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The defence sector's criteria document – chemical substances, chemical products, and articles

(This document is the English translation of the Swedish original document 24FMV838-2, v 14.0, dated 2024-01-29.)

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1 Introduction

1.1 About the Criteria document

The purpose of the Criteria document is to restrict the use of substances hazardous to human health and the environment in chemical products and articles (equipment) used by the authorities of the defence sector (the Swedish Armed Forces, the Swedish Defence Material Administration, the Swedish Defence University, the National Defence Radio Establishment, the Swedish Defence Research Agency, and the Swedish Fortifications Agency). This is part of the defence sector's work to contribute to achieving the national environmental quality objectives *A Non-Toxic Environment*.

The Criteria document is a tool for the defence sector's authorities to establish work environment and environmental requirements on chemical products and articles. This document is intended to be used as a requirement specification when procuring and purchasing chemical products and articles, as well as a basis for decisions for replacement of hazardous substances.

The requirements in the Criteria document are based on the properties of chemical substances (see table 1). All chemical products and articles delivered to the authorities of the defence sector shall to the furthest extent possible be free from substances that are classified as fatal, carcinogenic, mutagenic, toxic for reproduction, organ toxic, allergenic, environmentally hazardous, climate changing and ozone depleting. In addition to this, there are several specific substances whose use is limited (see table 2). There are also limitations to the use of substances in articles that can induce hazardous health and environmental effects (see table 3).

Regardless of if chemical products meet the criteria in this document or not, they shall be included in the organisation's systematic management of the working environment since they may be subject to risk assessment requirements for chemical hazards or CMR-investigation in the working environment (e.g., AFS 2011:19).

The basis of this criteria document are the EU regulations REACH[1] and CLP[2], and the requirements of these regulations. To promote security of supply and the development of chemical products and articles that cause as little harmful effects as possible on human health and on the environment, this Criteria document does in many cases postulate more advanced requirements than the current legislation.

The Criteria document includes a common set of requirements established through a cooperation of the authorities in the defence sector. Each authority will subsequently make individual decisions on the application of the Criteria document. The Criteria document is administrated and updated by the defence sector's chemical group, Ag Kemi. The group consists of representatives from all authorities in the defence sector.

The latest version of the Criteria document can be requisitioned from the respective authority's website. Please note that specific agreements may refer to older versions of the Criteria document, and that the version stated in the agreement is the one that is applicable.

1.2 Limitations

The following product groups are not covered by the Criteria document:

Pesticides, chemical weapons according to the Chemical Weapons Convention[3], radioactive substances, pharmaceuticals, and chemical products intended for scientific research and development.

The limitations are justified by that the product groups are covered by other legislations, and that hazardous substances are essential for the function of the product.

1.3 Exemptions from the criteria

The exemptions and how they are applied are described in detail in section 3, as well as in the flow charts in section 2. There are two types of exemptions to the criteria:

1. **General exemptions for certain substances, products and articles.**
   List of substances and products that are exempt from the criteria, given that substitution isn't possible.
2. **Specific exemptions for certain chemical products or articles.**
   If the substance or product is subjected to the criteria and there are no general exemptions, there is the possibility to apply for a specific exemption.

1.4 Appendices

Appendix 1: Examples of substances covered by the restrictions in section 2 with motivation.
Appendix 2: Examples of relevant legislation regarding chemicals.
Appendix 3: Change log.

1.5 Definitions

A chemical product[4] is defined as **a substance,** or as **a mixture** of two or more substances. Acetone and urea are examples of chemical products that are substances. Examples of chemical products that are mixtures are paints and fuels.

A substance[5] is defined as a chemical element and its compounds, including any additives necessary to preserve stability, as well as and any impurity deriving from the manufacturing process, but excluding solvents that can be separated without affecting the stability of the substance or changing its composition.

A mixture[5] is defined as a mixture or solution comprised of two or more substances.

An article[6] is defined as an object which during its production is given a special shape, surface or design that determines its function to a greater degree than its chemical composition. Examples of articles in the defence sector are equipment such as vehicles, gaskets, tents, windows, desks, computers and uniforms.

2 Requirements of the Criteria document

Note that compliance with the Criteria document does not relieve any party of the responsibility to comply with chemicals legislation in Sweden and in the EU.

2.1 Chemical products

Table 1 lists the criteria's that apply to chemical products. Chemical products, substances or mixtures that are classified according to CLP with the following listed hazard statements shall not occur.

Table 1. Chemical products that are classified with the following hazard statements shall not occur.[7]

Hazard statement		Pictogram	Signal word
H300	Fatal if swallowed (Hazard category 1 and 2)		Danger
H310	Fatal in contact with skin (Hazard category 1 and 2)		Danger
H317	May cause an allergic skin reaction (Hazard category 1, 1A and 1B)		Warning
H330	Fatal if inhaled (Hazard category 1 and 2)		Danger
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled (Hazard category 1, 1A and 1B)		Danger
H340	May cause genetic defects (Hazard category 1, 1A and 1B)		Danger
H350	May cause cancer (Hazard category 1, 1A and 1B)		Danger
H350i	May cause cancer by inhalation (Hazard category 1, 1A and 1B)		Danger
H360FD	May damage fertility. May damage the unborn child (Hazard category 1A and 1B)		Danger
H360F	May damage fertility (also H360Fd) (Hazard category 1A and 1B)		Danger
H360D	May damage the unborn child (also H360Df) (Hazard category 1A and 1B)		Danger
H362	May cause harm to breast-fed children	-	-
H370	Causes damage to organs (Hazard category 1)		Danger
EUH380	May cause endocrine disruption in humans		Danger
H410	Very toxic to aquatic life with long lasting effects (Hazard category 1)		Warning
H420	Harms public health and the environment by destroying ozone in the upper atmosphere (Hazard category 1)		Warning

