



SAFETY DATA SHEET-extended

Prepared in accordance with Commission Regulation (EU) 830/2015 amending Regulation EC 1907/2006, REACH

1,2 DICHLOROPROPANE

Revision: 5 Last up date: February 07, 2017 Date issued: May 02, 2011 Page 1/45

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Identification of the substance/preparation:

Trade name	Dichloropropane
IUPAC name	1,2-Dichloropropane
Synonyms	propylene dichloride; PDC; dichloropropane; DCP
EINECS (EC no)	201-152-2
CAS no.	78-87-5
Index no.	602-020-00-0
Molecular Formula	C ₃ H ₆ Cl ₂
Molecular weight	112.99
REACH Registration number	01-2119557878-16-0000
Type of substance	Monoconstituent (organic substance)

1.2. Relevant identified uses of the substance or mixture and uses advised against

Uses by workers in industrial settings

Use in solvent-based degreasers and cleaning products
Use as solvent/thinner for painting products/inks
Use as solvent for glues and adhesives
Use as stain remover for fabrics
Use as paint remover
Use as intermediate

Uses by professional workers

Use in solvent-based degreasers and cleaning products
Use as solvent/thinner for painting products
Use as solvent for glues and adhesives
Use as stain remover for fabrics
Use as paint remover

Uses by consumers

Use in solvent-based degreasers and cleaning products
Use as solvent/thinner for painting products
Use as solvent for glues and adhesives
Use as stain remover for fabrics

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Use as paint remover

Uses advised against: The use as active substance in plant protection products is forbidden, according to Directive 91/414/EEC.

1.3. Details of the supplier of the safety data sheet

Name	S.C. OLTCHIM S.A
Address	1 Uzinei Street, 240050 Ramnicu Valcea, Romania
Phone N°	+40 250 701 200
FAX N°	+40 250 735 030
E-mail of competent person responsible for SDS in the MS or in the EU:	tehnic@oltchim.com

1.4 Emergency telephone

European Emergency N°:	112
Emergency telephone at the company:	+40/250/738141- available 24h/day/365days
For Romania- The institution responsible with providing information in case of a health emergency is The National Institute for Public Health, Department for the International Sanitary Regulation and Toxicological Information.	Telephone: 021.318.36.06, Working hours: Monday - Friday from 8 a.m. to 3 p

2. HAZARD IDENTIFICATION

2.1. Classification of the substances or the mixture

2.1.1. Classification according to Regulation (EC) 1272/2008 (CLP)

A European Union [Harmonised Classification & Labelling](#) has been assigned to 1,2-dichloropropane.

Flam. Liq.2, H 225

Carc. 1B, H 350

Acute tox.4, H 302

Acute tox.4, H 332



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2.2. Label elements- Labeling according to Regulation 1272/2008

Labeling according to Regulation 1272/2008	
Signal Word	DANGER
GHS Pictograms	
GHS02 Flame	
GHS08 Health hazard	
GHS07: exclamation mark	
HAZARD STATEMENTS	
Hazard phrases	H 225: Highly flammable liquid and vapour. H 350: May cause cancer. H 302: Harmful if swallowed. H 332: Harmful if inhaled.
PRECAUTIONARY STATEMENTS	
Precautionary Statement	P202: Do not handle until all safety precautions have been read and understood. P210: Keep away from heat/sparks/open flames/hot surfaces. No smoking. P241: Use explosion-proof electrical/ventilating/lighting equipment. P303+P361+P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P260: Do not breathe dust/fume/gas/mist/vapours/spray. P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P301+P312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. P280: Wear protective gloves/protective clothing/eye protection/face protection.

Other information: 1,2-Dichloropropane is a highly flammable liquid, harmful if swallowed and inhaled. Vapor/air mixtures are explosive. Contact with strong oxidizers may cause fire.



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3. COMPOSITION/INFORMATION ON INGREDIENTS

Identification name	CAS no	EC No	Index no	Concentration, % (w/w)
1,2 - Dichloropropane	78-87-5	201-152-2	602-020-00-0	min.99.8

Impurities

No impurities relevant for classification and labelling.

4 . FIRST - AID MEASURES

4.1 Description of first aid measures

General Advice: If exposed or if you feel unwell: Call a Poison Center or doctor/physician. Show this safety data sheet to the doctor in attendance.

Following inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult give oxygen. Call a physician.

Following skin contact: Wash the contaminated skin with plenty of soap or mild detergent and water for at least 15 minutes while removing contaminated clothing and shoes. If irritation persists after washing, get medical attention.

Following eye contact: Wash the eyes immediately with large amount of water lifting the upper and lower lids. If irritation persists after washing get medical attention. Contact lenses should not worn with this product.

Following ingestion: Never give anything by mouth to an unconscious person. If victim is conscious give plenty of water to drink in order to dilute the content of stomach, also give activated charcoal (20-40g in 10% slurry), paraffin oil (3ml/kg) and sodium sulfate (1table spoon/1/4 l water). Do not induce vomiting. Keep the airway clear. Get medical attention immediately.

4.2. Most important symptoms and effects, both acute and delayed

By inhalation: Irritating to the respiratory tract. May causes headache, weakness, cyanosis, cyanosis, nausea vomiting and diarrhea. These symptoms may be followed by central nervous system effects, liver and kidney damage adrenal gland damage, weak and rapid pulse and unconsciousness.



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By eye contact: Vapor cause irritation. Splashes cause severe irritation, possible corneal burns and eye damage.

By skin contact: Causes irritation, rash and blister formation. Skin contact may produce a burning sensation.

By ingestion: Cause abdominal pain, nausea, diarrhea, headache and dizziness.

Chronic effect: Affects central nervous system, liver and kidneys. May cause cancer.

4.3 Indication of immediate medical attention and special treatment needed

Note to Physician: Gastric lavage

5. FIRE - FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media: Dry chemical, foam or carbon dioxide.

Unsuitable extinguishing media: Do not use a solid stream of water, since the stream will scatter and spread the fire. Water spray may be used to keep fire-exposed containers cool.

5.2 Special hazards arising from the substance or mixture

Exposure hazards: 1,2-Dichloropropane is a highly flammable liquid. Vapor/air mixtures are explosive at ambient temperatures.. Contact with strong oxidizers may cause fire. Toxic vapors of phosgene, carbon monoxide and hydrogen chloride are emitted on combustion. Explosive limit : 3,4 – 14,5 % vol.

Hazardous combustion products: Thermal decomposition or combustion may generate toxic and hazardous fumes of CO_x, HCl.

5.3 Advice for firefighters

Special precautions for fire-fighters: Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Protection of fire-fighters: Self-contained breathing apparatus, flame and chemical resistant clothing, hat, boots and gloves.

Remarks: Move containers from fire area if it can be done without risk. Water spray may be used to dilute spills to non flammable mixture, protect personnel attempting to stop leak and disperse vapors.



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6. ACCIDENTAL RELEASE MEASURES

6.1 . Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: Keep unnecessary and unprotected personnel away from entering. Avoid contact with skin, eyes, and clothing – wear suitable protective equipment (see section 8). Do not touch or walk through spill material. Shut off all ignition sources.

For emergency responders: Shutt off all source of ignition. Ventilate area of leak or spill. Persons performing clean-up work should wear adequate personal protective equipment and a self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Keep unnecessary and unprotected personnel from entering.

6.2. Environmental precautions

Stop leak and use water spray to reduce vapors. Do not let the product enter drainage system, surface and ground-water or soil. Contact local authorities in case of environmental release. Do not empty into drains.

6.3. Methods and materials for containment and cleaning up

Methods of cleaning up: Stop leak and use water spray to reduce vapors. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (vermiculite, dry sand, earth) and place in a chemical waste container. Send to the storage waiting for disposal procedures.

Special precautions: Do not use combustible materials, such as saw dust. Do not flush to sewer! Use only non sparking tools and equipment.

7. HANDLING AND STORAGE

7.1. Precautions for safe handling

Handling and Transfer Measures:

Do NOT use compressed air for filling, discharging or handling operations. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge



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The vapour is heavier than air, spreads along the ground and distant ignition is possible.

If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve.

Use explosion-proof electrical/ventilating/ lighting and other equipment.

Use appropriate equipment for filling containers. Containers must be constructed of appropriate material.

Ensure electrical continuity by bonding and grounding (earthing) all equipment.

Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks.

Handle and open container with care in a well-ventilated area.

Avoid Overfilling.

Do NOT empty into drains.

Use only with adequate ventilation.

Avoid all possible sources of ignition (spark or flame).

Do not puncture or incinerate container.

Advice on general occupational hygiene: Avoid inhalation or ingestion and contact with skin and eyes. General occupational hygiene measures are required to ensure safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no drinking, eating and smoking at the workplace. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home.

Storage: Must be stored in a dike (bunded) and well-ventilated area, away from sunlight, ignition sources and other sources of heat. Store DCP under nitrogen blanket and storage temperature should not exceed 20°C.

Keep away from flames, sources of ignition and hot surfaces. No smoking.

Take precautionary measures against static discharges.

Keep container in a well-ventilated place.

Keep container tightly closed

Incompatible substance: Keep away from strong oxidizers, strong acids and finely divided metals.

Incompatible materials: Polyethylene, rubber, light metals, aluminum.

Plastics have to be proven for their resistibility.

7.3. Specific end use(s)

Please check the identified uses from Section 1.2.



