoria Blue B 353; Victoria Blue B chloride; Victoria Blue BA; Victoria Blue BH; Victoria Blue BN; Victoria Blue BN CI 44045; Victoria Blue BP; Victoria Blue BS; Victoria Blue BSA; Victoria Blue BX; Victoria Blue FB; Victoria Pure Blue B; Victoria Pure Blue BC	2580-56-5	219-943-6	$C_{33}H_{32}ClN_3$	Basic Blue 26 is used in inks, dyes, paints, and pigments. Among potential uses registered by companies in the Colour Index (2012)7, for products (dyestuff) containing Basic Blue 26, are in printing inks (according to Gessner and Mayer, 2000, melted in oleic or stearic acid), spirit inks, and pigments. According to Denmal et al. (2010), blue and black ball point pen inks may contain Basic Blue 26; with around 80% of blue and black ball point pen inks containing “Basic Violet 3 and its homologues”.
C.I. Basic Violet 3	[4-[4,4’-bis(dimethylamino) benzhydrylidene]cyclohexa-2,5-dien-1-ylidene] dimethylammonium chloride; Methanaminium, N-[4-[bis[4-(dimethylamino)phenyl] methylene]-2,5-cyclohexadien-1-ylidene]-N-methyl-, chloride(1:1); 4-{Bis[4-(dimethylamino)phenyl] methylidene}-N,N-dimethylcyclohexa-2,5-dien-1-iminium; Chloride; Basic Violet 3; Crystal Violet Technical; Crystal Violet USP; Gentersal; Gentian violet; Gentian Violet B; Gentiaverm; Genticid; Gentioletten; Hecto Violet R; Hectograph Violet SR; Hexamethyl violet; Hexamethyl-p-rosaniline chloride; Hexamethylpararosaniline chloride	548-62-9	208-953-6	$C_{25}H_{30}ClN_3$	The main uses of C.I. Basic Violet 3 are as a dye in ink applied in cartridges for printers and in ball pens and as dyestuff for paper colouring. Minor dyestuff uses include carbon papers (where dyestuff is suspended in wax and applied to a thin impregnated paper), staining of dried flowers/plants (dried plants dyed by immersion in a hot water solution of the dyestuff) and as a marker (i.e. where dyestuff is used to improve the visibility of a liquid). Furthermore, C.I. Basic Violet 3 is used in microbial and clinical laboratories (for example, as stain to distinguish gram negative from gram positive bacteria) in presumably thousands of laboratories and teaching institutions around Europe.

TABLE 1 *Continued*

Substance Name	Synonym	CAS Number	EU Number	Chemical Formula	Common Uses
C.I. Solvent Blue 4;(α,α-bis[4-(dimethylamino)phenyl]-4 (phenylamino)naphthalene -1-methanol);	[4-(Dimet; hylamino)-5,8-dihydronaphthalen-1-yl]{bis[4-(dimethylamino)phenyl]}methanol; Victoria Blue B; Base B Baso Blue 645; Aizen Victoria Blue B Base; Brilliant Oil Blue B Base; C.I. 44045B; Fast Oil Blue B Base; Victoria Blue B Base; - Victoria Blue BA Base; Victoria Blue BDP Base; Victoria Blue Base; Victoria Blue Base B; Victoria Blue Base FB; Waxoline Victoria Blue B	6786-83-0	229-851-8	$C_{33}H_{33}N_3$ O	The main use of the substance is in the production of inks.
C.I. Solvent Violet 8;(4,4'-bis (dimethylamino)-4''-(methylamino) trityl alcohol)	Benzenemethanol, α,α-bis[4-(dimethylamino)phenyl]-4-(methylamino)-; Bis[4-(dimethylamino)phenyl][4-(methylamino)phenyl]methanol;	561-41-1	209-218-2	$C_{24}H_{29}N_3$ O	Uses of 4,4'-bis(dimethylamino)-4''-(methylamino)trityl alcohol are as formulation and production of writing inks.
Di-n-pentyl phthalate		131-18-0	205-017-9		Undetermined
Diboron trioxide, boric oxide	Boron oxide (B_2O_3); diboron trioxide	1303-86-2	215-125-8	B_2O_3	Undetermined
Diisopentylphthalate		605-50-5	210-088-4		Undetermined
Distillates (coal tar), heavy oils		90640-86-1	292-607-4		Undetermined
Distillates (coal tar), heavy oils, pyrene fraction		91995-42-5	295-304-5		Undetermined
Distillates (coal tar), pitch, pyrene fraction		91995-52-7	295-313-4		Undetermined
Formamide		75-12-7	200-842-0	CH_3NO	Although formamide is not registered for consumer use it was measured in toys like wooden toys (Danish EPA, 2005) and foam puzzle mats as well as in fitness and exercise mats which are made of ethylene vinyl acetate (EVA).
Further Arsenic compounds					Undetermined
Lead(II) bis(methanesulfonate)	Methanesulfonic acid, lead(2+) salt (2:1); Methanesulfonic acid, lead(2+) salt; Lead methane sulphonate; Lead salt FP (trade name); Methanesulfonicacid,lead(2+)salt; Lead Methane Sulfate; lmethanesulfonic acid, lead(II) salt; Lead methyl sulfonate	17570-76-2	401-750-5	C_2 H_6 O_6 Pb S_2	Methanesulphonic acid-based plating technology is the dominant electrolytic plating process for high-speed reel-to-reel processing of electronic components.

