Substance name: Alkanes, C_{10-13}, chloro
EC number: 287-476-5
CAS number: 85535-84-8

PRIORITISATION AND ANNEX XIV BACKGROUND INFORMATION

14 January 2009

Disclaimer:

The present document has been developed by ECHA mainly based on the technical report "Data on Manufacture, Import, Export, Uses and Releases of substance Alkanes, C10-13, chloro (SCCPs) as well as Information on Potential Alternatives to its Use"; prepared by BRE, supported by IOM and Entec under framework contract ECHA/2008/2 (specific contract ECHA/2008/02/SR2/ECA.225). Further secondary sources are listed under references.

Note that the information on alternatives is not intended to be an exhaustive analysis, but is only included in order to support the transitional arrangements and in particular the proposed application dates for substances proposed to be included in Annex XIV.

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PRIORITISATION AND ANNEX XIV BACKGROUND INFORMATION

1 Prioritisation

Given the PBT and vPvB properties of the substance, the wide dispersive uses of the preparations and articles containing SCCPs and the relatively high volumes **it is proposed to prioritise Alkanes, C10-13, chloro (SCCPs) for inclusion in Annex XIV**.

2 Identity of the substance

Chemical name:	Alkanes, C_{10-13}, chloro
EC Number:	287-476-5
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IUPAC Name:	Alkanes, C_{10-13}, chloro

3 Intrinsic properties

The substance has been identified as a Substance of Very High Concern according to article 57 (d) and (e) (PBT and vPvB) as reported in the support document on Alkanes, C_{10-13}, chloro and the agreement of the MSC adopted on 8 October 2008 (MSC 2008).

4 Volumes

The volume of Alkanes, C_{10-13}, chloro (SCCPs) currently manufactured in the EU is unclear. There are four companies thought to be main manufacturers of SCCPs in the EU in recent years. Given that there has been a marked reduction in use of SCCPs over recent years, it is however not clear if all these plants are still producing SCCPs at this time (BRE 2008).

Overall, the current manufacture in the EU is estimated to be in the range of 1,000 – 4,000 t/y with a most probable volume around 1,500 t/y.

No quantitative information is available on the amount of SCCPs imported into or exported from the EU. According to Euro Chlor, imports of SCCPs into the EU from sources in the United States and Asia are very small compared with the EU production (EC 2008 and Euro Chlor 2008).

Information on import and export of preparations and articles containing SCCPs is not available. The total volume of articles containing SCCPs manufactured in the EU15 in 2004 is however estimated to be < 10,000 tonnes articles per year (BRE 2008).

Information on the amounts of SCCPs used in the EU are presented in EC (2000 and 2008), HELCOM (2002) and OSPAR (2001). The overall consumption figures decreased significantly between 1994 and 2004 from 13,200 t/y to <600 t/y supply by the Euro Chlor member companies plus an unknown supply tonnage by the Romanian plant.

Overall, available information points to a reduction in consumption of SCCPs in the EU and several other countries. Directive 2002/45/EC restricts since January 2004 the placing of SCCPs on the market for use as substances or as constituents of other substances or preparations in concentrations higher than 1 % in metal working fluids and for fat liquoring of leather. Euro Chlor (personal communication, 2008a) commented that sales are decreasing due to substitution mainly by Medium Chain Chlorinated Paraffins (MCCPs), and the classification as a POP by UNECE would reinforce this trend even if the substance will not be prioritised for inclusion in Annex XIV. CPIA (personal communication, 2008a) comments that in their view the change to MCCPs has already occurred for the majority of uses for which this is possible.

In conclusion, no definite information on the amount of SCCP actually used is available, but according to information provided by Euro Chlor the actual tonnage used in the EU is <1,000 t/y.

5 Characterisation of uses and releases

5.1 Manufacture and uses

Manufacture

Manufacture currently takes place at 4 sites in the EU located in Italy, Romania, Slovakia and the United Kingdom.

Uses

The overall amount supplied in 2004 in the EU-15 was <600 t/y (BRE 2008). These uses, in descending order of amounts of SCCPs used, were: manufacture of rubber and articles from rubber, uses in sealants, paints and use for backcoating of textiles. Extrapolations of these use figures to the EU 27 scale are associated with high uncertainties. According to information provided by Euro Chlor the current tonnage used in the EU is <1,000 t with major amounts being used for rubber and sealants and small amounts used in other areas.

SCCPs are used as a flame retardant in rubber. They are generally used at an application rate of between 1 and 10% by weight (although higher concentrations can be used for some applications, like e.g. rubber conveyor belts) of the rubber in conjunction with other flame retarding additives such as antimony trioxide and aluminium hydroxide. SCCPs are additive flame retardants and so are physically incorporated into the rubber matrix.