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8 . EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

8.1.1. Occupational Exposure limit values

	Limit value -8h mg/m ³	Limit values-Short term mg/m ³
Belgium	47	
Denmark	350	700
Finland	46	92 (1)
France	350	
Hungary	50	
Poland	50	
Romania	100	200 (1)
Spain	47	
Switzerland	350	

Remark: (1) 15 minutes average value

8.1.2. Information on monitoring procedures

Substance name: 1,2-Dichloropropane EC no.: 201-152-2 CAS no.: 78-87-5

DNELs for workers

Exposure pattern	Route	Descriptors	DNEL/DMEL (appropriate unit)	Most sensitive endpoint
Acute - systemic effects (x Factor 2)	dermal (mg/kg bw /day)	NOAEL = 62 mg/kg/day	2.07 mg/kg/day	Acute Skin contact
	Inhalation (mg/m ³)	NOAEC = 693 mg/ m ³	57.75 mg/m ³	Acute inhalation exposure
Acute - local effects	Dermal (mg/cm ²)	NOAEL = 83.3 mg/cm ²	1.39 mg/cm ²	Acute Skin contact
	Inhalation (mg/m ³)	NOAEC = 693 mg/m ³	57.75 mg/m ³	Acute exposure
Long-term - systemic effects	Dermal (mg/kg bw /day)	NOAEL = 62 mg/kg/day	1.03 mg/kg/day	Skin contact
	Inhalation (mg/m ³)	NOAEC = 693 mg/m ³	28.88 mg/m ³	Prolonged exposure
Long-term – local effects	Dermal (mg/cm ²)	NOAEL = 83.3 mg/cm ²	1.39 mg/cm ²	Skin contact
	Inhalation (mg/m ³)	NOAEC = 693 mg/m ³	-	Prolonged exposure



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DNELs for general population

Exposure pattern	Route	Descriptors	DNEL/DMEL (appropriate unit)	Most sensitive endpoint
Acute - systemic effects (x Factor 2)	Dermal (mg/kg bw /day)	NOAEL = 62 mg/kg/day	1.03 mg/kg/day	Skin contact
	Inhalation (mg/m ³)	NOAEC = 693 mg/m ³	28.88 mg/m ³	Acute exposure
	Oral (mg/kg bw /day)	NOAEL = 62 mg/kg/day	2.29 mg/ kg/day	Ingestion
Acute - local effects	Dermal (mg/cm ²)	NOAEL = 83.3 mg/cm ²	0.67 mg/ cm ²	Skin contact
	Inhalation (mg/m ³)	NOAEC = 693 mg/m ³	28.88 mg/m ³	Acute exposure
Long-term - systemic effects	Dermal (mg/kg bw /day)	NOAEL = 62 mg/kg/day	0.52 mg/kg/day	Skin contact
	Inhalation (mg/m ³)	NOAEC = 693 mg/m ³	14.44 mg/m ³	Prolonged exposure
	Oral (mg/kg bw /day)	NOAEL = 62 mg/kg/day	0.52 mg/kg/day	Ingestion
Long-term – local effects	Dermal (mg/cm ²)	NOAEL = 83.3 mg/cm ²	0.69 mg/ cm ²	Skin contact
	Inhalation (mg/m ³)	NOAEC = 693 mg/m ³	-	Acute exposure

PNECs

Environmental protection target	PNEC
Freshwater (mg/l)	8.2 x 10 ⁻²
Freshwater sediments (mg/kg ww)	1.57 x 10 ⁻¹
Marine water (mg/l)	8.2 x 10 ⁻²
Marine sediments (mg/kg ww)	1.57 x 10 ⁻²
Soil (mg/kg ww)	2.84 x 10 ⁻²
STP (mg/l)	0.53

8.2. Exposure control

8.2.1. Engineering controls: A system of local and/or general exhaust is recommended to keep employee exposure as low as possible. Local extract ventilation is generally preferred because it can control the emissions of the contaminant at its sources, preventing dispersions of it into the general work area. Ventilation equipment should be explosion- proof if explosive concentration of vapors or fume are present.

8.2.2. Personal Protection Equipment

Eye / Face protection : Use chemical safety goggles and/or a full face shield where splashing is



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possible. Avoid using contact lenses at work. Equipment for eye protection should be tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). The working area will be equipped with eyewash fountains.

Skin protection: Complete suit protecting against chemicals (solvent resistant). Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Do not take contaminated work clothes home, family members could be exposed.

Hand protection: The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min)

Unsuitable materials for protective gloves due to their degradation, severe swelling or low permeation time: Natural rubber, polychloropropene, nitrile rubber, butyl rubber, polyvinyl chloride (PVC)

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. Above recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Respiratory protection: If the exposure limit is exceeded, wear a supplied air, full-face piece self contained breathing apparatus.

Organic vapor respirator with a particulate pre-filter may be worn if vapors are detected or irritating. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus. In confined or poorly ventilated areas, use an approved self-contained breathing apparatus or positive pressure air line with auxiliary self-contained air supply.

Warning! Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

Environmental Exposure Control: It is recommendable to develop a monitoring plan in order to maintain the releases in the environment below the maximum allowed concentrations, complying with local, regional, regional and national legislation.

Other precautions: Maintain shower, eye wash fountain and quick-drench facilities in work area.



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10.3. Possibility of hazardous reactions:

Avoid contact with acids, bases, alkali metals, alkaline earth metals, aluminum, powdered metals, amides.

10.4. Conditions to avoid: Heat, sparks, electric equipment & open flame.

10.5. Incompatible materials: aluminum, powdered metals.

Materials to avoid: acids, bases, alkali metals, alkaline earth metals, aluminum, finely powdered metals, amides.

Hazardous decomposition products : Emits toxic fumes of hydrogen chloride, phosgene, acetylene and vinyl chloride when heated to decomposition.

11. TOXICOLOGICAL INFORMATION

	Conclusions
Absorbtion	The results of studies demonstrated rapid absorption, metabolism, and excretion irrespective of the route of exposure. Urine was the principle route of elimination (accounting for 40-65% of recovered radioactivity), followed by expired air (20-40% of recovered radioactivity).
Acute toxicity	<u>Oral route:</u> Rat: LD50 2200 mg/kg bw (males/femals) (OECD SIDS 2003a) <u>Inhalation route:</u> Rat, LC50 (4h): 2000 ppm (9.400 mg/L) by a conversion factor of 1 ppm = 4.7 mg/L (male/female); (OECD SIDS 2003a) <u>Dermal route:</u> Rabbit, LD50: 10100 mg/kg bw (male); (OECD SIDS 2003a)
Irritation/Corrosion	<u>Skin</u> Slightly irritating to rabbit (semioclusive); according to OECD Guideline 404 minimal redness and slight edema appear <u>Eye</u> Moderately irritating to Isolated Chicken Eyes; according to Oecd Guidelines 438 redness, swelling, and slight opacity may appear.
Sensitisation	1,2-dichloropropane, is not a sensitizer to skin.



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Repeated dose toxicity	<u>Oral route (dietary)</u> rat (Fischer 344) male/female, exposure: 103 wk (5 d/wk) NOAEL: 62 — 125 mg/kg bw (total dose) LOAEL: 125 — 250 mg/kg bw (total dose) Systemic effects observed. <u>Dermal route</u> study scientifically unjustified <u>Inhalation route</u> rabbit (male/female), exposure 13 weeks of exposure (6 hr/d, 5 d/wk) LOAEL: 150 ppm males (693 mg/m ³) NOAEL: 150 ppm females (693 mg/m ³)
Mutagenity	1,2-Dichloropropan have no genotoxic potential.
Carcinogenity	Due to the lack of a carcinogenic potential of 1,2-dichloropropane, there is currently no need for classification and labeling.
Toxicity for reproduction	Overall these studies provide no evidence that 1,2-dichloropropane selectively targets the male or female reproductive systems or the developing embryo/fetus. Lowest NOAEL values : 70 mg/kg bw/day for fertility 150 mg/kg bw for teratogenicity

12. ECOLOGICAL INFORMATIONS

12.1. Toxicity

Acute (short-term) toxicity

Fish: *Pimephales promelas*/Fresh water/ flow-through LC50 (96 h)= 139 mg/L

Aquatic invertebrates:*Daphnia/semi-static* EC₅₀ (24 h): 3.8 mg/L

EC₅₀ (48 h): 2.7 mg/L

Algae and aquatic plants

Pseudokirchnerella subcapitata (reported as *Selenastrum capricornutum*) (algae)/fresh water/static
EC₅₀ (72 h): > 7.95 mg/L (NOEC = 7.95 mg/L)



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Chronic (long-term) toxicity

Fish: *Pimephales promelas* NOEC (28 d): 6 — 11 mg/L

Aquatic invertebrates:

Mysidopsis bahia (new name: *Americamysis bahia*)/ fresh water EC₁₀/LC₁₀ or NOEC: 4.09 mg/L

Toxicity to soil macro-organisms

Eisenia fetida (annelids)/ long-term toxicity LC₅₀ (14 d): 4240 mg/kg soil dw

Toxicity to terrestrial plants: In accordance with column 2 of REACH Annex IX, the short term toxicity to plants study does not need to be conducted as direct and indirect exposure of the soil compartment is unlikely. The substance shows a low adsorptive (log K_{oc} = 1.72) as well as a bioaccumulative (log K_{ow} = 1.99 - 2.28, BCF = 0.5 - 7) potential. Hence, a relevant distribution into soil and a considerable exposure of terrestrial plants is not expected.

12.2. Persistence and degradability

Abiotic degradation:

Biodegradation: 1,2-dichloropropane is not inherently biodegradable as only 11.7% of degradation was observed after 28 days.