TABLE 1 *Continued*

Substance Name	Synonym	CAS Number	EU Number	Chemical Formula	Common Uses
Michler's Base; (N,N,N',N'-tetramethyl-4,4'-methylenedianiline)	Benzenamine, 4,4'-methylenebis[N,N-dimethyl-; 4,4'-methylenebis(N,N-dimethylaniline); Aniline, 4,4'-methylenebis[N,N-dimethyl-(6Cl,7Cl,8Cl); Aniline, p,p'-methylenedi-(4Cl); 4,4'-(Dimethylamino)diphenylmethane; 4,4'-Bis(dimethylamino)diphenylmethane; 4,4'-Bis(dimethylaminophenyl)methane; 4,4'-Methylenebis[N,N-dimethylaniline]; 4,4'-Methylenebis[N,N dimethylbenzenamine]; 4,4'-Tetramethyldiaminodiphenylmethane; Arnold's base; Bis[4-(N,N-dimethylamino)phenyl]methane; Bis[4-(dimethylamino)phenyl]methane; Bis[p-(N,N-dimethylamino)phenyl]methane; Bis[p- (dimethylamino)phenyl]methane; Michler's Base; Michler's hydride; Michler's methane; N,N,N',N-Tetramethyl-4,4'-methylenedianiline; N,N,N',N'-Tetramethyl-4,4'-diaminodiphenylmethane; N,N,N',N'-Tetramethyl-p,p'-diaminodiphenylmethane; NSC 36782; NSC 4892; NSC 9029; Reduced Michler's ketone; Tetrabase; Tetramethyldiaminodiphenylmethane; p,p'-Bis(dimethylamino)diphenylmethane; p,p'-Tetramethyldiaminodiphenylmethane	101-61-1	202-959-2	$C_{17}H_{22}N_2$	Used as chemical intermediate in the manufacture of dyes and pigments, also used as chemical intermediate in the manufacture of its hydrochloric salt. The latter is used as an analytical reagent for the determination of lead.
Michler's Ketone; (4,4'-bis(dimethylamino) benzophenone)	Methanone, bis[4-(dimethylamino)phenyl]-; bis[4-(dimethylamino)phenyl]methanone; Benzophenone, 4,4'-bis(dimethylamino)-(6Cl,8Cl); 4,4'-Bis(N,N-dimethylamino)benzophenone; 4,4'-Bis(dimethylamino)benzophenone; 4,4'-Tetramethyldiaminobenzophenone; Bis(4-dimethylaminophenyl) ketone; Bis[(4-dimethylamino)phenyl]methanone; Bis[p-(N,N-dimethylamino)phenyl] ketone; DABP; Di(p-dimethylamino)benzophenone; Michler's ketone; N,N,N',N'-Tetramethyl-4,4'-diaminobenzophenone; NSC 9602; Nisso Cure MABP; S 112; S 112 (ketone); p,p'-Bis(dimethylamino)benzophenone; p,p'-Tetramethyldiaminobenzophenone	90-94-8	202-027-5	$C_{17}H_{20}N_2O$	Michler's ketone is an important intermediate in the manufacture of triphenylmethane dyes.
Perfluorooctanic acid (PFOA)	Pentadecafluorooctanoic acid	335-67-1	206-397-9	$C_8HF_{15}O_2$ (PFOA)	PFOA is used in a variety of commercial applications as refrigerants, surfactants and polymers, and as components of pharmaceuticals, fire retardants, lubricants, adhesives, paints, cosmetics, paper coatings, and insecticides.
Residues (coal tar), pitch distn.		92061-94-4	295-507-9		Undetermined