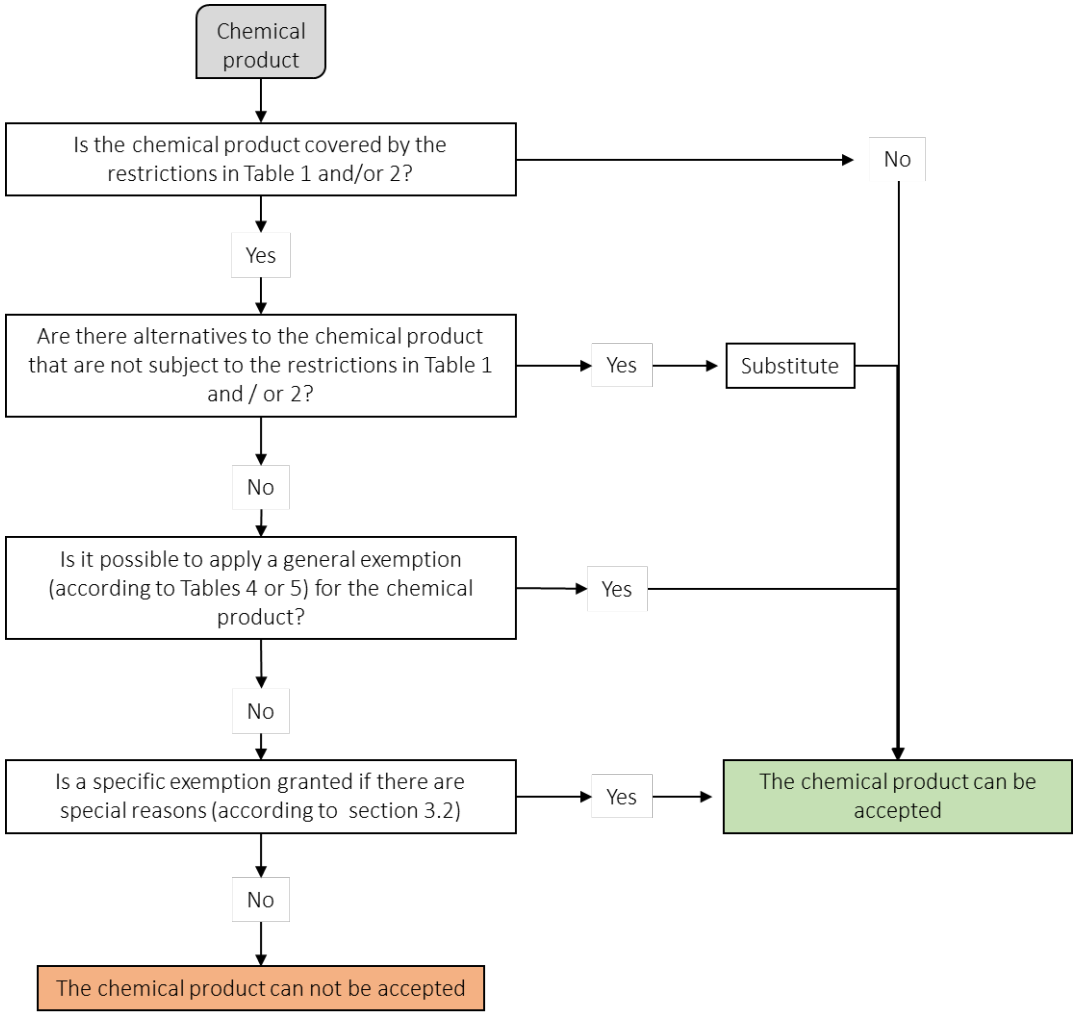
Hazard statement		Pictogram	Signal word
EUH440	Accumulates in the environment and living organisms including in humans (PBT)		Danger
EUH441	Strongly accumulates in the environment and living organisms including in humans (vPvB)		Danger
EUH450	Can cause long-lasting and diffuse contamination of water resources (PMT)		Danger
EUH451	Can cause very long-lasting and diffuse contamination of water resources (vPvM)		Danger

Table 2 shows additional restrictions on chemical products at a substance level. These substances are not necessarily covered by the criteria in Table 1 but are nevertheless important to limit because of their health and environmental hazardous properties.

Table 2. Additional restrictions for chemical products.

Substances with PBT-properties[8] **shall not be present** in concentrations ≥ 0.1 %
Substances with vPvB-properties[8] **shall not be present** in concentrations ≥ 0.1 %
Substances on the Candidate List[9] **shall not be intentionally added**[10]
Substances with a GWP-factor[11] above 150 (calculated over 100 years) **shall not be intentionally added**[12]
Substances explicitly identified by the defence sector[13] **shall not be intentionally added** • Dichloromethane/Methylene chloride (75-09-2) • Propyl paraben (94-13-3) • Bisphenol F (620-92-8) and AF (1478-61-1) • PFAS substances[14]
The defence sector specially identified substances[15] – **should be avoided**[16] Application for exemption is not required. • Toluene (108-88-3) • Styrene (100-42-5)

The following flowchart shows how the criteria document shall be applied to chemical products and how to determine whether a chemical product can or cannot be accepted based on its contents/properties.



2.2 Articles

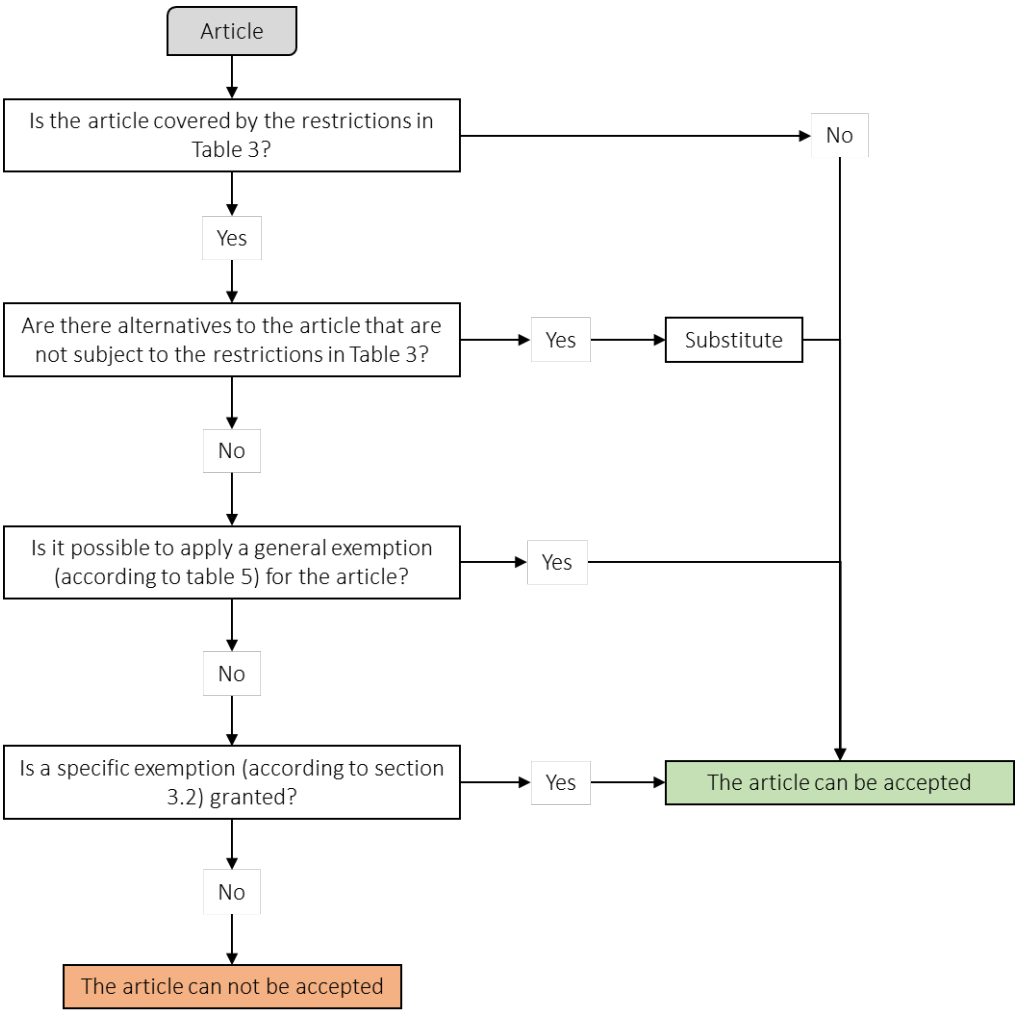
Table 3 shows **restrictions** on substances/groups of substances present in articles. The restrictions are based on properties that may cause severe health and environmental effects.