12.3. Bioaccumulative potential: Log Pow values were lower than the threshold level of 4.5 as indicated in the PBT assessment guidance, so substance is not considered to bioaccumulate in the aquatic organism.

12.4. Mobility

Air: Even 1,2-dichloropropane is considered to volatilise in the atmospheric compartment, the further evaluation did not show any hazard. Photo-oxidation half-life in air, based on estimated rate constant for the vapour phase reaction with hydroxyl radicals in air, in the range 65 - 646 hr.

Soil and water: 1,2-dichloropropane is not expected to adsorb significantly to organic matter in soil, sediment, or suspended solids in wastewater or surface waters, based on a modelled value for K_{oc} of 68 (Davis, 2004). The low K_{oc} value suggests that 1,2-dichloropropane is expected to have high mobility in soil. The Henry's Law constant of 274 Pa m³ mol⁻¹ indicates that 1,2-dichloropropane is expected to volatilize from soil and to a much lesser extent from water surfaces.

12.5. Results of PBT and vPvB assessment: 1,2-Dichloropropane does not fulfil the PBT criteria (not PBT) and not the vPvB criteria (not vPvB).



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13. DISPOSAL CONSIDERATIONS

This section contains generic advice and guidance.

13.1 Waste treatment methods

13.1.1 Product

Methods of disposal : The generation of waste should be avoided or minimised wherever possible. Hazardous waste according to Waste catalogue. If there is no way of recycling it must be disposed of in compliance with the respective national and local regulations. Avoid dispersal of spill material and runoff and contact with soil, waterways, drains and sewers.

Collection of small amounts of substance: place in a dedicated collection container properly labeled. Store the vessels in a well-ventilated location. Entrust them to the appropriate authorities for disposal. Do not use containers made of aluminium!

European waste codes list : 07 01 03* organic halogenated solvents, washing liquids and mother liquors

Note: Also please refer to your specific industry and take into account the waste composition for establish the correct waste code.

13.1.2. Packaging

Methods of disposal : The generation of waste should be avoided or minimised wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

Special precautions: Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spill material and runoff and contact with soil, waterways, drains and sewers.

Relevant European legislation regarding waste:

Directive 2008/98/EC on waste (Waste framework Directive)

Directive 2008/532/EC replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste Regulation (Ec) No 1013/2006 of the European Parliament and of the Council on shipments of waste, with subsequent modifications and additions



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14. TRANSPORT INFORMATION

1,2 Dichloropropane can be shipped according to transport regulations for dangerous goods, hazard class 3, Flammable liquids.

Transport Labeling



Label no.3
Flammable liquids

RID/ADR

UN No.	1279
Proper shipping name	1,2 Dichloropropane
Hazard class	3
UN Packing Group	II
Classification code	F1

Danger panel **33/1279** (**Hazard Identification No.** 33)
(**UN Identification No** 1279)

IMDG/IMO

UN No.	1279
Hazard class	3
UN Packing Group	II
Proper shipping name	1,2 Dichloropropane
EmS No.	F-E, S-D
Marine pollutant	No

IATA/IT-ICAO

Proper shipping name	1,2 Dichloropropane
UN No.	1279
Hazard class	3
UN Packing Group	II
IATA Label	Flammable Liquid



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Passenger and cargo: (LIMITED QUANTITY) P.I.: Y341; max net q.ty per pack: 1 L;

Passenger and cargo: P.I.: 353; max net q.ty per pack: 5 L;

Cargo only: P.I.: 364; max net q.ty per pack: 60L.

Special provision: 3H.

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Relevant information regarding the European legislation

EU Regulation (EC) No. 1907/2006 (REACH) Regulation (EC) no.1907/2006 of the European Parliament and of the Council regarding the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) Regulation

Regulation (EC) no.1272/2008 of the European Parliament and of the Council on the Classification, Labeling and Packaging of substances and mixtures.

Directive 2012/18/EU (SEVESO III) of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC

Regulation (EC) No 1005/2009 of the European Parliament and of the Council on substances that deplete the ozone layer

European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)

Regulation referring to the International Carriage of Dangerous Goods by Rail (RID)

International Maritime Dangerous Goods (IMDG)

Authorization: 1,2- Dichloropropane is not subject for authorization

Restrictions on use according to Annex XVII of Reg. 1907/2006, REACH

Annex XVII point 3

1. Putting into circulation and the utilisation of the substance is not allowed in decorative objects, games, and joke article.

Further information on restriction could be find into regulation.

Directive 2012/18/EU -SEVESO III Directive- 1,2 –Dichloropropane is listed on Annex I Part 1 in Sections P5a, P5b, P5c.

Water contaminating class WGK 3 (Germany regulation)

Other EU regulations: 1,2 –Dichloropropane is not subject to:

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer



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Regulation (EC) No 850/2004 on persistent organic pollutants

Regulation (EC) No 649/2012 concerning the export and import of dangerous chemicals

15.2 Chemical safety Assessment Assessment

A chemical safety assessment has been carried out for this substance and a CSR was issued.

16. OTHER INFORMATION

16.1. Relevant H-statements (number and full text)

H 225 Highly flammable liquid and vapour.

H 350: May cause cancer.

H 302 Harmful if swallowed.

H 332 Harmful if inhaled.

16. 2. Abbreviation and acronyms (NOT ALL ARE USED IN THIS SDS)

AC Article category

ADR European agreement concerning the international carriage of dangerous goods by road

BSAF Bio soil accumulation factor

BCF Bio concentration factor

CAS Chemical Abstracts Service

CLP Classification, labelling and packaging

CMR Carcinogenic, mutagenic or toxic for reproduction

CSA/CSR Chemical safety assessment / Chemical safety report

DNEL Derived no effect level

EC10 Concentration of a substance where 10% of the population is affected

EC50 Concentration of a substance where 50% of the population is affected

ECHA European chemicals agency

EINECS EU list of existing chemical substances

EmS Emergency schedule

ERC Environmental release category

ES Exposure scenario

eSDS Extended safety data sheet

GHS Globally harmonised system

IATA-DGR International air transport association - dangerous goods regulations

ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air

IU Identified use

IUPAC International Union of Pure and Applied Chemistry

IBC code International code for the construction and equipment of ships carrying dangerous



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chemicals in bulk

IMDG International maritime dangerous goods

KP Partition coefficient

LC10 Lethal concentration of a substance that can be expected to cause death in 10% of the population

LC50 Lethal concentration of a substance that can be expected to cause death in 50% of the population

LD50 Lethal dose of a substance that can be expected to cause death in 50% of the population

NO(A)EC No observed (adverse) effect concentration

NO(A)EL No observed (adverse) effect level

OECD Organisation for economic co-operation and development

OEL Occupational exposure limit

PBT Persistent, bioaccumulative, and toxic

PC Product category

PNEC Predicted no-effect concentration

PROC Process category

REACH Registration, evaluation, authorisation and restriction of chemicals (i.e. Regulation (EC) No. 1907/2006)

RID International rule for transport of dangerous substances by railway

SDS Safety data sheet

STOT Specific target organ toxicant

STP Sewage treatment plant

SU Sector of end use

TWA Time weighted average

vPvB Very persistent, very bioaccumulative

16.3. Key literature references

The information provided in this eSDS is consistent with the information provided in the REACH CSR. The CSR contains a complete reference list for all data used. Non confidential data from the REACH registration dossier are published by the ECHA, see <https://echa.europa.eu/information-on-chemicals/registered-substances>, http://echa.europa.eu/clp/c_1_inventory_en.asp <http://chelist.jrc.ec.europa.eu> <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp> (GESTIS chemicals database)

16.4. Revision 5 replaces revision 4.

Chapters 2, 3, 6, 7, 8, 9, 12, 13, 15, 16 of this safety data sheet have been revised according to the provision of Regulation (EC) No. 1907/2006, as amended by Regulation 830/2015, and Regulation (EC) No. 1272/2008 -consolidated. The information provided in this SDS is consistent with the information provided in the REACH CSR for 1,2-dichloropropane.



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Disclaimer:

Oltchim provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. Furthermore, this safety data sheet is made up based on the legal requirements as set by EC 1907/2006 (REACH) and EC Regulation 830/2015.



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ANNEX I -EXPOSURE SCENARIOUS

9.1 Exposure Scenario 1: MANUFACTURING OF THE SUBSTANCE

Sector of use:

Not relevant

Market sector:

Not relevant

Environment:

Manufacturing process of the substance (ERC1)

Workers:

Use in closed process, no like hood of exposure (PROC1)

Transfer of substance from vessel to large containers at dedicated facilities (PROC8b)

9.1.1 Exposure Scenario

Description of activities and processes covered in the exposure scenario:

1,2-Dichloropropane is produced as a co-product during the synthesis of propylene oxide via chlorohydrin process. After the process, the substance is purified by distillation and sent to storage facilities via dedicated pipelines. All the manufacturing stages are performed in closed systems.

The exposure scenario includes monitoring activities of the process, transfer and maintenance operations.

9.1.1.1 Control of environmental exposure: *Manufacturing process of the substance (ERC1)*

Product characteristics

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Concentration of substance in the manufactured product: up to 100% w/w.

Amount manufactured

Annual amount manufactured per site: up to 22000 ton/y (at one site);

Percentage of tonnage manufactured at regional scale: 100%.

Frequency and duration of manufacturing

Production days per site: up to 360 day/y.

Other given operational conditions affecting environmental exposure

Process conditions: temperature not > 20°C above ambient temperature.

Technical onsite conditions and measures at process level to prevent release and to reduce or limit discharges, air emissions and releases to soil

Closed system (COSHH essentials Control Approach 3: Containment).