The major application of rubber containing SCCPs is in high density conveyor belts used in the mining industry (EC, 2000), where specific safety requirements need to be met (Euro Chlor 2008a). Other uses of rubber containing SCCPs could be in the production of technical products such as gaskets and hoses (EC, 2000).

In 2007 the total volume of conveyor belts sold in the EU was 237,880 tonnes, with the highest production of such belts occurring in Germany (approximately 22.4%), Poland (16.4%), Greece (10.1%) and Romania (8.6%).

The volume of SCCPs used for rubber manufacture in the EU 15 decreased between 1994 and 2004 by approximately 70 % and was <600 t/y in 2004.

In sealants SCCPs act as fire-retardant and / or plasticiser (EC 2000). Chlorinated paraffins are used in several types of sealants mainly for building and construction. Chlorinated paraffins with high chlorine contents are also used in sealants for double- and triple-glazed windows. The chlorinated paraffin is typically added at a concentration of 5-14% by weight, but concentrations up to 20% by weight can also be used in exceptional cases. The SCCP is physically incorporated (mixed) into the sealant.

The main use of SCCPs is thought to be in sealants rather than adhesives (EC, 2008) although it should be noted that the distinction between an adhesive and a sealant is a little blurred in that some sealants can be used as adhesives and *vice versa*.

The amount of SCCPs used in EU15 for manufacture of sealants and adhesives was <300 t/y in 2004. However, FEICA (the Association of European Adhesives and Sealants Manufacturers) have indicated that, based on consultation of their members, SCCPs do not appear to be currently used, or are in the process of being phased out, in sealants and adhesives in Europe (FEICA, 2008). Similarly the British Adhesives and Sealants Association also considered that there was no current use of SCCPs in sealants and adhesives (BASA, 2008). The indications by FEICA and BASA regarding actual use of SCCPs in sealants and adhesives are, however, not in line with confidential information (regarding volumes) provided by Euro Chlor, which identifies use of SCCPs for sealants as one of the two major remaining uses of SCCPs (rubber being the other one).

The **main function of chlorinated paraffins in paints is as a plasticiser** but they can also be used to improve water resistance, chemical resistance and the non-flammability of paints (EC, 2000). The paints are used mainly in industrial/specialist applications such as marine primer paints, fire retardant paints and paints for road markings (EC, 2000). The typical level of chlorinated paraffin in a paint formulation would be 4-15% by weight but after application (evaporation of the solvent) the chlorinated paraffin content of the coating would be around 5-20% by weight (EC, 2008). The SCCP is mixed into the paint during the formulation step and becomes physically entrained in the coating once applied.

Recent estimates for use of SCCPs in paints and coatings in EU15 are <100 t/y (2004). However, CEPE (2008) considers that there is now little or no use of SCCPs in paints and coatings in the EU because SCCPs are proposed as a PBT substance.

Directive 2002/45/EC restricts the marketing and **use of SCCPs for metal working fluids and fat liquoring** as substances or as constituents of other substances or preparations in concentrations higher than 1%. Therefore, it is theoretically possible

that SCCPs are used in these applications provided that the concentration present is less than 1%. However such use would not be expected because of technical limitations. For example, for the SCCP to be effective, concentrations of round typically 5-10% are needed in oil-based metal cutting fluids and typically 20% of the leather fat liquoring mix (EC, 2000). Thus it is doubtful that any products are supplied for these applications with SCCP contents <1%. One possible exception to this is in emulsion-based metal working fluids where the final chlorinated paraffin concentration in the final emulsified fluid can be <l% (BUA (1992) and EC (2005)). However the supplied lubricants typically have chlorinated paraffin contents of 5% and up to around 8% and are then diluted before use and so again it is unlikely that lubricants supplied with <1% SCCP contents would be effective after dilution. Therefore, although it cannot be completely ruled out that SCCPs are still supplied in products for leather fat liquoring or metal working, this possibility is considered unlikely.

The current **uses of SCCPs in textiles are as a flame retardant** for the back coating of textiles with a small amount also being used in other textile treatments such as waterproofing (EC, 2000). In the back-coating process, the SCCP is applied to the back of the textile in a viscous polymer latex. Once cured the SCCP is effectively incorporated in a polymer matrix. The amount of SCCPs used in the EU15 for back coating of textiles is <100 t/a (2004).