Note that the concentration limit of 0.1 % shall be calculated for each individual article according to REACH (see Appendix 2).

Table 3. Restrictions on substances/groups of substances in articles.[17]

Substances with CMR-properties[18] in category 1A or 1B according to the CLP regulation (EC regulation No 1272/2008) **shall not be present** ≥ 0.1 %
Substances with PBT-properties[19] **shall not be present** ≥ 0.1 %
Substances with vPvB-properties[19] **shall not be present** ≥ 0.1 %
Substances on the Candidate List[20] **shall not be present** ≥ 0.1 %
Substances with a GWP-factor[21] above 150 (calculated over 100 years) **shall not be intentionally added**[22,23]
Ozone-depleting substances[24] **shall not be intentionally added**
Substances specifically identified by the defence sector[25] - **shall not be intentionally added** • Lead and its compounds/salts • Cadmium and its compounds/salts • Mercury and its compounds/salts • Polybrominated biphenyls (PBBs) • Polybrominated diphenyl ethers (PBDE) • Propyl paraben (94-13-3) • Bisphenol F (620-92-8) and AF (1478-61-1)
The defence sector's specially identified substances – **should be avoided**[26] (application for exemption is not required) • PFAS substances[14] Available information about articles, or components, containing PFAS substances or fluoropolymers, must be reported to relevant authority.

The following flowchart shows how the criteria shall apply to articles and how it is determined whether an article can be accepted or not accepted.



3 Exemptions from the Criteria document

3.1 General exemptions for specific chemical product groups and substances

The products and substances that are accepted although they do not meet the criteria are presented in table 4 and table 5.

It is compulsory to provide information regarding substances subjected to general exemptions. The obligation to provide information means that the defence sector's authorities shall be informed if general exemptions are applied, what substance or product group that is concerned and in which article or chemical product the substance is included. Instructions on how to submit the information is available from the relevant authority.

Note that substitution shall always be considered before general exemptions are applied.

Table 4. Accepted exemptions for specific product groups.

Product group	Applications where exemptions are relevant	Grounds for exemption
Zinc phosphate primer classified as H410.	Replacement for chromates in primers. *Please note! General exemption is not permitted if the product is classified with other criteria in table 1.*	The environmental impact will be lower than when using chromates.
Zinc-rich paint classified as H410.	Corrosion protection for steel when the zinc-rich paint is included in a colour system and when repairing galvanized constructions. *Please note! General exemption is not permitted if the product is classified with other criteria in table 1.*	The environmental impact is limited. Zinc-rich paint has good corrosion protective qualities in combination with low zinc leakage, due to additional layers in the surface treatment. Very small amounts are used when repairing with zinc-rich paint.
Allergenic products classified as H317 and/or H334 and that are handled in accordance with AFS 2011:19 § 37b-g.	Joint sealing foams, moulding components, sealants, primers, paint, varnish, thread-locking fluid and adhesives. *Please note! General exemption is not permitted if the product is classified with other criteria in table 1*	The use is regulated by The Swedish Work Environment Authority's provision 2011:19 on occupational health and safety risks (re-written and amended in 2014:43). When following the regulation and with limited use of the products, the risk of health effects is minor.
Products in the Swedish Armed Forces' Product catalogue – Fuels, lubricant and associated products (CD PRKAT Drivmedel M7789-000183 Swedish edition, alternatively M7789-000193 English edition).[27]	Fuels (i.e., fluids, lubricants, hydraulic fluids, brake fluids, antifreeze agents) in the materiel system (vehicles, ships, aircrafts etc.) of the Swedish Armed Forces and the Swedish Defence Material Administration.	The products in the catalogue are evaluated and their handling is clearly defined. A limited number of products reduces the environment impact. New products in the Product catalogue shall be evaluated according to the Criteria document.
Chemical products containing substances included in the Authorisation List in Annex XIV to Reach for which the sunset date has passed.	Use only applies to the substances and the areas of use covered by the submitted or granted authorisation application.	The use of these products is restricted due to the authorization requirement. Typically, there are no substitutes for these products.

Table 5. Accepted exemptions for substances in chemical products or in articles.

Name of the substance	CAS number	Grounds for limitation[28]	Accepted areas of use
Arsenic and its compounds	Several, e.g. 7440-38-2	May cause cancer, H350 Very toxic to aquatic life with long lasting effects, H410 Authorisation List Substances Candidate List Substances	• Doped semiconductors in electronics • Brass and other copper alloys *Please note - Sunset date in accordance with Annex XIV to REACH is applicable.*[29]
Beryllium (metal)	7440-41-7	May cause cancer, H350i	Beryllium in copper alloys
Beryllium oxide	1304-56-9	May cause cancer, H350i	Electrical components that are encapsulated and explicitly labelled
Lead (metal) and lead silicates	Several, e.g. 7439-92-1, 5906-71-5	Substance specifically identified by the defence sector Toxic for reproduction, H360FD May cause cancer, H350	• Diving weights • Ballast • Small calibre ammunition including pellets • Equipment for radiation protection • Electrical and electronic equipment that fulfil the requirements of the RoHS directive • Electrical and electronic equipment that are not within the scope of the RoHS directive, e.g., military equipment[30] • Batteries where lead-free alternatives are lacking • Lead in solder for soft soldering • Brass and aluminium alloys, where alternatives containing ≤0.1 % lead are lacking
Lead azide, picrate, styphnate, etc.	Several, e.g. 13424-46-9	Toxic for reproduction, H360Df Very toxic to aquatic life with long lasting effects, H410 Candidate List Substances	• Ignition in detonators etc., where alternatives are lacking
Lead oxides	Several	Substance specifically identified by the defence sector Toxic for reproduction, H360Df May cause cancer, H350 Candidate List Substances	• Propellant in medium calibre ammunition (>20 mm) • Additive in rocket engine propellants • Ignition caps • Electrolytic cells
Boric acid	10043-35-3, 11113-50-1	Toxic for reproduction, H360FD Candidate List Substances	• Electrolytic cells
Phthalates in RoHS Bis(2-ethylhexyl) phthalate (DEHP) Benzyl butyl phthalate (BBP) Diisobutyl phthalate (DIBP) Dibutyl phthalate (DBP)	117-81-7, 117-82-8, 84-69-5, 85-68-7	Toxic for reproduction, H360D Authorisation List Substances Candidate List Substances Suspected endocrine disruptor	• Electrical and electronic equipment that fulfil the requirements of the RoHS directive • Electrical and electronic equipment that is not within the scope of the RoHS directive, e.g., military equipment[30]