The substance is produced and handled under strictly controlled conditions: all process stages are performed in closed systems. The substance is rigorously contained by technical control measures during its whole production process, including purification, cleaning, maintenance of the equipment, sampling, analysis, loading and unloading of equipment, vessels, waste disposal and storage.



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No wastewater and air emissions containing the substance arise from the process; wastes from distillation phase are sent to incineration plants.

Conditions and measures related to sewage treatment plant

No wastewater containing the substance arises from the process.

Conditions and measures related to treatment of waste

Wastes from distillation phase are incinerated at dedicated plants.

9.1.1.2 Control of workers exposure: Use in closed process, no likelihood of exposure (PROCI)

Activities covered in the contributing exposure scenario

Monitoring activities during the manufacturing process; maintenance operations.

Product characteristics

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Concentration of substance in the manufactured product: up to 100% w/w.

Frequency and duration of exposure:

Duration of exposure > 4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: one hand face only (240 cm²) (Default ECETOC TRA model value)

Other given operational conditions affecting workers exposure:

Temperature not > 20°C above ambient temperature. Location: indoor; Industrial setting.

Technical conditions and measures to control dispersion from source towards the workers:

Closed system (COSHH essentials Control Approach 3: Containment).

The substance is produced and handled under strictly controlled conditions: all process stages are performed in closed systems. The substance is rigorously contained by technical control measures during its whole production process, including purification, cleaning, maintenance of the equipment, sampling, analysis, loading and unloading of equipment, vessels, waste disposal and storage.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Only properly trained and authorized personnel handle the mixtures; handling procedures are well documented and strictly supervised by trained operators.

For cleaning and maintenance operations, special procedures such as purging and washing are applied before the system is opened.

In cases of accident and where wastes are generated, procedural and/or control technologies are used to minimize emissions and exposure of workers.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment are recommended: gloves, safety glasses, coveralls, safety shoes, helmet.

Gloves materials and specifications: in case of long-term contact Viton fluoroelastomer gloves (thickness: 0.3-0.71 mm; typical breakthrough time: 480 min) or PVA gloves (thickness: 0.3 mm; typical breakthrough time: 360 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).

(Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).

Good hygiene practices and housekeeping.

9.1.1.3 Control of workers exposure: Transfer of the substance from vessel to large containers at dedicated facilities (PROC8b)

Activities covered in the contributing exposure scenario: unloading/loading operations



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Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)
Concentration of substance in the manufactured product: ≤100% w/w.

Frequency and duration of exposure:

Duration of exposure >4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands (960 cm²) (Default ECETOC TRA model value)

Other given operational conditions affecting workers exposure:

Temperature not > 20°C above ambient temperature. Location: indoor; Industrial setting.

Technical conditions and measures to control dispersion from source towards the workers:

COSHH essentials Control Approach 3: Containment (Reduction efficiency: 99%).
The substance is rigorously contained by technical control measures during its whole production process, including loading and unloading of equipment, vessels, waste disposal and storage. Transfer operations occurs via dedicated pipelines.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.
Only properly trained and authorized personnel handle the mixtures; handling procedures are well documented and strictly supervised by trained operators.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment are recommended: gloves, safety glasses, coveralls, safety shoes, helmet.
Gloves materials and specifications: in case of long term contact Viton fluoroelastomer gloves (thickness: 0.3-0.71 mm; typical breakthrough time: 480 min) or PVA gloves (thickness: 0.3 mm; typical breakthrough time: 360 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).
(Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).
Good hygiene practices and housekeeping.

9.2 Exposure Scenario 2: FORMULATION

Sector of use:

Not relevant

Market sector:

PC0 (UCN code: R10100): Degreasers;
PC35: Washing and cleaning products;
PC9a: Coatings and paints, thinners, paint removers;
PC1: Adhesives, sealants;
PC18: Ink and toners

Environment:

Formulation process (ERC2)

Workers:

Used in closed batch process (PROC3)
Mixing or blending in batch process (PROC5)
Transfer of the substance/mixtures from/to vessel to/from large containers at dedicated facilities (PROC8b)
Transfer of the substance/mixtures into small containers (dedicated filling line) (PROC9)



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9.2.1 Exposure Scenario

Description of activities and processes covered in the exposure scenario:

During the formulation stage, 1,2-Dichloropropane is mixed to other components to produce mainly industrial and professional preparations as degreasers/cleaning products and solvents/thinners for painting products/inks (ca. 70% w/w of the tonnage used for formulations); and, to a lesser extent, solvents for glues and adhesives, stain removers for fabric and paint removers.

In the final products, the content of 1,2-Dichloropropane can vary from 1-2% w/w, when it is used as denaturing additive for other solvents (e.g. alcohols, white spirit), to 90% w/w, when its main function is as solvent; the typical content of the substance in the formulated products is 40% w/w.

The exposure scenario includes monitoring activities of the process, transfer operations and maintenance.

9.2.1.1 Control of environmental exposure: *Formulation process (ERC 2)*

Product characteristics

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical content in the final mixtures: up to 40% w/w.

Amount used

Annual amount used per site: up to 4500 ton/y (at the main site of use)

Fraction of the main site of use: 0.9

Frequency and duration of process

Production days per site: up to 240 day/y.

Other given operational conditions affecting environmental exposure

Process conditions: T = ambient temperature; P= 1 atm. Location: Indoor.

Technical onsite conditions and measures at process level to prevent release and to reduce or limit discharges, air emissions and releases to soil

The formulation process is arranged to maximize the efficiency of use of input raw materials, through the highest conversion into formulated products. Process losses are minimized, through the use of closed or semi-closed equipment to minimize losses of VOCs (Volatile Organic Compounds). RMMs primarily are aimed at controlling emission of VOCs at source to meet the relevant total emission limit value set out in the EU Solvent Emission Directive (1999/13/EC):

- use of closed storage facilities for VOC-containing raw materials;
- use of closed transfers of liquids from storage to production equipment;
- use of closed production equipment, with no extraction, except when opening vessels for additions/sampling;
- use of semi-closed production vessels with extraction to atmosphere to maintain workplace airborne VOC concentrations below respective OELs;
- use of impermeable covers on work in progress;
- use of closed equipment cleaning;
- storage of finished products in closed containers (bulk tanks, IBCs, drums, cans etc);
- recycling and reuse of over-made product in subsequent batches;
- storage of all VOC-containing wastes in closed, secure containers (bulk tanks, IBCs, drums)

Air emissions are treated by adsorption with activated carbon (RMM Library code: E12.14); efficiency of adsorption: 80% (default value); 95% (max achievable).

The composition the formulated products (solvent borne) and the formulation process are such that there are no discharges of raw materials or products to wastewater or to soil.

Organisational measures to prevent/limit release from site

An environmental management system should be implemented.



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Conditions and measures related to sewage treatment plant

Liquid wastes are collected into dedicated containers for the recovery of the substance and the other organic solvents, through distillation. No wastewater containing the substance arises from the process.

Conditions and measures related to treatment of waste

Contaminated solid wastes are collected into containers and sent to external waste disposal facilities.

9.2.1.2 Control of workers exposure: *Use in closed batch process (PROC3)*

Activities covered in the contributing exposure scenario:

Monitoring activities during the formulation process.

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Concentration of substance in the final mixture: up to 90% w/w.

Frequency and duration of exposure:

Duration of exposure: > 4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: one hand face only (240 cm²) (Default ECETOC TRA model value).

Other given operational conditions affecting workers exposure:

Operational conditions: T= ambient temperature. Location: indoor; Industrial setting.

Technical conditions and measures to control dispersion from source towards the workers:

Process losses are minimized, through the use of closed equipment to minimize losses of VOCs (Volatile Organic Compounds). RMMs primarily are aimed at controlling emission of VOCs at source: the substance is mixed with the other components through computerized systems; the final mixtures are packaged by the use of automatic machines, in case of big batches, or using semi-automatic machines, for small batches.

General good ventilation.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment: gloves, safety glasses, coveralls, safety shoes.

Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).

(Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).

Good hygiene practices and housekeeping.

9.2.1.3 Control of workers exposure: *Mixing or blending in batch process (PROC5)*

Activities covered in the contributing exposure scenario:

Monitoring activities during the formulation process.

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Concentration of substance in the final mixture: up to 90% w/w.

Frequency and duration of exposure:

Duration of exposure: > 4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands face (480 cm²) (Default ECETOC TRA model value).



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Other given operational conditions affecting workers exposure:

Operational conditions: T= ambient temperature. Location: indoor; Industrial setting.

Technical conditions and measures to control dispersion from source towards the workers:

Process losses are minimized, through the use of closed or semi-closed equipment to minimize losses of VOCs (Volatile Organic Compounds). RMMs primarily are aimed at controlling emission of VOCs at source.
General good ventilation and LEV should be provided. Efficiency of LEV (RMM library code: W17.Ex1): 80% (typical default value); 96% (maximum achievable); LEV efficiency assumed by ECETOC TRA Worker model: 90%.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment: gloves, safety glasses, coveralls, safety shoes.
Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).
(Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).
Good hygiene practices and housekeeping.

9.2.1.4 Control of workers exposure: Transfer of the substance/mixtures from/to vessel to/from large containers at dedicated facilities (PROC8b)

Activities covered in the contributing exposure scenario: loading and unloading to/from mixer

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)
Concentration of substance in the final mixture: up to 90% w/w.

Frequency and duration of exposure:

Duration of exposure: up to 4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands (960 cm²) (Default ECETOC TRA model value).