TABLE 1 *Continued*

Substance Name	Synonym	CAS Number	EU Number	Chemical Formula	Common Uses
TGIC (1,3,5-tris(oxiranylmethyl) -1,3,5-triazine-2,4,6(1H,3H,5H) -trione)	1,3,5-Triazine-2,4,6(1H,3H,5H)-trione, 1,3,5-tris(2-oxiranylmethyl)- (a combination of α and ß isomers of TGIC); 1,3,5-Tris(oxiran-2-ylmethyl)-1,3,5-triazinane-2,4,6-trione (a combination of α and ß-isomers); triglycidyl isocyanurate; TGIC; 1,3,5-triglycidyl isocyanurate; 1,3,5-triglycidyl-s-triazinetrione; 1,3,5-tris(2,3-epoxypropyl)-s-triazine-2,4,6(1H,3H,5H)-; trione; tris(2,3-epoxypropyl)isocyanurate; 1,3,5-Triglycidyl-s-triazine-2,4,6-trione; 1,3,5-Triglycidylhexahydro-1,3,5-triazine-2,4,6-trione; 1,3,5-Triglycidylisocyanuric acid; 1,3,5-Tris(2,3-epoxypropyl) isocyanurate; 1,3,5-Tris(oxiran-2-ylmethyl)-1,3,5-triazine-2,4,6-trione; 1,3,5-Tris(oxiranylmethyl)-1,3,5-triazine-2,4,6-trione; Glycidyl isocyanurate; N,N',N''-Triglycidyl isocyanurate; NSC 269934; PTGIC; TGT; Triglycidyl isocyanurate; Tris(2,3-epoxypropyl) isocyanurate; Tris(epoxypropyl) isocyanurate; TEPIC; Araldite PT 810; TK 10622	2451-62-9	219-514-3	$C_{12}H_{15}N_3O_6$	TGIC is an epoxy compound that is used as a hardener in resins and coatings. The main use is in polyester powder coatings for metal finishing.
β-TGIC; (1,3,5-tris[(2S and 2R)-2,3-epoxypropyl]-1,3,5-triazine-2,4,6-(1H,3H,5H)-trione)	1,3,5-Triazine-2,4,6(1H,3H,5H)-trione, 1,3,5-tris[(2R)-2-oxiranylmethyl]-, rel-; reaction mass of 1,3,5-tris[(2R)-oxiran-2-ylmethyl]-1,3,5-triazinane-2,4,6-trione and 1,3,5-tris[(2S)-oxiran-2-ylmethyl]1,3,5-triazinane-2,4,6-trione; triglycidyl isocyanurate; TGIC; 1,3,5-triglycidyl isocyanurate;1,3,5-triglycidyl-s-triazinetrione; 1,3,5-tris(2,3-epoxypropyl)-s-triazine-2,4,6(1H,3H,5H)-trione; tris(2,3-epoxypropyl)isocyanurate; ß—Triglycidyl isocyanates; NSC 296964; TEPIC-H	59653-74-6	423-400-0	$C_{12}H_{15}N_3O_6$	TGIC is an epoxy compound that is used as a hardener in resins and coatings. The main use is in polyester powder coatings for metal finishing.
Cadmium	Cd rod Cd stangen kadmium stangen	7440-43-9	231-152-8	Cd	In the environment cadmium is mainly associated with zinc but also with lead and copper. Anthropogenic sources include by-products of the metallurgy of these elements. The release of cadmium into the human environment occurs via emission from mining activities and metal industries (the smelting of other metals), the combustion of fossil fuels, the incineration of waste materials or inappropriate waste disposal, leaching from landfill sites and the use of cadmium-rich phosphate fertilizers and sewage sludge. These anthropogenic activities have contributed to the contamination by cadmium of the food chain. However, there are also areas with naturally elevated cadmium concentrations in soil. Because cadmium is easily taken up by many plants, plant-based food, in particular wheat, rice and potatoes, is a major source of exposure to cadmium. Another source of exposure is tobacco smoking, mainly because the absorption in the lungs is higher than in the gastrointestinal tract.