Name of the substance	CAS number	Grounds for limitation[28]	Accepted areas of use
Halons e.g., halon-1211, halon-1301	Several	Ozone-depleting H420 GWP > 150	• Commission Regulation (EU) No 744/2010 applies for halons. Exemptions are applicable for the use of halons that cannot be replaced by another substance or new technology.
1,1,1,3,3,3-Hexafluoro-propane (HFC 236fa, DeuGenN)	690-31-1	GWP > 150 PFAS – The defence sector's specially identified substances	• Fire extinguishing equipment in military vehicles and containers
Hexogen Oktogen	121-82-4, 2691-41-0	Causes damage to organs, H370[31]	• Gunpowder • Explosive charges
HFC (Hydro fluorocarbons) in the form of: R134a, R404a, R410a, R407a and R507	Several	GWP > 150 PFAS substance (substance specifically identified by the defence sector)	• Refilling of existing equipment
2,2',4,4',6,6'-hexanitrostilbene (HNS)	20062-22-0	Very toxic to aquatic life with long lasting effects, H410	• Explosive charges
Cadmium and its compounds	Several, e.g., 7440-43-9	Substance specifically identified by the defence sector May cause cancer, H350 Toxic for reproduction, H360Df Candidate List Substances	• Electrical and electronic equipment that fulfil the requirements of the RoHS directive • Electrical and electronic equipment that is not within the scope of the RoHS directive, e.g., military equipment • Use in systems critical to safety and in applications/components where a specific function is critical.
Chromium (VI) compounds	Several, e.g., 11118-57-3, 1333-82-0, 7789-06-2	May cause cancer, H350 May cause genetic defects, H340 Toxic for reproduction, H360FD May cause an allergic skin reaction, H317 Very toxic to aquatic life with long lasting effects, H410 Authorisation List Substances Candidate List Substances	• Electrical and electronic equipment that fulfil the requirements of the RoHS directive • Electrical and electronic equipment that is not within the scope of the RoHS directive, e.g., military equipment *Please note - Sunset date in accordance with Annex XIV to REACH is applicable*[29]
Mercury (metal)	7439-97-6	Substance specifically identified by the defence sector Very toxic to aquatic life with long lasting effects, H410 Toxic for reproduction, H360	• Electrical and electronic equipment that fulfil the requirements of the RoHS directive • Electrical and electronic equipment that is not within the scope of the RoHS directive, e.g., military equipment • Light sources
PFAS substances	Several	Substance specifically identified by the defence sector PBT substances vPvB substances	• Refilling of existing equipment[32] containing cooling media and fire extinguishing media • Fire fighting foam

Name of the substance	CAS number	Grounds for limitation[28]	Accepted areas of use
		Candidate List Substances	Provided that use to maintain operational function is considered necessary and that are no viable alternatives.
Polybrominated biphenyls (PBB)	Several, e.g., 59536-65-1	Persistent PBT substances vPvB substances Candidate List Substances	• Electrical and electronic equipment that fulfil the requirements of the RoHS directive • Electrical and electronic equipment that is not within the scope of the RoHS directive, e.g., military equipment
Polybrominated diphenyl ethers (PBDE)	Several	Persistent PBT substances vPvB substances Candidate List Substances	• Electrical and electronic equipment that fulfil the requirements of the RoHS directive • Electrical and electronic equipment that is not within the scope of the RoHS directive, e.g., military equipment
Sulphur hexafluoride	2551-62-4	GWP > 150	• Gas insulated mid-voltage switchgear and control equipment within electricity transition lines (≤52 kV). As insulating gas in high voltage equipment included in defence material. *Please note that exemptions are only applied to replacement of existing switchgear or refilling of gas.*

3.2 Specific exemptions for substances and product groups

If a general exemption is **not** listed in table 4 or table 5 there is a possibility to apply for a specific exemption for use of a chemical product, or for a substance that is present in an article or a chemical product if there are extraordinary circumstances and if a viable alternative is not available. Extraordinary circumstances are for example that the substance is needed to achieve a critical function, or that the nature of the work requires the use of the specific substance. An application for a specific exemption must always be preceded by an investigation of potential substitutes for the relevant substance or product and an assessment of the associated risks to users and the environment during normal use. The exemptions may be granted on a temporary basis and must always be compliant with current legislation.

All details about the process for application for specific exemptions are regulated separately within each agreement or according to other instructions from the relevant authority. If the relevant authority within the defence sector rejects a specific exemption, the chemical substance or the chemical product must not be used in the specific case.

Appendix 1: Examples of substances covered by the restrictions

The table in appendix 1 contains examples of substances that are not accepted according to the criteria in section 2, as well as justifications as to why the substances shall not be present. Examples of areas of use within the defence sector where these substances may be present are also presented in the table. Exemptions from these restrictions have been granted for certain applications in the defence sector. If such exemptions exist, they are specified in the far right-hand column of the table.

Please note that this is not an exhaustive compilation. The table is intended as a guidance, and it shows examples of substances that are relevant for applications in the defence sector.

Classifications given in the table are harmonised within the EU and regulated in Annex VI in CLP. In case where a substance does not have a harmonised classification, the most frequently reported classifications from the ECHA C&L inventory database are listed. Please note that the full list of classifications for the substance is not always specified. In the table, only the classification justifying why the substance is restricted in respect to the criteria given in section 2 is specified.

Substance/ Group of substance	**CAS number**	**Grounds for limitation**[33]	**Example of applications**	**Exemptions for certain applications**
Acrylamide (monomer)	79-06-1	May cause cancer, H350 May cause genetic defects, H340 May cause an allergic skin reaction, H317 Candidate List Substance	• Flocculation agent for water purification. • Sealant.	
Alkanes, C10-13, chlorinated (short chained chlorinated paraffins)	85535-84-8	Very toxic to aquatic life with long lasting effects, H410 Persistent, PBT and vPvB Candidate List Substances	• Flame retardant and plasticiser in plastic and rubber industry.	
Anthracene	120-12-7	Persistent, PBT Candidate List Substance	• Signal smoke.	
Arsenic and its compounds	Several, e.g., 1303-28-2, 1327-53-3	May cause cancer, H350 Very toxic to aquatic life with long lasting effects, H410 Authorisation List Substances Candidate List Substances	• Electronics. • Surface treatment. • Pressure impregnated wood. • Alloys, e.g., in ammunition.	Yes (see table 5)[34]