Other given operational conditions affecting workers exposure:

Operational conditions: T= ambient temperature. Location: indoor; Industrial setting.

Technical conditions and measures to control dispersion from source towards the workers:

Process losses are minimized, through the use of closed or semi-closed equipment to minimize losses of VOCs (Volatile Organic Compounds). RMMs primarily are aimed at controlling emission of VOCs at source:

- use of closed production equipment, with no extraction, except when opening vessels for additions/sampling;
- use of semi-closed production vessels with extraction to atmosphere to maintain workplace airborne VOC concentrations below respective OELs.

General good ventilation and LEV should be provided. Efficiency of LEV (RMM library code: W17.Ex1): 80% (typical default value); 96% (maximum achievable); LEV efficiency assumed by ECETOC TRA Worker model: 95%.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment used: gloves, safety glasses, coveralls, safety shoes.
Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).



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(Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).
Good hygiene practices and housekeeping.

9.2.1.5 Control of workers exposure: *Transfer of the substance/mixtures into small containers (PROC9)*

Activities covered in the contributing exposure scenario: unloading from mixer; sampling

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)
Concentration of substance in the final mixture: up to 90% w/w.

Frequency and duration of exposure:

Duration of exposure: up to 4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands face (480 cm²) (Default ECETOC TRA model value)

Other given operational conditions affecting workers exposure:

Operational conditions: T= ambient temperature. Location: indoor; Industrial setting.

Technical conditions and measures to control dispersion from source towards the workers:

Process losses are minimized, through the use of closed or semi-closed equipment to minimize losses of VOCs (Volatile Organic Compounds). RMMs primarily are aimed at controlling emission of VOCs at source:

- use of closed production equipment, with no extraction, except when opening vessels for additions/sampling;
- use of semi-closed production vessels with extraction to atmosphere to maintain workplace airborne VOC concentrations below respective OELs.

General good ventilation and LEV should be provided. Efficiency of LEV (RMM library code: W17.Ex1): 80% (typical default value); 96% (maximum achievable); LEV efficiency assumed by ECETOC TRA Worker model: 90%.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment used: gloves, safety glasses, coveralls, safety shoes.

Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).

(Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).
Good hygiene practices and housekeeping.

9.3 Exposure Scenario 3: USE OF FORMULATIONS - Industrial use

Sector of use:

SU3 (Industrial uses):

SU17: General manufacturing, (e.g. machinery, equipment, vehicles, other transport equipment);

SU15: Manufacture of fabricated metal products, except machinery and equipment,

SU18: Manufacture of furniture;

SU5: Manufacture of textiles, leather, fur;

SU7: Printing and reproduction of recorded media

Market sector:

PC0 (UCN code: R10100): Degreasers;

PC35: Washing and cleaning products;



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PC9a: Coatings and paints, thinners, paint removers;
PC1: Adhesives, sealants;
PC18: Ink and toners

Environment:

Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

Workers:

Use in closed continuous process with occasional controlled exposure (PROC2)
Mixing or blending for formulation (PROC5)
Industrial spraying (PROC7)
Treatment of articles by dipping and pouring (PROC13)
Roller application or brushing (PROC10)
Transfer of the substance/mixtures from/to vessel to/from large containers at dedicated facilities (PROC8b)

9.3.1 Exposure Scenario

Description of activities and processes covered in the exposure scenario:

Mixtures containing 1,2-dichloropropane are mainly used in the industry as degreasers/cleaning products and solvents/thinners for painting products/inks (ca. 70% w/w of the tonnage intended to industrial uses); and, to a lesser extent (ca. 30% w/w), as solvent in glues and adhesives products, stain removers for fabric and paint removers. The exposure scenario includes transfer from storage, pouring/unloading from drums or containers, mixing/diluting in the preparatory phase, application by spraying, brushing, dipping and wiping, equipment cleaning and maintenance.

9.3.1.1 Control of environmental exposure: Industrial use of processing aids in processes and products, not becoming part of articles (ERC 4)

Product characteristics

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)
Typical concentration in the final mixtures: 40% w/w

Amount used

Annual amount used: up to 2700 ton/y;
Annual amount used at the main local site of use: up to 1350 ton/y (EUSES default value for the fraction of the main local source: 0.5).

Frequency and duration of process

Use days per site: 180 day/y (EUSES default value for number emission days at the main local site of use)

Other given operational conditions affecting environmental exposure

Process conditions: T = ambient temperature; P= 1 atm. Location : Indoor; Industrial settings.

Technical onsite conditions and measures at process level to prevent release and to reduce or limit discharges, air emissions and releases to soil

The process should be optimized for highly efficient utilisation of the formulations. RMMs primarily are aimed at controlling emission of VOCs (Volatile Organic Compounds) to meet the relevant total emission limit value set out in the EU Solvent Emission Directive (1999/13/EC):

- use of closed storage facilities for VOC-containing raw materials;
- use of closed transfers of liquids from storage to equipment;
- use of closed application equipment
- use of closed equipment cleaning;
- storage of all VOC-containing wastes in closed, secure containers (bulk tanks, IBCs, drums).

Air emissions are treated by wet scrubber (RMM Library code: E12.02; efficiency: 70% (default), >99% (max



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achievable); thermal oxidation (RMM Library code: E12.12; efficiency: 98% (default), >99.9% (max achievable); adsorption (RMM Library code: E12.14); efficiency of adsorption: 80% (default value); 95% (max achievable). Substance losses to wastewater are restricted to equipment cleaning or in the spray booth scrubber water. No discharges of raw materials or products to soil occur. Overall efficiency of the total process, aimed to control emissions, is estimated as 80%.

Organisational measures to prevent/limit release from site

An environmental management system should be implemented.

Conditions and measures related to sewage treatment plant

Liquid wastes and wastewater are collected into dedicated containers for the recovery of the substance and the other organic solvents, through distillation. Not recoverable liquid wastes are sent to incineration.

Conditions and measures related to treatment of waste

Contaminated solid wastes are collected into containers and sent to external waste disposal facilities.

9.3.1.2 Control of workers exposure: *Use in closed continuous process with occasional controlled exposure (PROC2)*

Activities covered in the contributing exposure scenario:

Use of the formulations in closed continuous process

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)
Typical concentration in the final mixtures: 40% w/w

Frequency and duration of exposure:

Duration of exposure: > 4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands face (480 cm²) (Default ECETOC TRA model value).

Other given operational conditions affecting workers exposure:

Operational conditions: T= ambient temperature. Location: indoor; Industrial setting.

Technical conditions and measures to control dispersion from source towards the workers:

Process losses are minimized, through the use of closed equipment to minimize losses of VOCs (Volatile Organic Compounds). RMMs primarily are aimed at controlling emission of VOCs at source: General good ventilation and LEV should be provided. Efficiency of LEV (RMM library code: W17.Ex1): 80% (typical default value); 96% (maximum achievable); LEV efficiency assumed by ECETOC TRA Worker model: 90%.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment: gloves, safety glasses, coveralls, safety shoes.
Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).
(Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).
Good hygiene practices and housekeeping.

9.3.1.3 Control of workers exposure: *Mixing or blending for formulation (PROC5)*



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Activities covered in the contributing exposure scenario:

Mixing/diluting in the preparatory phase

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical concentration in the final mixtures: 40% w/w

Frequency and duration of exposure:

Duration of exposure: up to 1 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands face (480 cm²) (Default ECETOC TRA model value).

Other given operational conditions affecting workers exposure:

Operational conditions: T= ambient temperature. Location: indoor; Industrial setting.

Technical conditions and measures to control dispersion from source towards the workers:

General good ventilation and LEV should be provided. Efficiency of LEV (RMM library code: W17.Ex1): 80% (typical default value); 96% (maximum achievable); LEV efficiency assumed by ECETOC TRA Worker model: 90%.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment: gloves, safety glasses, coveralls, safety shoes.

Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).

Half-mask respirator is recommended (APF factor of respiratory protection: 10) (Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).

Good hygiene practices and housekeeping.

9.3.1.4 Control of workers exposure: Industrial spraying (PROC7)**Activities covered in the contributing exposure scenario:**

Application of formulations by spraying

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical concentration in the final mixtures: 40% w/w

Frequency and duration of exposure:

Duration of exposure: > 4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands and forearms (1500 cm²) (Default ECETOC TRA model value).

Other given operational conditions affecting workers exposure:

Operational conditions: T= ambient temperature. Location: indoor; Industrial setting.

Technical conditions and measures to control dispersion from source towards the workers:

Process losses are minimized, through the use of closed equipment to minimize losses of VOCs (Volatile Organic Compounds). RMMs primarily are aimed at controlling emission of VOCs at source:

General good ventilation and LEV should be provided. Efficiency of LEV (RMM library code: W17.Ex1): 80% (typical default value); 96% (maximum achievable); LEV efficiency assumed by ECETOC TRA Worker model: 95%.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Conditions and measures related to personal protection, hygiene and health evaluation:

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Personal protective equipment: gloves, safety glasses, coveralls, safety shoes.
Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).
Half-mask respirator is recommended (APF factor of respiratory protection: 20) (Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).
Good hygiene practices and housekeeping.

9.3.1.5 Control of workers exposure: *Treatment of articles by dipping and pouring (PROC13)*

Activities covered in the contributing exposure scenario:

Application of formulations by dipping

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical concentration in the final mixtures: 40% w/w

Frequency and duration of exposure:

Duration of exposure: > 4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands face (480 cm²) (Default ECETOC TRA model value).

Other given operational conditions affecting workers exposure:

Operational conditions: T= ambient temperature. Location: indoor; Industrial setting.