5.2 Releases

Manufacture

Releases to the environment
The maximum releases to the environment of SCCPs from the manufacturing sites in UK and Italy are thought to be less than 0.01 to 0.027 t/y at each site EC (2008). The emissions from the production plant in Slovakia are reported to be effectively zero as the plant uses *"zero discharge technology"* (Novacke Chemické Závody (2007) and SAŽP (2008)). No emission information is available for the Romanian site.

Releases at the workplace
About 50-100 employees may be potentially exposed to SCCPs within the EU at manufacturing sites (EC 2000). As the production of SCCPs involves the use of closed systems and batch production measures, occupational exposure is expected to be intermittent and may occur during sampling, plant cleaning, filter cleaning, drumming and tanker loading operations.

Uses

Releases to the environment
The releases of SCCPs estimated to occur to the environment based on 2004 consumption data for the EU15 are summarised in Table 1 below. **Overall environmental emissions from manufacture, formulation and use of SCCPs in 2004 were estimated to be in the range of 55 – 80 t/y**. More recent (confidential) information from industry indicates that the actual releases from the EU27 are of the

same order as those in the table (the information does not allow a detailed revised calculation).

Release into the environment from articles over their service life
A number of articles or products containing SCCPs may have a substantial service life duration. For example SCCPs will be present in painted surfaces, treated textiles, rubber products and sealants and so losses through volatilisation, leaching and erosion/particulate losses over the entire service life of the article are possible. These losses have been quantified in EC (2008) using a relatively crude, worst case approach. The exact details of the methodology used are confidential but the methodology assumes that all of the chlorinated paraffin used the EU in sealants and adhesives, paints and coatings, textiles and rubber will be used to make an article and that these articles will be subjected to volatile loss, leaching loss and erosion/particulate loss over their entire lifetime, and erosion/particulate loss at disposal. **With this method the total EU loss was estimated to be in the range of 21.5 – 44.8 t/y**.
These estimates are based on the estimated amount of SCCPs used in the EU. Any import of articles containing SCCPs would add to these emissions.

A further source of releases not covered by the above estimate is release from recycled SCCP-containing conveyor belts. These belts are increasingly being recycled by reduction to powder and subsequent manufacture of new belts, mats and building materials. Information on releases from recycling of the belts containing SCCP or during the service life of articles produced from the recycled rubber is not available. Especially the uses of such recycled articles are likely to be wide dispersive and a potential source of SCCP releases.

Other sources of releases of SCCPs
SCCPs are present as impurities in medium-chain chlorinated paraffins. The actual levels of SCCPs in the MCCPs are low at <1% (and frequently much lower than this limit). Therefore small amounts of SCCPs can be released to the environment as a result of the use of MCCPs. Based on the known estimated amounts of MCCPs released to the environment and **assuming a maximum SCCP content of 1% in the MCCPs, a rough estimate of the emission of SCCPs from this source is ≈ 33 t/y** (EC 2008).

Table 1: Estimates of release of SCCPs in EU15 in 2004

Lifecycle stage	**Estimated release (tonnes/year)**			
	Surface water	**Waste water**	**Air**	**Industrial/ urban soil**
Manufacture	<0.037			
Formulation of rubber		<0.1	<0.1	
Formulation of textile backcoatings		<0.5		
Formulation of sealants		Negligible	negligible	
Formulation of paints		Negligible	negligible	
Processing of rubber		<0.5	<0.5	
Processing (application) of textile backcoatings		<0.5 (to waste water or waste)		
Use of sealants		Negligible	negligible	
Industrial application of paints		<0.1		
Service-life articles * (rubber goods, building and construction materials (sealants), textiles, and articles painted with paints and coatings)	4.7-9.5	7.4-19.6	0.6-1.8	8.7-13.9
Consumer use of preparations (paints and sealants)		Negligible	negligible	
Total from SCCPs lifecycle	**4.7-9.5**	**7.4-19.6**	**0.6-1.8**	**8.7-13.9**
Impurity in medium-chain chlorinated paraffins	<8.9	<13.1	<1.7	<9.7
Overall total	**<13.6-<18.4**	**<20.5-<32.7**	**<2.3-<3.5**	**<18.4-<23.6**

* The estimations for releases during service life include releases at disposal

Releases and exposure at the workplace

According to EC (2000) the number of people occupationally exposed to SCCPs in the EU is unknown. However, EC (2000) estimated that the numbers occupationally exposed during all formulation processes (rubber, textiles, paints and coatings and adhesives and sealants) in the EU at that time could be of the order of several thousands. Similarly, EC (2000) estimated that the number of people occupationally

exposed during the industrial use of paints, adhesives and sealants would be of the order of thousands.