Substance/ Group of substance	CAS number	Grounds for limitation[33]	Example of applications	Exemptions for certain applications
Asbestos Amosite Antophyllite Crocidolite Chrysotile	Several, e.g., 12172-73-5, 77536-67-5, 12001-28-4, 12001-29-5	May cause cancer, H350	• Brake linings • Building material • Thermal insulation • Carpets • Textile products • Asbestos cement products • Filters • Gaskets, sealings • Glue, sealants, fix, paint	
Benzene	71-43-2	May cause cancer, H350 May cause genetic defects, H340	• Solvents • Gasoline components	Yes (see table 4)
Beryllium and its compounds	Several	May cause cancer, H350i	• Electronics • Radar	Yes (see table 5)
Bisphenols e.g. Bisphenol A Bisphenol B Bisphenol F Bisphenol S Bisphenol AF	80-05-7, 77-40-7, 620-92-8, 80-09-1 1478-61-1	Substance specifically identified by the defence sector. Suspected endocrine disruptors Candidate List Substances	• Epoxy plastic component • Thermal paper	Allowed if chemically bound to the material in the article
Lead and its compounds	Several	Substance specifically identified by the defence sector Toxic for reproduction, H360Df May cause cancer, H350 Candidate List Substances	• Batteries • Electrical and electronic products • Ammunition • Weights • Surface treatment • Transport fuels • Lubricants	Yes (some of them, see table 5)
Lead in pigments, Lead chromate molybdate sulphate (C.I. Pigment Red 104), Lead chromate sulphate (C.I. Pigment Yellow 34)[34]	Several, e.g., 12656-85-8, 1344-37-2	May cause cancer, H350 Toxic for reproduction, H360Df Very toxic to aquatic life with long lasting effects, H410 Authorisation List Substances Candidate List Substances	• Pigments in paint, especially for anticorrosion protection. • Military labelling of equipment.	
Boric acid	10043-35-3, 11113-50-1	Toxic for reproduction, H360FD Candidate List Substance	• Raw materials for glass and ceramics • Photo chemicals • Wood protection • Fertilisation • Disinfection • Flame retardant • Metal treatment • Adhesives	Yes (see table 5)

Substance/ Group of substance	CAS number	Grounds for limitation[33]	Example of applications	Exemptions for certain applications
Brominated flame retardants Deca/Octa/Penta-BDE HBCDD (stereoisomers) Polybrominated biphenyls (PBB) Polybrominated diphenyl ethers (PBDE)[34]	Several, e.g., 1163-19-5, 25637-99-4, 134237-50-6, 32536-52-0	Toxic for reproduction, H360 Persistent, PBT and vPvB Authorisation List Substances Candidate List Substances	• Flame retardants	Yes (some of them, see table 5)
CFC och **HCFC** (Chlorofluoro-carbons)	Several	Ozone-depleting H420 GWP > 150	• Refrigerants • Propellants	
Dimethylacetamide (DMAC)	127-19-5	Toxic for reproduction, H360D Candidate List Substance	• Solvent • Car glass repairing	
2,4-Dinitrotoluene[34]	121-14-2	May cause cancer, H350 Very toxic to aquatic life with long lasting effects, H410 Authorisation List Substance Candidate List Substance	• Explosives	
Phthalates DEHP DBP Diisobutyl phthalate BBP	Several, e.g., 117-81-7, 117-82-8, 84-69-5, 85-68-7	Toxic for reproduction, H360FD Authorisation List Substance Candidate List Substance Suspected endocrine disruptor	• Plasticisers • Additive in paints and glue • Fillers • Explosives	Yes (see table 5)[34]
Halons eg. halon-1211, halon-1301	Several	Ozone-depleting H420, GWP > 150	• Fire extinguishing agents	Yes (see table 5)
1,1,1,3,3,3-Hexafluoro-propane (HFC 236fa, DeuGenN)	920-66-1	GWP > 150	• Fire extinguishing agent • Refrigerant	Yes (see table 5)
HFC (fluorocarbons) R143a, R404a, R410a, R417a, R507	Several, e.g., 420-46-2	GWP > 150	• Propellants • Refrigerants • Fire extinguishing agents	Yes (see table 5)
Hydrazine	302-01-2, 7803-57-8, 10217-52-4	May cause cancer, H350 Very toxic to aquatic life with long lasting effects, H410 Candidate List Substance	• Propellant • Corrosion inhibitor in hot and cold-water systems	

Substance/ Group of substance	CAS number	Grounds for limitation[33]	Example of applications	Exemptions for certain applications
Cadmium and its compounds	Several	Substance specifically identified by the defence sector May cause cancer, H350 Toxic for reproduction, H360	• Batteries • Electrical and electronic equipment • Alloys • Surface treatments	Yes (see table 5)
Cobalt salts	Several	May cause cancer, H350i	• Humidity indicator in silica gel • Lithium-ion batteries	
Cobalt dichloride	7646-79-9	May cause an allergic skin reaction, H317 May cause cancer, H350 Toxic for reproduction, H360F Very toxic to aquatic life with long lasting effects, H410 Candidate List Substance	• Corrosion protection	
Carbon tetrachloride	56-23-5	Ozone-depleting, H420	• Solvent	
Creosote	8001-58-9	May cause cancer, H350	• Pressure-impregnated wood	
Chromium (VI) compounds Potassium dichromate Chromium trioxide Sodium dichromate Sodium chromate Strontium-chromate(VI) Zinc chromate(VI)-hydroxide	Several, e.g., 7778-50-9, 1333-82-0, 10588-01-9, 7789-12-0, 7775-11-0, 7789-06-2, 49663-84-5	May cause cancer, H350 May cause genetic defects, H340 Toxic for reproduction, H360FD May cause an allergic skin reaction, H317 Very toxic to aquatic life with long lasting effects, H410 Authorisation List Substance Candidate List Substance	• Anti-corrosive pigment in paints and varnishes • Coated sheet metal and other metal articles • Pigment in paints and inks • Surface treatment of steel and aluminium in for example the aviation industry • Corrosion protection • Pressure-impregnated wood • Electrical products	Yes (see table 5)[35]
Mercury and its compounds	Several	Substances specifically identified by the defence sector Very toxic to aquatic life with long lasting effects, H410 Toxic for reproduction, H360	• Electrical and electronic products • Batteries • Alloys	Yes (see table 5)