Technical conditions and measures to control dispersion from source towards the workers:

Process losses are minimized, through the use of closed equipment to minimize losses of VOCs (Volatile Organic Compounds). RMMs primarily are aimed at controlling emission of VOCs at source:

General good ventilation and LEV should be provided. Efficiency of LEV (RMM library code: W17.Ex1): 80% (typical default value); 96% (maximum achievable); LEV efficiency assumed by ECETOC TRA Worker model: 90%.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment: gloves, safety glasses, coveralls, safety shoes.

Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).

Half-mask respirator is recommended (APF factor of respiratory protection: 20) (Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).

Good hygiene practices and housekeeping.

9.3.1.6 Control of workers exposure: *Roller application or brushing (PROC10)*

Activities covered in the contributing exposure scenario:

Application of formulations by brush or roll

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical concentration in the final mixtures: 40% w/w

Frequency and duration of exposure:



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Duration of exposure: up to 4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands (960 cm²) (Default ECETOC TRA model value).

Other given operational conditions affecting workers exposure:

Operational conditions: T= ambient temperature. Location: indoor; Industrial setting.

Technical conditions and measures to control dispersion from source towards the workers:

Process losses are minimized, through the use of closed equipment to minimize losses of VOCs (Volatile Organic Compounds). RMMs primarily are aimed at controlling emission of VOCs at source:

General good ventilation and LEV should be provided. Efficiency of LEV (RMM library code: W17.Ex1): 80% (typical default value); 96% (maximum achievable); LEV efficiency assumed by ECETOC TRA Worker model: 90%.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment: gloves, safety glasses, coveralls, safety shoes.

Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).

Half-mask respirator is recommended (APF factor of respiratory protection: 20) (Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).

Good hygiene practices and housekeeping.

9.3.1.7 Control of workers exposure: Transfer of the substance/mixtures from/to vessel to/from large containers at dedicated facilities or brushing (PROC8b)

Activities covered in the contributing exposure scenario: unloading from containers

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical concentration in the final mixtures: 40% w/w

Frequency and duration of exposure:

Duration of exposure: up to 4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands (960 cm²) (Default ECETOC TRA model value).

Other given operational conditions affecting workers exposure:

Operational conditions: T= ambient temperature. Location: indoor; Industrial setting.

Technical conditions and measures to control dispersion from source towards the workers:

Process losses are minimized, through the use of closed equipment to minimize losses of VOCs (Volatile Organic Compounds). RMMs primarily are aimed at controlling emission of VOCs at source:

General good ventilation and LEV should be provided. Efficiency of LEV (RMM library code: W17.Ex1): 80% (typical default value); 96% (maximum achievable); LEV efficiency assumed by ECETOC TRA Worker model: 95%.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment: gloves, safety glasses, coveralls, safety shoes.

Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min); in case of short-term



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contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).

Half-mask respirator is recommended (APF factor of respiratory protection: 10) (Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).

Good hygiene practices and housekeeping.

9.4 Exposure Scenario 4: USE OF FORMULATIONS - Professional use

Sector of use:

SU22 (Professional uses):

SU0 (NACE code: 45.2): Maintenance and repair of vehicles

SU0 (NACE code: C33): Repair and installation of machinery and equipment

SU15: Manufacture of fabricated metal products, except machinery and equipment

SU18: Manufacture of furniture

SU5: Manufacture of textiles, leather, fur

SU0: Laundries

SU7: Printing and reproduction of recorded media

Market sector:

PC0 (UCN code: R10100): Degreasers

PC35: Washing and cleaning products;

PC9a: Coatings and paints, thinners, paint removers;

PC1: Adhesives, sealants;

PC18: Ink and toners

Environment:

Wide dispersive indoor use of processing aids in open system (ERC8a)

Wide dispersive outdoor use of processing aids in open system (ERC8d)

Workers:

Use in batch and other process where opportunity for exposure arises (PROC4)

Mixing or blending for formulation (PROC5)

Non-industrial spraying (PROC11)

Treatment of articles by dipping and pouring (PROC13)

Roller application or brushing (PROC10)

Hand-mixing with intimate contact and only PPE available (PROC19)

Transfer of the substance/mixtures from/to vessel to/from large containers at non-dedicated facilities (PROC8a)

9.4.1 Exposure Scenario



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Description of activities and processes covered in the exposure scenario:

Mixtures containing 1,2-dichloropropane are used by professional workers as degreasers/cleaning products and solvents/thinners for painting products/inks; and, to a lesser extent, as solvent in glues and adhesives, stain removers for fabric and paint removers.

The exposure scenario includes transfer from storage, pouring/unloading from drums or containers, mixing/diluting in the preparatory phase, application by spraying, brushing, dipping and wiping, equipment cleaning and maintenance.

9.4.1.1 Control of environmental exposure: *Wide dispersive indoor/outdoor use of processing aids in open system (ERC 8a/8d)*

Product characteristics

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical concentration of substance in the final mixtures: 40% w/w

Amount used

Annual amount used: up to 2050 ton/y;

Annual amount used at the main local site of use: up to 5 ton/y (EUSES default value for the fraction of the main local source: 0.002).

Frequency and duration of process

Use days per site: 300 day/y (EUSES default value for number emission days)

Environment factors not influences by risk management

Flow rate of receiving surface water (m³/d): 18000 (default value for the standard town)

Other given operational conditions affecting environmental exposure

Process conditions: T = ambient temperature; P= 1 atm. Location: Indoor/Outdoor;

Technical onsite conditions and measures at process level to prevent release and to reduce or limit discharges, air emissions and releases to soil

The process should be optimized for highly efficient utilisation of the formulations.

The activities falling under the EU Solvent Emission Directive (1999/13/EC) adopt RMMs to control emission of VOCs (Volatile Organic Compounds) to meet the relevant total emission limit value set out in the Directive:

- use of closed storage facilities for VOC-containing raw materials;
- use of closed transfers of liquids from storage to equipment;
- use of closed application equipment
- use of closed equipment cleaning;
- storage of all VOC-containing wastes in closed, secure containers (bulk tanks, IBCs, drums).

Organisational measures to prevent/limit release from site

Good hygiene practices and housekeeping. An environmental management system should be implemented.

Conditions and measures related to sewage treatment plant

Losses to sewers are treated in the municipal STP.

Size of municipal STP is 2000 m³/d (default size).

Conditions and measures related to treatment of waste

Contaminated solid wastes are collected into containers and sent to external waste disposal facilities.

9.4.1.2 Control of workers exposure: *Use in batch and other process where opportunity for exposure arises (PROCA)*

Activities covered in the contributing exposure scenario:

Use of the formulations in batch processes

Product characteristics:



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Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical concentration in the final mixtures: 40% w/w

Frequency and duration of exposure:

Duration of exposure: > 4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands face (480 cm²) (Default ECETOC TRA model value).

Other given operational conditions affecting workers exposure:

Operational conditions: T= ambient temperature. Location: indoor; Professional settings.

Technical conditions and measures to control dispersion from source towards the workers:

RMMs primarily are aimed at controlling emission of VOCs at source.

General good ventilation and LEV should be provided. Efficiency of LEV (RMM library code: W17.Ex1): 80% (typical default value); 96% (maximum achievable); LEV efficiency assumed by ECETOC TRA Worker model: 80%.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment: gloves, safety glasses, coveralls, safety shoes.

Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).

Half-mask respirator is recommended (APF factor of respiratory protection: 10). (Exposure reduction factor of gloves: 10).

Good hygiene practices and housekeeping.

9.4.1.3 Control of workers exposure: *Mixing or blending for formulation (PROC5)*

Activities covered in the contributing exposure scenario:

Mixing/diluting in the preparatory phase

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical concentration in the final mixtures: 40% w/w

Frequency and duration of exposure:

Duration of exposure: up to 1 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands face (480 cm²) (Default ECETOC TRA model value).

Other given operational conditions affecting workers exposure:

Operational conditions: T= ambient temperature. Location: indoor; Professional settings.

Technical conditions and measures to control dispersion from source towards the workers:

RMMs primarily are aimed at controlling emission of VOCs at source.

General good ventilation and LEV should be provided. Efficiency of LEV (RMM library code: W17.Ex1): 80% (typical default value); 96% (maximum achievable); LEV efficiency assumed by ECETOC TRA Worker model: 80%.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment: gloves, safety glasses, coveralls, safety shoes.

Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium



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concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).
Half-mask respirator is recommended (APF factor of respiratory protection: 10) . (Exposure reduction factor of gloves: 10).
Good hygiene practices and housekeeping.

9.4.1.4 Control of workers exposure: *Non – industrial spraying (PROC11)*

Activities covered in the contributing exposure scenario:

Application of formulation by spraying

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical concentration in the final mixtures: 40% w/w

Frequency and duration of exposure:

Duration of exposure: up to 4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands and forearms (1500 cm²)

Other given operational conditions affecting workers exposure:

Operational conditions: T= ambient temperature. Location: indoor; Professional settings.

Technical conditions and measures to control dispersion from source towards the workers:

RMMs primarily are aimed at controlling emission of VOCs at source. Application by spraying is performed in dedicated spray booths connected to an aspiration system.

General good ventilation and LEV should be provided. Efficiency of LEV (RMM library code: W17.Ex1): 80% (typical default value); 96% (maximum achievable); LEV efficiency assumed for assessment: 90%

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment: gloves, safety glasses, coveralls, safety shoes.

Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).

Half-mask respirator is recommended (APF factor of respiratory protection: 20) . (Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).

Good hygiene practices and housekeeping.