Information on releases at the workplace is not available. However, EC (2000) estimated the exposure of workers using the EASE Model. Resulting estimates are summarised in Table 2.

Table 2: Worker exposure estimations by the EASE model (EC 2000)

Lifecycle stage	**Exposure by inhalation (mg/m3) 8h TWA**	**Dermal exposure [1] ($mg/cm^2/day$)**
Use as flame retardant in rubber formulations *(Formulation and processing)*	11-63	0.1-1
Formulation of textile back coatings	0-2.1	0.1-1
Processing (application) of textile back-coatings	0-2.1	0.03-0.3
Formulation of sealants	0-2.1[2] 11-63[3]	0.1-1
Use of sealants	0.32[4]	0.01-0.1
Formulation of paints	0-2.1	0.1-1
Industrial application of paints	0.32	0.01-0.1

1 Dermal exposure of hands and forearms. It is expected that this value would be considerably reduced by the use of personal protective equipment
2 Low temperature mixing processes (the majority of cases)
3 Formulation of hot melt adhesives
4 Inhalation exposure where sealants are applied by spray. Inhalation exposure during other industrial application of sealants is expected to be insignificant as SCCPs have very low vapour pressures (EC, 2000).

5.3 Geographical distribution

There are 4 companies located in Italy, UK, Slovakia and Romania thought to be main producers of SCCPs in the EU in recent years.

The main use of SCCPs in rubber is in conveyor belts for mining. The highest production of rubber conveyor belts appears to occur in Germany, Poland, Greece and Romania and so the highest use (or number of sites of use) is assumed to occur in these countries (BRE 2008). However, conveyor belts are produced in the majority of EU countries and so use in other countries is also likely. The current use of SCCPs in this application, and the number and location of sites where SCCPs are used is unclear.

The main areas of the EU where back coating of textiles is carried out include the UK and Germany but the process is also likely to be carried out in other parts of the EU. The total number of sites is estimated at <14 for formulation sites and <42 for sites applying back-coatings (processing sites). The current use of SCCPs in this application, and the number and location of sites where SCCPs are used is unclear.

The number and location of sites where SCCPs are used in the formulation of sealants and adhesives is unknown. According to information by FEICA and BASA (the European and British associations of adhesives and sealant manufacturers) there is currently little or no use of SCCPs in this application. If this was the case, the number of formulation sites is likely to be very low, however there is contradicting information from Euro Chlor available indicating that use of SCCPs in sealants is still a major use. In the latter case the potential number of formulation sites and in particular the sites where SCCP containing sealants are used could be relatively large and widespread throughout the EU.

Based on information from CEPE (2008) it appears that there is currently little or no use of SCCPs in paints and sealants in the EU and so the number of current formulation sites is likely to be very low. However, if SCCPs are used in paints and coatings the potential number of sites of use would be expected to be relatively large and widespread throughout the EU. The major users of such paints are professional painters and specialist applicators, although it is possible that some DIY paints containing chlorinated paraffins may be used by the general public (EC 2008).

5.4 Conclusions on wide dispersiveness of uses

Formulation of preparations and manufacture of articles containing SCCPs appear to happen at a limited number of sites. However, all known end-uses, i.e. use of rubber articles containing SCCPs, use of textiles with back coatings containing SCCPs, use of sealants, adhesives and paints containing SCCPs, are likely to be widespread and associated with a high potential for release of the substance and can therefore be considered as wide dispersive. The same conclusion can be drawn for use of articles made from recycled rubber belts containing SCCPs.

6 Complexity of the supply chain

From the information currently available to ECHA it seems that the actors directly associated with the SCCP supply chain and potentially affected by a possible authorisation requirement would include at least:

- 4 (or less) EU manufacturers of SCCPs (import is apparently negligible),
- a limited number of formulators of SCCP-containing preparations (rubber, sealants, adhesives, paints),
- a likely higher number of end users of the SCCP containing preparations (sealants, adhesives, paints),
- a likely somewhat higher number of producers of SCCP containing articles (rubber (containing) products and coated textiles),
- potentially a high number of users of these articles and
- an unknown number of recyclers of rubber products (conveyer belts) and users of the articles produced of the recycled rubber.

As no information could be obtained on imports of SCCP containing preparations and articles this could be considered as an indication that such imports may be insignificant compared to EU internal production.

The supply chains related to the identified uses of SCCP except rubber and textiles seem to be fairly short, not very complicated and associated with a relatively limited number of downstream users. The rubber and textile articles containing SCCPs are for limited and specialised uses. The users of articles made of recycled conveyer belts may present several industry branches, however, the available information does not indicate that these uses specifically require SCCP containing rubber.