Substance/ Group of substance	CAS number	Grounds for limitation[33]	Example of applications	Exemptions for certain applications
1-Methyl-2-pyrrolidone (NMP)	872-50-4	Toxic for reproduction, H360D Candidate List Substance	• Solvent in paints and varnishes • Detergents • Car care products • Degreasers • Paint removers • Anti-friction varnishes	
Methylene chloride (dichloromethane)	75-09-02	Substances specifically identified by the defence sector. May cause cancer, H351	• Solvent	
Sodium borates Disodium tetraborate Tetraboron disodium heptaoxide, hydrate	Several, e.g., 1330-43-4, 12267-73-1	Toxic for reproduction, H360FD Candidate List Substance	• Raw material for glass and ceramics • Wood protection • Fertilisation • Disinfection • Flame retardants • Cleaning products • Metal treatment • Photo chemicals • Adhesives	
Nonylphenol ethoxylates, NPE[36]	Several, e.g., 9016-45-9, 68412-54-4, 26027-38-3	Persistent, PBT and vPvB Very toxic to aquatic life with long lasting effects, H410 Suspected endocrine disruptor	• Detergents • Washing agents	
Octylphenol ethoxylates, OPE[36]	Several, e.g., 9036-19-5, 9002-93-1	Very toxic to aquatic life with long lasting effects, H410 Candidate List Substance Authorisation List Substance	• Vulcanisation agent • Regulator of viscosity and complexing agent in manufacturing of polymers and ethoxylates, in for example adhesives and sealants • Paints and varnishes • Coatings	
Parabens Propylparaben Butylparaben	94-13-3, 94-26-8	Suspected endocrine disruptor Candidate List Substance	• Preservatives	
Pentalead tetraoxide sulphate (Lead sulphate, tetrabasic)	Several, e.g., 12065-90-6	Toxic for reproduction, H360D Very toxic to aquatic life with long lasting effects, H410 Candidate List Substance	• Stabilisers for PVC • Plastic products	

Substance/ Group of substance	CAS number	Grounds for limitation[33]	Example of applications	Exemptions for certain applications
PFAS for example Perfluorooctane-sulfonic acid and its derivatives (PFOS) Perfluorooctanoic acid (PFOA) Perfluorohexanoic acid (PFHxA)	Several	Substances specifically identified by the defence sector Toxic for reproduction, H360D May cause harm to breast-fed children, H362 Persistent, PBT Ozone-depleting, H420 GWP >150 Candidate List Substance	• Fire extinguishing agents • Impregnation of textiles and leather • O-ring seals, packing • Sealant • Electronics	Yes (see table 5)
Polychlorinated biphenyls (PCB)	Several, e.g., 1336-36-3	Persistent, PBT and vPvB	• Dielectric medium in capacitors • Transformers • Sealants	
Sulphur hexafluoride	2551-62-4	GWP > 150	• Insulating medium in high voltage equipment, switches, and transformers	Yes (see table 5)
Organotin compounds	Several, e.g., 56-35-9	Very toxic to aquatic life with long lasting effects, H410 Suspected endocrine disruptor Candidate List Substance	• Anti-fouling paints • Preservatives in imported goods such as textiles, paper, leather, rubber and polymeric materials	
Triethyl arsenate	15606-95-8	May cause cancer, H350 Very toxic to aquatic life with long lasting effects, H410 Candidate List Substance	• Electronics	
1,1,1-Trichloroethane	71-55-6	Ozone-depleting, H420	• Solvent	
Tri(2-chloroethyl) phosphate[36]	115-96-8	Toxic for reproduction, H360F Authorisation List Substance	• Flame retardant in plastic, paint, varnish and adhesives • Construction products • Furniture and textiles	
Trixylyl phosphate (TXP)	25155-23-1	Toxic for reproduction, H360F Candidate List Substance Authorisation List Substance	• May be present in lubricants and transmission agents	

Appendix 2: Examples of relevant legislation

REACH (Regulation (EC) No 1907/2006)

The REACH regulation covers registration, evaluation, authorisation, and restriction of chemical substances.-The Regulation is based on requirements for manufacturers, importers, or those who are placing articles and chemical products on the EU/EEA market. The Regulation also contains provisions that downstream users of chemical products must comply with.

REACH distinguishes between substances, mixtures and articles (see section 1.5). It primarily regulates substances and mixtures, i.e., chemical products, but requirements also apply to the content of articles.

An **article** is defined (REACH chapter 2, article 3.3) as an object that during production is given a special shape, surface or design, which determines its function to a greater degree than the objects chemical composition. A more thorough assessment of an object's function and properties may be required to establish whether an object fulfils the definition of article under REACH. The European Chemicals Agency (ECHA) has published a guide on requirements for substances in articles,[37] which, among other things provides guidance on what shall be seen as an article. It also assists suppliers to establish which requirements that must be fulfilled for production, import and supply of articles. Articles or complex articles that may occur in the defence sector are a wide range of equipment such as ships, camouflage nets, light fixtures, etc.

Ammunition and other explosives are difficult to classify as either an article or chemical product according to REACH. As support concerning the classification of ammunition and explosive items, the European Defence Agency (EDA) published the document "EDA Member States Common Position on Ammunition Classification under Reach".[38]

REACH entails requirements that information on articles containing substances of very high concern shall be communicated to professional users (article 33.1 in REACH). The requirement applies if a substance has been identified as particularly hazardous (also known as a SVHC, Substance of Very High Concern) included in the Candidate List,[39] and if the concentration in the article is above 0.1 % weight by weight. Starting from January 5, 2021, supply of articles containing more than 0.1% of a substance on the Candidate List must be reported to the ECHA's SCIP database. The legislation is found in the EU directive on waste. The supplier of the article must provide the recipient of the article with enough information (of the information available to the supplier) to allow a safe use of the article. This includes the name of that substance as a minimum. The content of a specific substance must be calculated as the ratio between the weight of the substance in relation to the weight of the individual separable parts of the complex article. For a complex article that consists of several parts, this means that the basis for calculating must be the weight of the individual part that contains the substance, not the total weight of the complex article.

When a substance on the Candidate List is included in Annex XIV [40] in REACH, it means that from that specific date, the substance is not allowed to be used or placed on the market without authorisation from the EU Commission. Annex XIV specifies the sunset date for when the substance is not allowed to be used without authorisation, and a deadline for application for authorisation from ECHA. Substances in Annex XIV do remain on the Candidate List and therefore the duty to communicate information (article 33.2 in REACH) also remains the same.

CLP (Regulation (EC) No 1272/2008)

CLP is a regulation that came into force in January 2009 across the EU. CLP introduces rules on how to classify, label and package chemical substances and chemical products (substances or mixtures).

All chemicals placed on the European market must be classified with respects to their physical, health and environmental hazards. The labelling on the package as well as a safety data sheet (SDS) shall provide information on the hazardous properties of chemical substances and the appropriate means of protection for oneself and for the environment. The labelling must comply with the classification of the product and include for example hazard pictograms, hazard statements and protective statements. Since June 1, 2019, all older labelling (according to KIFS 2005:7) of chemical products must be replaced with labelling according to CLP. This also includes chemicals used within one's own business.

Chemical Hazards in the Working Environment (AFS 2011:19 alt. AFS 2023:10/11)
The Swedish Work Environment Authority's regulations on chemical work environment risks (2011:19) specify the requirements for systematic work environment management for workplaces with chemical risks. This includes the obligations to investigate and assess risks, take risk mitigation measures, plan accident preparedness, prepare documents and mark containers and pipelines. The purpose of the regulation is to prevent illness and accidents caused by chemical risk sources.