9.4.1.5 Control of workers exposure: *Treatment of articles by dipping and pouring (PROC13)*

Activities covered in the contributing exposure scenario:

Application of formulation by dipping

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical concentration in the final mixtures: 40% w/w

Frequency and duration of exposure:

Duration of exposure: up to 4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands face (480 cm²) (Default ECETOC TRA model value).



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Other given operational conditions affecting workers exposure:

Operational conditions: T= ambient temperature. Location: indoor; Professional settings.

Technical conditions and measures to control dispersion from source towards the workers:

RMMs primarily are aimed at controlling emission of VOCs at source. Degreasing and cleaning of equipments and parts of them are performed through automated/semi-automated washing machines, connected to an aspiration system. General good ventilation and LEV should be provided. Efficiency of LEV (RMM library code: W17.Ex1): 80% (typical default value); 96% (maximum achievable); LEV efficiency assumed by ECETOC TRA Worker model: 80%.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment: gloves, safety glasses, coveralls, safety shoes.

Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).

Half-mask respirator is recommended (APF factor of respiratory protection: 20) . (Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).

Good hygiene practices and housekeeping.

9.4.1.6 Control of workers exposure: Roller application or brushing (PROC10)**Activities covered in the contributing exposure scenario:**

Application of formulation by brush or roll

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical concentration in the final mixtures: 40% w/w

Frequency and duration of exposure:

Duration of exposure: up to 4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands (960 cm²) (Default ECETOC TRA model value).

Other given operational conditions affecting workers exposure:

Operational conditions: T= ambient temperature. Location: indoor; Professional settings.

Technical conditions and measures to control dispersion from source towards the workers:

RMMs primarily are aimed at controlling emission of VOCs at source.

General good ventilation and LEV should be provided. Efficiency of LEV (RMM library code: W17.Ex1): 80% (typical default value); 96% (maximum achievable); LEV efficiency assumed by ECETOC TRA Worker model: 80%.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment: gloves, safety glasses, coveralls, safety shoes.

Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).

Half-mask respirator is recommended (APF factor of respiratory protection: 20) . (Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).

Good hygiene practices and housekeeping.



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9.4.1.7 Control of workers exposure: *Hand-mixing with intimate contact and only PPE available (PROC19)*

Activities covered in the contributing exposure scenario:

Manual mixing of small quantities of formulations

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical concentration in the final mixtures: 40% w/w. Due to the small quantities manually mixed, a concentration as 5-25% was considered.

Frequency and duration of exposure:

Duration of exposure: up to 1 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands (1980 cm²) (Default ECETOC TRA model value).

Other given operational conditions affecting workers exposure:

Operational conditions: T= ambient temperature. Location: indoor; Professional settings.

Technical conditions and measures to control dispersion from source towards the workers:

General good ventilation and LEV should be provided. Efficiency of LEV (RMM library code: W17.Ex1): 80% (typical default value); 96% (maximum achievable); LEV efficiency assumed by ECETOC TRA Worker model: 80%.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment: gloves, safety glasses, coveralls, safety shoes.

Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).

Half-mask respirator is recommended (APF factor of respiratory protection: 10) . (Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).

Good hygiene practices and housekeeping.

9.4.1.8 Control of workers exposure: *Transfer of the substance/mixtures from/to vessel to/from large containers at non-dedicated facilities (PROC8a)*

Activities covered in the contributing exposure scenario:

Loading/unloading operations

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical concentration in the final mixtures: 40% w/w

Frequency and duration of exposure:

Duration of exposure: up to 1 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands (960 cm²) (Default ECETOC TRA model value).

Other given operational conditions affecting workers exposure:

Operational conditions: T= ambient temperature. Location: indoor; Professional settings.

Technical conditions and measures to control dispersion from source towards the workers:

RMMs primarily are aimed at controlling emission of VOCs at source.

General good ventilation and LEV should be provided. Efficiency of LEV (RMM library code: W17.Ex1): 80%



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(typical default value); 96% (maximum achievable); LEV efficiency assumed by ECETOC TRA Worker model: 80%.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment: gloves, safety glasses, coveralls, safety shoes.

Gloves materials and specifications: in case of long-term contact and mixtures at high concentrations, fluoroelastomer gloves (thickness: 0.5-1.5 mm; typical breakthrough time: > 240 min); in case of mixtures at low-medium concentrations, neoprene gloves (thickness: 0.75 mm; typical breakthrough time: 60-120 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).

Half-mask respirator is recommended (APF factor of respiratory protection: 20) . (Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 10).

Good hygiene practices and housekeeping.

9.5 Exposure Scenario 5: USE OF FORMULATIONS - Consumer use

Sector of use:

SU21 (Consumers uses)

Market sector:

PC0 (UCN code: R10100): Degreasers

PC35: Washing and cleaning products;

PC9a: Coatings and paints, thinners, paint removers;

PC1: Adhesives, sealants

Environment:

Wide dispersive indoor use of processing aids in open system (ERC8a)

Wide dispersive outdoor use of processing aids in open system (ERC8d)

9.5.1 Exposure Scenario

Description of activities covered in the exposure scenario:

Mixtures containing 1,2-dichloropropane are used by consumers as degreasers/cleaning products and solvents/thinners for painting products; and, to a lesser extent, as solvent in glues and adhesives, stain removers for fabric and paint removers.

The exposure scenario includes mixing/diluting in the preparatory phase, application by brush or cloth and by spraying.

9.5.1.1 Control of environmental exposure: *Wide dispersive indoor/outdoor use of processing aids in open system (ERC 8a/8d)*

Product characteristics

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical concentration of substance in the final mixtures: 40% w/w

Amount used

Annual amount used: up to 250 ton/y;

Annual amount used at the main local site of use: up to 0.5 ton/y (EUSES default value for the fraction of the main



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local source: 0.002).

Frequency and duration of process

Use days per site: 365 day/y (EUSES default value for number emission days)

Environment factors not influences by risk management

Flow rate of receiving surface water (m³/d): 18000 (default value for the standard town)

Other given operational conditions affecting environmental exposure

Process conditions: T = ambient temperature; P= 1 atm. Location: Indoor/Outdoor;

Conditions and measures related to sewage treatment plant

Losses to sewers are treated in the municipal STP.

Size of municipal STP is 2000 m³/d (default size).

Conditions and measures related to treatment of waste

Contaminated solid wastes should be collected into dedicated containers for urban waste.

9.5.1.2 Control of consumers exposure: *Use of degreasers (UCN code R10100)*

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical concentration of substance in the mixtures: <40% w/w

Amount product used per application:

100 ml/event (90 g/event; typical product density: 0.9 g/ml)

Frequency of exposure:

Infrequent use (between once a month and once every 6 month).

ECETOC TRA default factor for infrequent use: 0.04

Duration of exposure:

Exposure time: 1 hr

Human factor not influenced by risk management:

Body parts potentially exposed: fingertips (35.7 cm²)

Other given operational conditions affecting consumers exposure:

Application by brush or cloth.

Location: outdoor (air exchanges per hour: 2.5; room volume: 100 m²); indoor with good home ventilation (air exchanges per hour: 6; room volume: 20 m²).

Conditions and measures related to information and behavioural advice to consumers:

Instruction for safe handling (e.g. Keep in a cool, well-ventilated place; Keep away from sources of ignition; Use only in a well-ventilated place; Avoid contact with skin and eyes; Do not empty into drains) are communicated on the label and in the instruction of use or in the leaflet available to consumers.

9.5.1.3 Control of consumers exposure: *Use of solvent/thinner for painting products (PC9a)*

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical concentration of substance in the final mixtures, after dilution: <8% w/w

Amount product used per application:

1300 g/event for application by brush; 300 g/event for application by spraying

Frequency of exposure:

Infrequent use (between once a month and once every 6 month). ECETOC TRA default factor for Infrequent use: 0.04

Duration of exposure:

Exposure time: 2 hr for application by brush; 20 minutes for application by spraying



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Human factor not influenced by risk management:

Body parts potentially exposed: inside hands / one hand / palm of hands (428,75 cm²) for application by brush; fingertips (35.7 cm²) for application by spraying

Other given operational conditions affecting consumers exposure:

Application by brush or spray can.

Location: outdoor (air exchanges per hour: 2.5; room volume: 100 m²)

Conditions and measures related to information and behavioural advice to consumers:

Instruction for safe handling (e.g. Keep in a cool, well-ventilated place; Keep away from sources of ignition; Use only in a well-ventilated place; Avoid contact with skin and eyes; Do not empty into drains) are communicated on the label and in the instruction of use or in the leaflet available to consumers.

9.5.1.4 Control of consumers exposure: Use of glues and adhesives (PCI)**Product characteristics:**

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Typical concentration of substance in the final mixtures, after dilution: < 8% w/w

Amount product used per application:

9 g/event

Frequency of exposure:

Occasional use (between once a week and once a month). ECETOC TRA default factor for Infrequent use: 0.2

Duration of exposure:

Exposure time: 20 minutes

Human factor not influenced by risk management:

Body parts potentially exposed: fingertips (35.7 cm²)

Other given operational conditions affecting consumers exposure:

Location: indoor (air exchanges per hour: 0.6; room volume: 20 m²).

Conditions and measures related to information and behavioural advice to consumers:

Instruction for safe handling (e.g. Keep in a cool, well-ventilated place; Keep away from sources of ignition; Use only in a well-ventilated place; Avoid contact with skin and eyes; Do not empty into drains) are communicated on the label and in the instruction of use or in the leaflet available to consumers.