7 Alternatives

The information on possible alternatives is summarised in Table 3 (BRE 2008). With regard to performance and costs there appear to be alternative substances available for all of the use areas of SCCPs, although it is not clear whether this is the case for all specific applications of SCCPs (BRE 2008).

There is no information available on alternative materials or means of avoiding materials requiring SCCP.

8 Existing Community legislation relevant for possible exemptions

Directive 2002/45/EC restricts the placing of SCCPs on the market for use as substances or as constituents of other substances or preparations in concentrations higher than 1 % in metal working fluids and for fat liquoring of leather.

Alkanes, C10-13, chloro is a Priority Hazardous Substance of the Water Framework Directive (WFD; Directive 2000/60/EC, Annex X). According to Article 16(6) of the WFD the objective for Priority Hazardous Substances is *'… the cessation or phasing-out of discharges, emissions and losses of the substances…'*.

9 Other information

None.

Table 3: Summary of information on potential alternatives to the use of SCCPs (BRE, 2008)

Use	Alternative	Toxicity	Ecotoxicity	Cost	Availability	Use pattern	Performance
Rubber	MCCPs	Reproductive toxicant, effects on liver, kidney	R50-53; not readily biodegradable	Similar cost of substance, possible higher use rate; additional one-off costs	Commercially available	Similar to SCCPs	Technically viable alternative
	LCCPs	Possible carcinogenicity and reproductive effects	Not readily biodegradable; does not meet B and T criteria	Higher cost of substance; additional one-off costs.	Commercially available	Similar to SCCPs	Technically viable alternative
	Cresyl diphenyl phosphate	Toxicity to liver, kidney and blood	Does not meet P, B or T criteria	Significantly higher substance costs; additional one-off costs	Commercially available	Probable use in PVC rather than rubber	Currently used in PVC belting
	Tertbutylphenyl diphenyl phosphate	Possible liver, kidney and adrenal toxicity	Does not meet P and B criteria; provisional classification R50	Significantly higher substance costs; additional one-off costs	Commercially available	Probable use in PVC rather than rubber	Currently used in PVC belting
	Isopropylphenyl diphenyl phosphate	Low toxicity	Does not meet P and B criteria; acute aquatic toxicity <1 mg/l	Significantly higher substance costs; additional one-off costs	Commercially available	Probable use in PVC rather than rubber	Currently used in PVC belting
Textiles	MCCPs	Reproductive toxicant, effects on liver, kidney	R50-53; not readily biodegradable	Similar cost of substance, possible higher use rate; additional one-off costs	Commercially available	Similar to SCCPs, possible higher use rate	Technically viable alternative
	LCCPs	Possible carcinogenicity and reproductive effects	Not readily biodegradable; does not meet B and T criteria	Higher cost of substance; additional one-off costs.	Commercially available	Similar to SCCPs	Technically viable alternative

Use	Alternative	Toxicity	Ecotoxicity	Cost	Availability	Use pattern	Performance
	Decabromodiphenylether	Neurotoxicant	Not readily biodegradable , low to moderate bioaccumulation potential	Significantly higher substance cost than SCCPs; additional one-off costs. Requires diantimony trioxide	Commercially available	25% by weight (in conjunction with ATO)	Technically viable alternative
	Hexabromocyclododecane	Developmental effects	Meets the PBT criteria	Significantly higher substance cost than SCCPs; additional one-off costs. Requires diantimony trioxide	Commercially available	25% by weight (in conjunction with ATO)	Technically viable alternative
	Ethane, 1-2 bis(pentabromophenyl)	Limited data, but likely to be of low toxicity	Not readily biodegradable, may be persistent	Significantly higher substance cost than SCCPs; additional one-off costs. Requires diantimony trioxide	Commercially available	Typical loading 10-30 g/m^2	Technically viable alternative
Sealants, adhesives, paints, coatings	MCCPs	Reproductive toxicant, effects on liver, kidney	R50-53; not readily biodegradable	Similar cost of substance, possible higher use rate; additional one-off costs	Commercially available	Similar to SCCPs	Technically viable alternative
	LCCPs	Possible carcinogenicity and reproductive effects	Not readily biodegradable; does not meet B and T criteria	Higher cost of substance; additional one-off costs.	Commercially available	Similar to SCCPs	Technically viable alternative
	Phthalates	Possible developmental effects	Readily biodegradable; generally no effects at solubility		Commercially available		Do not provide flame retardancy

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