The regulation contains an appendix with substances that are prohibited to use (Group A), and substances that may not be handled without permit from the Swedish Work Environment Authority (Group B). It is critical that the substances in Group B are not present in the activities of the defence sector. The work environment regulations of hygiene limit values (AFS 2018:1) must also be considered in the systematic work environment management.

The Chemical Products (Handling, Import and Export Prohibitions) Ordinance (SFS 1998:944)
This Swedish ordinance contains specific prohibitions or other restrictions for the handling of:

1. two-component epoxy adhesives/resins containing bisphenol A or bisphenol A-diglycidyl ether,
2. cadmium and ammonium carbonate in fertilizers,
3. plastic particles in cosmetic products,
4. oxo-biodegradable plastics
5. chlorinated solvents,
6. mercury,
7. cadmium and mercury in batteries,
8. heavy metals in packaging,
9. ammunition that contains lead, and
10. certain other chemical products and articles hazardous to health or the environment.

RoHS 2 (EU directive 2011/65/EU)
The RoHS Directive aims to replace and limit hazardous chemical substances in electrical and electronic equipment to reduce the risks to human health and the environment. The RoHS directive is also aimed to promote profitable and sustainable material recycling from electronic waste. The RoHS directive came into force in 2006 and has up until July 22, 2019, been implemented step by step for different product categories. The number of substances limited by the RoHS directive has been increased and as of July 22, 2019, the presence of mercury, cadmium, lead, hexavalent chromium, two fire protection agents (PBB and PBDE) and four phthalates (DEHP, BBP, DBP and DIBP) in electrical and electronic equipment are also regulated. Please note that there are requirements on chemical substances in electronics in several other legislations and that these requirements apply in parallel with the requirements of the RoHS directive.

Swedish applications are introduced in "Regulation (2012:861) on hazardous substances in electrical and electronic equipment" and in the Swedish Chemicals Agency's regulations (KIFS 2017:7) on chemical products and biotechnological organisms.

Per- and polyfluoroalkyl substances (PFAS)

PFAS[14] is an abbreviation for per- and polyfluoroalkyl substances. It is a group of synthetic organofluorine chemical compounds that have multiple fluorine atoms attached to an alkyl chain. This group of compounds consist of thousands of different substances, estimated to approximately 10 000 substances. None of the substances occur naturally in the environment but they are synthetically produced. The use of PFAS substances started in the1950s and the usage has increased since then. Thanks to the special technical properties of PFAS substances, they are currently used globally in many types of material, goods, and chemical products. Some are presented below.

- *Grease, dirt and water repellent properties* are useful in, for example, food packaging and in textile materials that must protect the wearer against moisture, dirt, or oil products (e.g. outer garments in the uniform system).
- *The surface-active properties* cause PFAS to form a layer, for example between water and an organic solvent or between a liquid and a solid surface. This surface-active property is extremely useful, and has, among other things, used to produce highly effective fire extinguishing foams (so-called AFFF) against petroleum fires or in lubricants made for special applications.
- The PFAS substances are also *highly resistant* to degradation from UV light, other chemicals, high and low temperatures and can withstand high and low pressure, which is beneficial in many applications where the exposure to these factors are problematic for materials and chemical products.

Due to the enormous number of substances in the PFAS group, only a few substances have been well investigated regarding the impact on human health and the environment. Information is lacking for the rest of them. The severe negative effects demonstrated for a limited number of substances, and the knowledge that all the substances in the PFAS group are persistent in the environment have led to a decision in the EU that the entire PFAS group should be phased-out of the society through Union-wide regulations.

The principle of phasing out all PFAS substances began when the European Chemicals Agency (ECHA) published a proposal in the spring of 2022 to ban the manufacture, sale and use of fire-extinguishing medium like foam concentrates, extinguishing liquids and fire-fighting foams containing PFAS. A decision on limitation has not yet been made. Due to the very widespread use of PFAS in various materials, components, goods and chemical products, several member states considered that phasing-out "per product group" would take too long to achieve an effective stop to the spread of PFAS in the near future. A bill to limit all PFAS in all areas of use (except fire-fighting foam) was published in February 2023. The proposal is now being prepared within various bodies in the EU and a decision can be expected in 2025 or 2026. A broad ban on PFAS is estimated to have serious impact on the operational capability by the Swedish Armed Forces based on several operational areas, purchasing of defence equipment by the Swedish Defence Materiel Administration and the Swedish Fortifications Agency´s mission to manage defence-related buildings and facilities.

The proposals[41,42] can be found on the website of the European Chemicals Agency (EHCA). More information is available on The Swedish Chemicals Agency's website.[43]

Appendix 3: Change log

Changes that affect the criteria, the application of the criteria or are of other relevance are listed below.

Section or table	Main change	Justification for change	Affects criteria	Change introduced
Table 2	Addition of PFAS.	Adaption to upcoming legislation.	Yes	2021
Table 2	Removed substances: GHB, GBL.	Restricted by other requirements or legislation.	Yes	2021
Table 2 and 3	Removed substance: Butylparaben	Candidate List Substance.	No	2021
Table 2 and 3	Lower limit for GWP.	Adjustment to legal requirements.	Yes	2021
Table 3	Removed substance: Pentabromodiphenyl ether (Penta-BDE)	Restricted by other requirements.	No	2021
Appendix 2	New chapter on PFAS.	Enhanced information for reader.	No	2021
Section 4, 5 and 6	Moved to appendices.	Requirements compiled in main document and other information is compiled in appendices.	No	2021
Appendix 1	Examples of substances have been updated.	A more relevant list.	No	2021
Table 2 and 3	Clarifying definition of PBT and vPvB substances.	Increased clarity.	No	2021
Section 1.2, Extended limitations	Research and development added as areas of exemption to the criteria.	Restriction is counteracting the purpose of use.	Yes	2021
Table 5	Extended general exemptions for phthalates, certain explosives, PFAS.	Tolerance for products that are necessary for maintaining operative ability.	Yes	2021
Table 1	New hazard classes according to the CLP regulation	Adaption to legislation and new requirements regarding endocrine disruptors	Yes	2024
Table 2 and 3	Removed substance: bisphenol S, added substance: bisphenol AF	The removed substance is included in Annex XIV, Candidate List. Adaption to upcoming legislation	Yes	2024
Table 2 and 3	Updated definition of PFAS	Adaption to proposed upcoming legislation	No	2024
Table 2	Change of wording (should)	Adjustment to the phraseology of procurement	No	2024
Table 3	Removed substance: bisphenol S, added substance: bisphenol AF	The removed substance is included in Annex XIV, Candidate List. Adaption to upcoming legislation	Yes	2024
Table 3	Added an award criterion regarding PFAS in articles	Adaption to proposed upcoming legislation	Yes	2024
Table 4	Added area of use within allergenic products	Thread locking fluid is frequently used	Yes	2024
Table 4	New general exemptions	The substances are subject to strict regulations	Yes	2024
Table 5	Lead silicates included in general exemptions for lead	Tolerance for products necessary to maintain operational capability	Yes	2024
Table 5	Removed general exemption for Cr (VI) included in sealants and surface treatment.	New general exemptions in table 4	Yes	2024