9.5.1.5 Control of consumers exposure: Use of stain removers for fabric (PC35)**Product characteristics:**

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Concentration of substance in the final mixture: < 15% w/w

Amount product used per application:

5 g/event

Frequency of exposure:

Infrequent use (between once a month and once every 6 month). ECETOC TRA default factor for Infrequent use: 0.04

Duration of exposure:

Exposure time: 20 minutes

Human factor not influenced by risk management:

Body parts potentially exposed: fingertips (35.7 cm²)

Other given operational conditions affecting consumers exposure:

Location: indoor (air exchanges per hour: 0.6; room volume: 20 m²).

Conditions and measures related to information and behavioural advice to consumers:

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Instruction for safe handling (e.g. Keep in a cool, well-ventilated place; Keep away from sources of ignition; Use only in a well-ventilated place; Avoid contact with skin and eyes; Do not empty into drains) are communicated on the label and in the instruction of use or in the leaflet available to consumers.

9.5.1.6 Control of consumers exposure: *Use of paint removers (PC9a)*

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Concentration of substance in the final mixture: < 90% w/w

Amount product used per application:

250 g/event

Fraction of the product released during the application:

An inhalation transfer fraction as 0.8 is considered. Paint removers are viscous liquids or gels formulations with slow evaporation rate. These products are applied on the surfaces to treat, left to work for about 20 minutes and removed.

Frequency of exposure:

Very infrequent (no more than once in 6 month). ECETOC TRA default factor for Infrequent use: 0.01

Duration of exposure:

Exposure time: 1 hr

Human factor not influenced by risk management:

Body parts potentially exposed: fingertips (35.7 cm²)

Other given operational conditions affecting consumers exposure:

Application by brush.

Location: outdoor (air exchanges per hour: 2.5; room volume: 100 m³); indoor with good home ventilation (air exchanges per hour: 6; room volume: 20 m³).

Conditions and measures related to information and behavioural advice to consumers:

Instruction for safe handling (e.g. Keep in a cool, well-ventilated place; Keep away from sources of ignition; Use only in a well-ventilated place; Avoid contact with skin and eyes; Do not empty into drains) are communicated on the label and in the instruction of use or in the leaflet available to consumers.

Conditions and measures related to personal protection, hygiene and health evaluation:

Protective gloves (e.g. nitrile rubber gloves) are recommended.

9.6 Exposure Scenario 6: USE AS INTERMEDIATE

Sector of use:

SU3 (Industrial use):

SU8: Manufacture of bulk, large scale chemicals

SU9: Manufacture of fine chemicals

Market sector:

PC19: Intermediate

Environment:

Industrial use resulting in manufacture of another substance (ERC6a)

Workers:

Use in closed process, no likelihood of exposure (PROC1)

Use in closed, continuous process with occasional controlled exposure (PROC2)



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Transfer of substance from vessel to large containers at dedicated facilities (PROC8b)

9.6.1 Exposure Scenario

Description of activities and processes covered in the exposure scenario:

1,2-Dichloropropane is used as an intermediate to produce perchloroethylene and several other related chlorinated chemicals. All the process stages are performed in closed systems.

The exposure scenario includes monitoring activities of the process, transfer and maintenance operations.

9.6.1.1 Control of environmental exposure: Industrial use resulting in manufacture of another substance (ERC6a)

Product characteristics

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Concentration of substance in the manufactured product: up to 100% w/w.

Amount used

Annual amount used: 10 ton/y

Annual amount used per site: up to 6.5 ton/y (EUSES default value for the fraction of the main local source: 0.65).

Frequency and duration of manufacturing

Production days per site: 240 day/y. (EUSES default value for emission days)

Other given operational conditions affecting environmental exposure

Process conditions: temperature not > 20°C above ambient temperature; Location: Indoor; Industrial settings.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Closed system (COSHH essentials Control Approach 3: Containment).

The substance is used and handled under strictly controlled conditions: all process stages are performed in closed systems. The substance is rigorously contained by technical control measures during its whole use process, including purification, cleaning, maintenance of the equipment, sampling, analysis, loading and unloading of equipment, vessels, waste disposal and storage.

No wastewater and air emissions containing the substance arise from the process; wastes from distillation phase are sent to incineration plants.

Conditions and measures related to sewage treatment plant

No wastewater containing the substance arises from the process.

Conditions and measures related to treatment of waste

Wastes from distillation phase are incinerated at dedicated plants.

9.6.1.2 Control of worker exposure: Use in closed process, no likelihood of exposure (PROCI)

Activities covered in the contributing exposure scenario

Monitoring activities during the use process; maintenance operations.

Product characteristics

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Concentration of substance in the manufactured product: up to 100% w/w.

Frequency and duration of exposure:

Duration of exposure > 4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: one hand face only (240 cm²) (Default ECETOC TRA model value)

Other given operational conditions affecting workers exposure:



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Temperature not > 20°C above ambient temperature. Location: indoor; Industrial setting.

Technical conditions and measures to control dispersion from source towards the workers:

Closed system (COSHH essentials Control Approach 3: Containment).

The substance is handled under strictly controlled conditions: all process stages are performed in closed systems. The substance is rigorously contained by technical control measures during its whole use process, including purification, cleaning, maintenance of the equipment, sampling, analysis, loading and unloading of equipment, vessels, waste disposal and storage.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Only properly trained and authorized personnel handle the mixtures; handling procedures are well documented and strictly supervised by trained operators.

For cleaning and maintenance operations, special procedures such as purging and washing are applied before the system is opened.

In cases of accident and where wastes are generated, procedural and/or control technologies are used to minimize emissions and exposure of workers.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment are recommended: gloves, safety glasses, coveralls, safety shoes, helmet.

Gloves materials and specifications: Viton fluoroelastomer gloves (thickness: 0.3-0.71 mm; typical breakthrough time: 480 min) or PVA gloves (thickness: 0.3 mm; typical breakthrough time: 360 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min). (Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20). Good hygiene practices and housekeeping.

9.6.1.3 Control of worker exposure: *Use in closed, continuous process with occasional controlled exposure (PROC2)*

Activities covered in the contributing exposure scenario

Monitoring activities during the use process; maintenance operations.

Product characteristics

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Concentration of substance in the manufactured product: up to 100% w/w.

Frequency and duration of exposure:

Duration of exposure > 4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: one hand face only (240 cm²) (Default ECETOC TRA model value)

Other given operational conditions affecting workers exposure:

Temperature not > 20°C above ambient temperature. Location: indoor; Industrial setting.

Technical conditions and measures to control dispersion from source towards the workers:

Closed system (COSHH essentials Control Approach 3: Containment).

The substance is handled under strictly controlled conditions: all process stages are performed in closed systems. The substance is rigorously contained by technical control measures during its whole use process, including purification, cleaning, maintenance of the equipment, sampling, analysis, loading and unloading of equipment, vessels, waste disposal and storage.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Only properly trained and authorized personnel handle the mixtures; handling procedures are well documented and strictly supervised by trained operators.

For cleaning and maintenance operations, special procedures such as purging and washing are applied before the



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system is opened.

In cases of accident and where wastes are generated, procedural and/or control technologies are used to minimize emissions and exposure of workers.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment are recommended: gloves, safety glasses, coveralls, safety shoes, helmet.

Gloves materials and specifications: Viton fluoroelastomer gloves (thickness: 0.3-0.71 mm; typical breakthrough time: 480 min) or PVA gloves (thickness: 0.3 mm; typical breakthrough time: 360 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).

(Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).

Good hygiene practices and housekeeping.

9.6.1.4 Control of workers exposure: *Transfer of the substance from vessel to large containers at dedicated facilities (PROC8b)*

Activities covered in the contributing exposure scenario: unloading/loading operations

Product characteristics:

Physical state of the substance: liquid (medium volatility: 66.2 hPa at 25°C)

Concentration of substance in the manufactured product: ≤100% w/w.

Frequency and duration of exposure:

Duration of exposure >4 hr/day.

Human factor not influenced by risk management:

Body parts potentially exposed: two hands (960 cm²) (Default ECETOC TRA model value)

Other given operational conditions affecting workers exposure:

Temperature not > 20°C above ambient temperature. Location: indoor; Industrial setting.

Technical conditions and measures to control dispersion from source towards the workers:

COSHH essentials Control Approach 3: Containment (Reduction efficiency: 99%).

The substance is rigorously contained by technical control measures during its whole production process, including loading and unloading of equipment, vessels, waste disposal and storage. Transfer operations occurs via dedicated pipelines.

Organizational measures to prevent/limit releases, dispersion and exposure:

Regular training of workers and consequent supervision.

Only properly trained and authorized personnel handle the mixtures; handling procedures are well documented and strictly supervised by trained operators.

Conditions and measures related to personal protection, hygiene and health evaluation:

Personal protective equipment are recommended: gloves, safety glasses, coveralls, safety shoes, helmet

Gloves materials and specifications: Viton fluoroelastomer gloves (thickness: 0.3-0.71 mm; typical breakthrough time: 480 min) or PVA gloves (thickness: 0.3 mm; typical breakthrough time: 360 min); in case of short-term contact, nitrile gloves (thickness: 0.2-0.38 mm; typical breakthrough time: 10-30 min).

(Exposure reduction factor of gloves in combination with specific activity training assumed in the assessment: 20).

Good hygiene practices and housekeeping.



This information only concerns the above mentioned product and does not need to be valid if used with other product(s) or in any process. The information is to our best present knowledge correct and complete and is given in good faith but without warranty. It remains the user's own responsibility to make sure that the information is appropriate and complete for his special use of this product.

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