Explanatory endnotes

[1] REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) is the globally used abbreviation of Regulation (EC) No 1907/2006 concerning the registration, evaluation and restriction of chemicals.
[2] CLP (Classification, Labelling and Packaging) is the globally used abbreviation of Regulation (EC) No 1272/2008 concerning classification, labelling and packaging of substances and mixtures.
[3] The Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction.
[4] The definition of a chemical product is found in the environmental legislation SFS 1998:808, Chap. 14 § 2.
[5] The definition of a substance and a mixture are found in Title 1, Chapter 2, Article 3.1 and 3.2 in REACH.
[6] The definition of an article is found in Title 1, Chapter 2, Article 3.3 of REACH.
[7] Please note that there are transitional periods from the entry into force of the new hazard classes. More information: New hazard classes 2023 - ECHA (europa.eu).
[8] PBT = Persistent (low degradability), bioaccumulative (potential to accumulate in living organisms) and toxic (poisonous). vPvB = Very persistent and very bioaccumulative. Substances with PBT- and vPvB-properties are defined through criteria in Annex XIII in the REACH regulation. For examples, please see the PBT assessment list - ECHA (europa.eu) or https://sinlist.chemsec.org/. Please note that these lists do not cover all PBT/vPvB substances.
[9] The latest version of the Candidate List: https://echa.europa.eu/en/candidate-list-table
[10] Not intentionally added means that substances shall not have been intentionally added to the raw material or product during any stage of the manufacturing process. The definition of intentionally added also includes substances from recycled materials.
[11] The GWP-factor for a substance is its Global Warming Potential. See GWP values according to the latest IPCC-report, https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter08_FINAL.pdf (appendix 8.A), or equivalent.
[12] The criteria only apply to newly produced products or products that undergo half-time modification or life-time extension.
[13] Substances with exceptional hazardous properties. See Appendix 1 in the Criteria document for CAS number and justification to why the substance is undesirable.
[14] 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). Source: https://www.oecd.org/chemicalsafety/portal-perfluorinated-chemicals/aboutpfass/Figure1-classification-of-per-and-polyfluoroalkyl-substances%20-PFASs.pdf
[15] Exposure to these substances in combination with noise pollution increases the risk of hearing damage. See the Swedish Work Environment Authority's provisions (AFS) on Occupational Exposure Limit Values.
[16] The presence of toluene and styrene shall, if possible, not be present, but can be accepted in cases where their application is critical for function. Application for exemption is not required.
[17] In cases where EU legislation specifies a lower restriction limit than 0.1 % in the article (or prohibits its use), the legislative restriction shall apply.
[18] CMR = Carcinogenic, mutagenic (can damage genetic material) and/or toxic to reproduction (can impair fertility or harm the embryo/foetus). Examples of such substances can be found in the Classification List Annex VI, table 3.1 and 3.2 in CLP (EC) No 1272/2008, which contains harmonised and binding classification and labelling for substances and groups of substances.
[19] PBT = Persistent (low degradability), bioaccumulative (potential to accumulate in living organisms) and toxic (poisonous). vPvB = Very persistent and very bioaccumulative. Substances with PBT- and vPvB-properties are defined through criteria in Annex XIII to the REACH regulation. For examples, see PBT assessment list - ECHA (europa.eu) or https://sinlist.chemsec.org/. Please note that these lists are not complete records of all PBT/vPvB substances.
[20] The latest version of the Candidate List: http://echa.europa.eu/uk/candidate-list-table
[21] The GWP-factor for a substance is its Global Warming Potential. See GWP-values according to the latest IPCC-report, https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter08_FINAL.pdf (appendix 8.A), or equivalent.
[22] Intentionally added means that substances shall not have been intentionally added to the raw material or product during any stage of the manufacturing process. The definition of intentionally added also includes substances from recycled materials.
[23] Exemptions need only be applied for newly produced products or products that undergo half-time modification or life-time extension.
[24] Substances that may endanger the structure or functioning of the stratospheric ozone layer, i.e. fulfils classification criteria H420 (according to CLP (EC) No 1272/2008).
[25] Substances with exceptional hazardous properties. See Appendix 1 in the criteria document for CAS number and justification to why the substance is undesirable.

[26] Exemptions do not need to be reported or applied for.
[27] https://logistikportalen.fmv.se/tjansterprodukter/drivmedel/Drivmedelskatalog_EN/index.aspx#/
[28] The column shows a selection of negative effects of the substance or substances in the group. All effects do not apply to all substances in the group.
[29] Substances in Annex XIV of REACH are allowed if a permit from the European Commission has been granted (alternatively that the application for a permit has been submitted to the ECHA) for the correct area of use.
[30] According to RoHS article 2, §4a.
[31] Non-harmonized classification.
[32] Existing equipment does not include new purchases, half-time modifications, or life-time extensions of products. Also, renovations of buildings are excluded. An application for specific exemption is required if PFAS substances are necessary to maintain function and no alternatives are available for new purchases or extensive half-time modifications or life-time extensions, or renovations of buildings.
[33] The column shows a selection of negative effects of the substance or substances in the group. All effects do not apply to all substances in the group.
[34] Sunset date has passed. Use is only allowed according to given permits.
[35] Sunset date has passed. Use is only allowed according to given permits. Several permits are applicable for defence equipment.
[36] Sunset date has passed. Use is only allowed according to given permits or applications in process.
[37] Guidance on requirements for substances in articles:
https://www.echa.europa.eu/documents/10162/2324906/articles_en.pdf/cc2e3f93-8391-4944-88e4-efed5fb5112c
[38] EDA Member States Common Position on Ammunition Classification under Reach:
https://eda.europa.eu/docs/default-source/brochures/eda-member-states-common-position-on-ammunition-classification-under-reach---adopted.pdf
[39] Substances on the Candidate List as well as examples of applications:
https://www.kemi.se/download/18.164ad6b3172927a928918843/1625746173599/Amnen-pa-kandidatforteckningen.xlsx
[40] Substances in Annex XIV of REACH: https://www.echa.europa.eu/sv/web/guest/authorisation-list
[41] PFASs in fire-extinguishing medium like foam concentrates, extinguishing liquids and fire-fighting foams: Registry of restriction intentions until outcome - ECHA (europa.eu)
[42] PFASs in all areas of use, except from fire-fighting foams: Registry of restriction intentions until outcome - ECHA (europa.eu)
[43] https://www.kemi.se/en/chemical-substances-and-materials/pfas